

# Notes to the Consolidated Financial Statements

## General Disclosures

### (1) Company information

These consolidated financial statements for the year ended December 31, 2021, were prepared for MERCK Kommanditgesellschaft auf Aktien (Merck KGaA), Frankfurter Strasse 250, 64293 Darmstadt, Germany, entered in the commercial register of the Darmstadt Local Court under HRB 6164. The ultimate parent company of the Group is the parent company of Merck KGaA, Darmstadt, Germany, E. Merck Kommanditgesellschaft (E. Merck KG), Darmstadt, Germany. The consolidated financial statements of E. Merck KG, Darmstadt, Germany, can be accessed at [www.bundesanzeiger.de](http://www.bundesanzeiger.de). Shares in Merck KGaA, Darmstadt, Germany, are traded on the regulated market on the Frankfurt Stock Exchange and other exchanges.

### (2) Reporting principles

These consolidated financial statements have been prepared in accordance with the International Financial Reporting Standards (IFRS) effective at the end of the reporting period and adopted by the European Union and the additional provisions of section 315e of the German Commercial Code (HGB). The fiscal year is the calendar year. These consolidated financial statements have been prepared in euros, the reporting currency. The values presented in the consolidated financial statements have been rounded. This may lead to individual values not adding up to the totals presented.

The Executive Board of Merck KGaA, Darmstadt, Germany, prepared these consolidated financial statements on February 15, 2022, and approved them to be forwarded to the Supervisory Board. The Supervisory Board is responsible for examining the consolidated financial statements and declaring whether it approves them.

The German Corporate Governance Code declaration (declaration of conformity) in accordance with section 161 of the German Stock Corporation Act (Aktiengesetz) was issued and made available to the Group's shareholders. It can be viewed in the corporate governance section at <https://www.emdgroup.com/en/investors.html>.

The accounting and measurement policies used in the consolidated financial statements are presented in the following Notes and are indicated there.

### Amendments to standards effective for the first time in fiscal 2021

The following regulations are binding as of fiscal 2021:

- Amendment to IAS 39 "Financial Instruments: Recognition and Measurement"
- Amendments to IFRS 4 "Insurance Contracts"
- Amendment to IFRS 7 "Financial Instruments: Disclosures"
- Amendment to IFRS 9 "Financial Instruments"
- Amendment to IFRS 16 "Leases"

The regulations listed had no material impact on the consolidated financial statements.

### Standards and amendments to standards effective for the first time from fiscal 2022 and 2023

The following regulations are binding as of fiscal 2022:

- Amendment to IAS 16 “Property, Plant, and Equipment”
- Amendment to IAS 37 “Provisions, Contingent Liabilities, and Contingent Assets”
- Amendment to IFRS 3 “Business Combinations”
- Amendment to IFRS 16 “Leases”
- Annual Improvements to IFRS 2018-2020 Cycle

The following regulations are binding as of fiscal 2023:

- IFRS 17 “Insurance Contracts”
- Amendment to IFRS 17 “Insurance Contracts”

We did not opt for early application of any of these regulations.

The impact of IFRS 17 “Insurance Contracts” on Merck Re S.A., Luxembourg, a fully consolidated subsidiary of Merck KGaA, Darmstadt, Germany, is currently being investigated. Based on the information currently available, however, IFRS 17 is not expected to have a material impact on the net assets, financial position, and results of operations of the Group. Furthermore, none of the other changes are expected to have a material impact on the consolidated financial statements.

### Regulations published but not yet endorsed by the European Union

As of the balance sheet date, the following regulations were published by the IASB but not yet endorsed by the European Union:

- Amendment to IAS 1 “Presentation of Financial Statements”
- Amendment to IAS 8 “Accounting Policies, Changes in Accounting Estimates, and Errors”
- Amendment to IAS 12 “Income Taxes”
- Amendment to IFRS 17 “Insurance Contracts”

From today’s perspective, the new regulations are not expected to have any material effects on the consolidated financial statements.

### Change in reporting of non-current income tax receivables and income tax liabilities

To improve comparability, the Group amended the reporting of non-current income tax receivables and income tax liabilities in fiscal 2021 and restated the prior-period figures accordingly.

Non-current assets now also include “Non-current income tax receivables”. As of January 1, 2020, € 11 million was reclassified from other non-current non-financial assets in this context.

Non-current liabilities now also include “Non-current income tax liabilities”. There were no non-current income tax liabilities as of January 1, 2020, meaning that the change in reporting did not require any reclassifications as of this date.

## Accounting and measurement policies

### Currency translation

#### Functional currency

To a predominant extent, the subsidiaries of Merck KGaA, Darmstadt, Germany, conduct their business independently so that the functional currency is normally the respective local currency.

Some subsidiaries, particularly in the Electronics business sector, use the U.S. dollar as their functional currency rather than the local currency.

#### Transactions in non-functional currency

When the financial statements of consolidated companies are prepared, business transactions that are conducted in currencies other than the functional currency are translated using the exchange rate on the date of the transaction.

#### Translation of financial statements into the reporting currency (euro)

The financial statements of consolidated companies not using the euro as their functional currency are translated into the reporting currency, the euro. Assets and liabilities are measured at the closing rate while income and expenses are translated at average monthly rates. Any currency translation differences arising during consolidation of Group companies are recognized in equity.

#### Hyperinflation

Since 2018, Argentina's economy has been classified as hyperinflationary in accordance with IAS 29 "Financial Reporting in Hyperinflationary Economies". Accordingly, business activities in Argentina are no longer reported at historical cost but are presented adjusted for inflation. For this purpose, the Group uses a combination of the wholesale index IPIM (Índice de precios internos al por mayor) and the consumer price index IPC (Índice de precios al consumidor). The index applied stood at 7,396.8 as of the balance sheet date (December 31, 2020: 4,896.2/January 1, 2020: 3,722.0). The loss on the net monetary position is recognized under remaining other operating expenses in "Other operating expenses".

After adjusting the amounts for inflation, the balance sheet items and income and expenses are translated into the reporting currency, the euro, at the closing rate in accordance with IAS 21.42. Prior-year comparative figures are not restated.

#### Exchange rates of most significant currencies

The exchange rates of the most significant currencies in these consolidated financial statements were as follows:

€ 1 =	Average rate		Closing rate	
	2021	2020	Dec. 31, 2021	Dec. 31, 2020
Chinese renminbi (CNY)	7.634	7.872	7.206	8.000
Japanese yen (JPY)	129.848	121.756	130.189	126.801
Swiss franc (CHF)	1.081	1.070	1.034	1.083
South Korean won (KRW)	1,353.475	1,344.968	1,345.493	1,336.094
Taiwan dollar (TWD)	33.062	33.589	31.285	34.548
U.S. dollar (USD)	1.183	1.141	1.131	1.230

### (3) Discretionary decisions and sources of estimation uncertainty

#### Dealing with discretionary decisions and sources of estimation uncertainty

The preparation of the consolidated financial statements requires the Group to make discretionary decisions and assumptions as well as estimates to a certain extent. The discretionary scope and estimation uncertainty are assessed in a Group-specific manner. Discretion describes the need to make assumptions concerning recognition or measurement. Estimation uncertainty is determined by the degree of availability and reliability of historical experience and external data for future developments.

#### Increased uncertainty due to the Covid-19 pandemic

The Group is continuously examining the impact of the Covid-19 pandemic on its business and the resulting effects for the Group's accounting. Despite a temporary downturn in net sales in 2020, the Group's diversified business model has proven to be largely robust during the pandemic to date. Most notably, the high level of demand for the products and services of the Life Science business sector – and the Process Solutions business unit in particular – resulted in significant sales and earnings growth in the reporting period. Business development in the Electronics business sector is also benefiting from the acceleration of the digitalization trend as a result of the Covid-19 pandemic and the consequent growth in demand for semiconductor materials. As in the previous year, the positive course of business and current business planning gave no grounds to suggest that the going concern assumption should not have been applied in preparing the consolidated financial statements.

Although the degree of estimation uncertainty has decreased compared with the previous year, it remains greater than usual because the pandemic situation is still developing dynamically and having a corresponding impact on global macroeconomic performance.

#### Increased uncertainty due to climate risks

As a globally active science and technology group, the Group is subject to transition-related and physical climate risks that could have a potentially negative impact on its net assets, financial position, and results of operations and lead to increased estimation uncertainty in its accounting. Physical climate risks describe the risks of longer-term changes in the general climatic conditions, while transition-related climate risks describe the consequences for companies as a result of the transition to a sustainable economic system.

The Group has set itself the goal of reducing its direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions by 50% in the period from 2020 to 2030. This will be achieved by lowering process-related emissions, implementing energy efficiency measures, and increasingly purchasing electricity from renewable sources. The Group also plans to reduce the indirect emissions along the entire value chain (Scope 3) by 1,500 metric kilotons of CO<sub>2</sub> equivalents by 2030 and to achieve climate-neutral business operations along the entire value chain by 2040. In November 2021, the Group also decided to sign up to the Science Based Targets Initiative, meaning it has committed to contribute to the achievement of the Paris Agreement goals through specific actions.

The most significant transition-related climate risks to the net assets, financial position, and results of operations are in the Electronics business sector, which is responsible for well in excess of half of the Group's direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions. The majority of the greenhouse gas emissions in this business sector take the form of process-related emissions resulting from the production of specialty gases for the semiconductor and electronics industries. In order to achieve the climate goals it has adopted, the Group intends to reduce the emissions in its business with these specialty gases by making technological improvements to the production process in particular. Based on the information currently available, the implementation of the Group's sustainability strategy is not expected to result in a significant decline in net sales in this business. There have been no indications of impairment of the assets concerned to date, nor has it been necessary to adjust their remaining useful lives.

## Overview of significant discretionary decisions and sources of estimation uncertainty

The accounting matters with the most significant discretionary decisions as well as the most comprehensive assumptions relating to the future and sources of estimation uncertainty are described below:

Accounting matter	Carrying amount as of Dec. 31, 2021 in € million	IFRS	Discretionary scope/estimation uncertainty	Sensitivity analysis	Note
<b>Goodwill</b>	17,004			yes	18
Determination of recoverable amount		IAS 36	high		
<b>Other intangible assets</b>	7,612			yes	6, 19
Identification and measurement of intangible assets within the scope of business combinations		IFRS 3	high		
In-licensing of intangible assets		IAS 38	medium		
Determination of amortization		IAS 38	medium		
Identification of impairments or reversal of impairments		IAS 36	high		
<b>Property, plant, and equipment</b>	7,217			no	20
Determination of depreciation		IAS 16	medium		
Identification of impairments or reversal of impairments		IAS 36	medium		
<b>Leases</b>	447			yes	21
Recognition and measurement of lease arrangements		IFRS 16	medium		
<b>Inventories</b>	3,900			no	24
Identification of impairments or reversal of impairments		IAS 2	medium		
<b>Trade and other receivables</b>	3,646			no	25, 42
Determination of loss allowance		IFRS 9	medium		
<b>Other financial assets</b>				yes	36, 43
Determination of fair values of contingent considerations	271	IFRS 13	high		
Determination of fair values of equity instruments	462	IFRS 9, IFRS 13	medium		
<b>Provisions for employee benefits</b>				yes	33
Determination of present value of defined-benefit obligations	5,995	IAS 19	medium		
Determination of parameters for the valuation of fair values of share-based payment programs	348	IFRS 2	medium		
<b>Other provisions and contingent liabilities</b>	647			no	27, 28
Recognition and measurement of other provisions and contingent liabilities		IAS 37	high		
<b>Revenue recognition</b>				yes	9
Measurement of sales deductions and refund liabilities	839	IFRS 15	high		
<b>Income tax</b>				no	15
Recognition and measurement of income tax liabilities	1,462	IAS 12	high		
Recognition and measurement of deferred taxes from temporary differences		IAS 12	medium		
Recognition of deferred tax assets from tax loss carryforwards	11	IAS 12	high		

#### (4) Subsequent events

The acquisition of Chord Therapeutics SA, Switzerland, was closed on January 31, 2022. See Note (6) "[Acquisitions and divestments](#)" for further information.

On January 19, 2022, the Group exercised an early repayment option and repaid a USD bond with a nominal value of USD 1 billion (€ 883 million) ahead of schedule. The bond was originally set to mature on March 19, 2022.

On February 7, 2022, the Group announced a change in the organizational structure of the Life Science business sector effective April 1, 2022. The existing contract development and manufacturing services and testing services, together with the respective sales and marketing, research and development, manufacturing, and supply chain functions, will be consolidated in the new Life Science Services business unit. Additionally, the existing Research Solutions and Applied Solutions business units will be combined to form the Science and Lab Solutions business unit, which will act as a third pillar alongside Process Solutions and Life Science Services.

Subsequent to the balance sheet date, no further events of special importance occurred that could have a material impact on the net assets, financial position, or results of operations.

# Group Structure

## (5) Changes in the scope of consolidation

### Accounting and measurement policies

#### Scope of consolidation

Immaterial subsidiaries are not included in consolidation but are instead reported in non-current financial assets (see Note (36) "[Other financial assets](#)").

The scope of consolidation changed as follows in the reporting period:

<b>Fully consolidated companies as of Dec. 31, 2020</b>		<b>326</b>
Additions	Companies established	1
	Acquisitions	-
	Materiality	4
Retirements	Liquidations/mergers	-5
	Divestments	-
	Immateriality	-1
	Loss of control	-
<b>Fully consolidated companies as of Dec. 31, 2021</b>		<b>325</b>
Subsidiaries rated at-equity as of Dec. 31, 2020		1
Subsidiaries rated at-equity as of Dec. 31, 2021		2
Non-consolidated subsidiaries as of Dec. 31, 2020		33
Non-consolidated subsidiaries as of Dec. 31, 2021		36

The list of non-consolidated subsidiaries mainly comprises non-operating shelf companies as well as entities subject to liquidation procedures, which were subsequently measured at fair value through other comprehensive income. Overall, the impact of subsidiaries not consolidated due to immateriality on net sales, profit after tax, assets, and equity was less than 1% relative to the entire Group. The two companies accounted for using the equity method are Syntropy Technologies LLC, United States, and MM Domain Holdco Limited, United Kingdom. In addition, there are two joint operations (Hydrochlor, LLC, United States, and Showa Denko Versum Materials 2 Co., Ltd., Japan) as referred to by IFRS 11. The joint operations are immaterial to the presentation of the financial position and financial performance, both individually and in aggregate. The effects of the existing contractual arrangements also have no potentially significant effect in these contexts.

The list of shareholdings presents all of the companies included in the consolidated financial statements as well as all of the shareholdings of Merck KGaA, Darmstadt, Germany (see Note (48) "[List of shareholdings](#)").

## (6) Acquisitions and divestments

### Accounting and measurement policies

#### Business combinations

The balance sheet items goodwill, other intangible assets, and deferred taxes are significantly influenced by purchase price allocations conducted within the scope of business combinations. As observable market prices are mostly not available for the acquired other intangible assets, the Group regularly relies on the expertise of external professionals when it comes to business combinations. The following overview shows the methods typically used to measure intangible assets within the scope of purchase price allocations:

	Measurement method for determining fair value
Customer relationships	Multi period excess earnings method
Technology	Relief from royalty method
Trademark	Relief from royalty method

Results from foreign currency hedging of expected business combinations, if they meet the requirements for hedge accounting, are offset against the carrying value of the net assets acquired.

Where management considers it to be appropriate, the optional concentration test set out in IFRS 3.B7B is applied in individual transactions. This makes it easier to determine whether a transaction constitutes a business combination or the acquisition of an individual asset or a group of similar assets.

### Significant discretionary decisions and sources of estimation uncertainty

#### Business combinations

In particular, estimation uncertainty and discretionary decisions in conjunction with purchase price allocation relate to:

- planning of future cash flows,
- the customer churn rate, which indicates how existing customer relationships will change in the future,
- the license rate for technologies, which estimates royalty savings on the basis of comparable transactions of similar technologies,
- the discount factor, which is applied for maturity- and risk-based discounting of expected cash inflows, and
- the useful life and the degree of technical obsolescence which depend, among other things, on assumptions about technological developments.

#### Divestments

The assessment as to when a non-current asset, disposal group, or discontinued operation meets the prerequisites of IFRS 5 for classification as “held for sale” is subject to discretionary judgment. Even in the case of an existing management decision to review a disposal, an uncertain assessment has to be made as to the probability of whether a corresponding disposal will occur during the year.



## Planned acquisitions in the fiscal year

### Planned acquisition of Chord Therapeutics SA, Switzerland

On December 20, 2021, the Group announced the conclusion of an agreement to acquire Chord Therapeutics SA, Switzerland, a biotech company specializing in rare neuroinflammatory diseases. It is currently being examined as to whether the acquisition constitutes a business operation when applying the optional concentration test in accordance with IFRS 3. The purchase price was agreed as an upfront cash payment in a double-digit million euro amount plus standard payments for the achievement of future development and sales milestones. The transaction closed on January 31, 2022.

### Planned acquisition of Exelead Inc., United States

On December 30, 2021, the Group signed a definitive agreement for the purchase of all of the shares in Exelead Inc., United States, (Exelead), a biopharmaceutical contract development and manufacturing organization (CDMO), for around USD 780 million (approximately € 690 million) in cash. The transaction is expected to close in the first quarter of 2022 subject to regulatory clearances as well as the satisfaction of other customary closing conditions. Exelead specializes in complex injectable formulations, including the lipid nanoparticles that are key components of mRNA (messenger ribonucleic acid) therapeutics for treating Covid-19 and other indications. The aim of the planned acquisition is for Exelead's capacities and expertise to expand the Group's service range for mRNA contract development and manufacturing, allowing it to provide a fully integrated offering across the entire mRNA manufacturing process. The business will be integrated into the Process Solutions business unit in the Life Science business sector.

## Acquisitions in the previous year

### Acquisition of Resolution Spectra Systems S.A.S., France

On June 30, 2020, the Group completed the acquisition of all of the shares in Resolution Spectra Systems S.A.S., a leading provider of systems for real-time analysis and monitoring of bioprocesses. The acquisition strengthened the Group's bioprocessing product portfolio within the Life Science business sector. The purchase price comprised a fixed compensation of € 4 million and future sales-based milestone payments of up to € 4 million. The purchase price allocation was completed as of December 31, 2020.

### Acquisition of AmpTec GmbH, Hamburg, Germany

On December 22, 2020, the Group acquired all shares in AmpTec GmbH, one of the leading contract development and manufacturing organizations for mRNA (messenger ribonucleic acid).

The deal strengthened the Group's capabilities to develop and manufacture mRNA. The acquisition added to the Group's lipid manufacturing expertise and created an integrated offering across the entire mRNA value chain. The company was integrated into the Process Solutions business unit, which is part of the Life Science business sector. The purchase price comprised a payment of € 7 million and milestone payments of up to € 18 million for the achievement of technological development targets and sales- and profit-based targets. Valuation of the contingent purchase price payments resulted in a purchase price of € 13 million in accordance with IFRS 3. Purchase price allocation was carried out and completed in the course of fiscal 2021. The prior-year figures were not restated for reasons of materiality.

## Divestments in the previous year

### Divestment of the Allergopharma allergy business

On February 19, 2020, the Group signed an agreement to sell its Allergopharma allergy business to Dermapharm Beteiligungs GmbH, Grünwald, Germany. Following regulatory approval and the satisfaction of other customary closing conditions, the transaction closed on March 31, 2020. Allergopharma is a leading provider of specific immunotherapies for type 1 allergies. The transaction encompassed the Allergopharma

business in Europe and Asia, including a wide range of therapeutic and diagnostic products, as well as the production site in Reinbek, Germany. The final purchase price was € 70 million. After deducting the cash transferred, the Group received € 56 million. This was reported in the cash flow statement in cash flows from investment activities in fiscal 2020. The gain on disposal in the amount of € 35 million was reported in other operating income in the consolidated income statement.

In the management's estimation, the conditions for classification as a disposal group within the meaning of IFRS 5 were met only when the agreement on the divestment of the Allergopharma business was signed.

#### **Divestment of Litec-LLL GmbH, Greifswald, Germany**

The Group sold Litec-LLL GmbH on August 31, 2020, as part of a management buyout. The company specializes in lighting materials. The selling price was € 3 million.

## **(7) Collaboration and licensing agreements**

### **Accounting and measurement policies**

#### **Out-licensing agreements**

The Group primarily enters into material out-licensing agreements for intellectual property in the Healthcare business sector. In the vast majority of cases, the granting of a license constitutes a distinct performance obligation that must usually be recognized at a point in time. Due to the uncertainty of development results and regulatory events, contingent consideration is typically recognized when the event in question has occurred. Sales-based and usage-based royalties are recognized when the contract partner makes the corresponding sales or uses the intellectual property. As out-licensing transactions in the Healthcare business sector do not form part of ordinary activities, the corresponding income from upfront payments, milestone payments and royalties is reported in other operating income (see Note (13) "[Other operating income](#)").

#### **In-licensing agreements**

The accounting and measurement policies for the in-licensing of intellectual property are presented in Note (19) "[Other intangible assets](#)".

#### **Collaboration agreements**

In addition to out-licensing agreements for selling intellectual property, the Group enters into collaboration agreements in the Healthcare business sector in which the Group works with partners to develop pharmaceutical drug candidates and, if regulatory approval is granted, to commercialize them. The agreements with Pfizer Inc., United States (Pfizer), in the field of immuno-oncology is the most significant collaboration. The immuno-oncology collaboration with GlaxoSmithKline plc, United Kingdom, on the drug candidate bintrafusp alfa was ended amicably, effective September 30, 2021.

As the partner companies do not have customer characteristics, these collaboration agreements do not fall directly within the scope of IFRS 15, and any income from upfront payments, milestone payments, and royalties is reported under other operating income. Reimbursements of research and development costs made between the collaboration partners are recognized on a net basis in research and development costs. The Group recognizes the consideration received in the course of collaboration agreements for bundled obligations arising from granting rights to intellectual property as well as other goods and services promised as income over the performance period in line with industry practice. Income is caught up cumulatively upon receipt of uncertain future milestone payments attributable to contractual obligations which have already been fulfilled. This refers especially to milestone payments subsequent to regulatory approval. Furthermore, collaboration agreements in the Healthcare business sector typically allocate the net sales generated in specific markets, or with specific products, to the respective collaboration partners in the event of a successful approval; in turn, defined income and expense items are carried by the collaboration partners according to fixed allocation ratios. Under these circumstances, the Group recognizes the net sales from the commercialization of products to third-party

customers, if the Group takes on the role of a principal within the meaning of IFRS 15. Expenses resulting from payments made to collaboration partners in connection with profit share agreements are reported under “Other operating expenses”.

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### Significant discretionary decisions and sources of estimation uncertainty

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#### Collaboration and licensing agreements

As part of the accounting treatment of collaboration and licensing agreements, significant discretionary decisions have to be made in the following areas:

- Identification of an appropriate income recognition method;
- Determination of the appropriate timing of income recognition.

Estimates are to be made especially when it comes to determining the transaction price and progress on the performance obligation.

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#### Strategic alliance with Pfizer Inc., United States, to jointly co-develop and co-commercialize active ingredients in immuno-oncology

On November 17, 2014, the Group formed a global strategic alliance with Pfizer to co-develop and co-commercialize the anti-PD-L1 antibody avelumab. Avelumab received its first regulatory approvals in 2017 under the trade name Bavencio®. The overriding objective of the strategic alliance is to share the development risks and to expand the two companies' presence in immuno-oncology. The execution of the collaboration agreement is not being structured through a separate vehicle. Upon entry into the agreement in 2014, Pfizer made an upfront cash payment of US\$ 850 million (€ 678 million) to the Group, which was recognized in the income statement until the end of 2019. Pfizer also committed to making further payments of up to US\$ 2 billion to the Group subject to the achievement of defined development and commercial milestones.

According to the collaboration agreement, during the development period each company bears one half of the development expenses. In the commercialization phase, the Group recognizes the majority of net sales from the commercialization of Bavencio® while the Group and Pfizer evenly split the net amount of sales less defined expense components. Net sales generated with Bavencio® amounted to € 373 million in the year under review (2020: € 156 million). In fiscal 2021, the Group recognized a high double-digit million euro amount in research and development expenses (2020: low triple-digit million euro amount) and profit transfer expenses of € 159 million (2020: € 63 million). The Group also realized other operating income of € 50 million from the achievement of two approval milestones in fiscal 2021 (2020: no other operating income from the achievement of milestones).

#### End of strategic alliance with GlaxoSmithKline plc, United Kingdom, to co-develop and co-commercialize active ingredients in immuno-oncology

On February 5, 2019, the Group had entered into a global agreement in the field of immuno-oncology with a subsidiary of GSK to co-develop and co-commercialize the drug candidate bintrafusp alfa (formerly M7824). In fiscal 2019, the Group received an upfront payment of € 300 million, which was recognized as deferred income on the balance sheet and presented under other liabilities. The Group recognized the upfront payment as income over time in accordance with the fulfillment of performance obligations existing on the basis of contractual agreements. A cost-based method was used to recognize these payments. According to the collaboration agreement, each company bore one half of the development expenses in the development period.

In the third quarter of 2021, it was amicably decided with GSK to end the agreement on bintrafusp alfa effective September 30, 2021. The decision was based on the clinical study data gathered by that time, and in

particular the results of the INTR@PID Lung 037 study on the first-line treatment of patients with non-small cell lung cancer, which failed to reproduce the promising results of previous studies.

As in the previous year, the Group had recognized research and development costs in a low triple-digit million euro amount in fiscal 2021. This included a mid double-digit million euro amount in expenses for the recognition of provisions for follow-on obligations, which were recognized as a result of the termination of the collaboration in the third quarter of 2021. Furthermore, other operating income of € 123 million was recognized in fiscal 2021 from the reversal in profit or loss of the remainder of the upfront payment that was received from GSK and deferred in 2019 (2020: € 85 million).

### Out-licensing of the rights to a drug candidate in the area of osteoarthritis to Novartis AG, Switzerland, in the previous year

On October 1, 2020, the Group entered into an agreement with Novartis AG, Switzerland (Novartis), on the out-licensing of M6495, a phase II-ready drug candidate for the treatment of osteoarthritis. The Group received an upfront payment of € 50 million and is entitled to potential additional payments of up to € 400 million subject to the achievement of certain sales and development milestones, as well as royalties on future net sales. Novartis will assume full responsibility for the development and commercialization of M6495. The income from the out-licensing of intellectual property in the amount of € 27 million was reported in other operating income in the previous year. There was no further effect on the net assets, financial position, and results of operations in fiscal 2021.

### In-licensing agreement with Debiopharm International SA, Switzerland, on drug candidates for the treatment of head and neck cancer

On March 1, 2021, the Group announced its entry into an in-licensing agreement with Debiopharm International SA, Switzerland (Debiopharm), for the exclusive rights for the development and global commercialization of the drug candidate xevinapant (Debio 1143), and for the development of preclinical follow-on compounds. Xevinapant is currently being investigated in a phase III study for patients with untreated high-risk locally advanced squamous cell carcinoma of the head and neck in combination with platinum-based chemotherapy and standard fractionation intensity-modulated radiotherapy.

The Group made upfront payments of € 188 million in conjunction with the agreement. Moreover, Debiopharm received a right to future milestone payments of up to € 710 million in total, dependent on the achievement of certain development and sales milestones, plus royalties on future net sales. The transaction became effective in April 2021. The upfront cash payment resulted in the recognition of an intangible asset not yet available for use in the amount of € 118 million, an asset under other financial assets for claims for reimbursement in respect of Debiopharm, and a prepayment for future development activities.

### Out-licensing agreement with MoonLake Immunotherapeutics AG, Switzerland, on a drug candidate for the treatment of several inflammatory diseases

On May 3, 2021, the Group announced the conclusion of an out-licensing agreement on sonelokimab (M1095) with the newly founded MoonLake Immunotherapeutics AG, Switzerland (MoonLake). Sonelokimab is an investigational anti-IL-17 A/F Nanobody® that neutralizes both IL-17A and IL-17F in patients with moderate to severe chronic plaque-type psoriasis. MoonLake will assume full responsibility for the research, development, and commercialization of sonelokimab. Under the agreement, the Group will receive an upfront cash payment in a double-digit million euro amount and an equity interest of almost 10% in MoonLake. Depending on the achievement of certain development and sales milestones, the Group is also entitled to future milestone payments up to a mid triple-digit million euro amount, as well as royalties depending on future net sales. The equity instruments received were measured at their fair value on initial recognition. The income from the out-licensing of intellectual property in a low double-digit million euro amount was reported in other operating income.

# Operating Activities

## (8) Segment Reporting

### Accounting and measurement policies

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#### Segment reporting

The internal organizational and reporting structure of the Group forms the basis of the segmentation of its business activity. It is founded on the business models of the business sectors, leading to largely identical risk structures within the segments. Resource allocation and the assessment of business development are performed at the level of the segments by the Executive Board of Merck KGaA, Darmstadt, Germany, as the chief operating decision-maker.

Corporate and Other includes income and expenses, assets, and liabilities, as well as cash flows that cannot be allocated to the reportable segments as they are managed at Group level in central Group functions. Moreover, the column serves the reconciliation to the Group figures. As these are managed at Group level, financial expenses and financial income, which include interest expenses and interest income, as well as income tax expenses and income are also disclosed under Corporate and Other.

Apart from net sales, the success of a segment is mainly determined by EBITDA pre (segment result). EBITDA pre is not defined by the International Financial Reporting Standards, but it is the most important performance indicator for the Group. To permit a better understanding of operational performance, EBITDA pre excludes depreciation and amortization, impairment losses and reversals of impairment losses in addition to specific adjustments presented below.

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## Information by business sector – 2021

€ million	Life Science	Healthcare	Electronics	Corporate and Other	Group
<b>Net sales<sup>1</sup></b>	<b>8,990</b>	<b>7,089</b>	<b>3,608</b>	<b>-</b>	<b>19,687</b>
Intersegment sales	62	-	-	-62	-
<b>Operating result (EBIT)<sup>2</sup></b>	<b>2,479</b>	<b>1,823</b>	<b>509</b>	<b>-632</b>	<b>4,179</b>
Depreciation	767	315	528	103	1,713
Impairment losses <sup>3</sup>	11	19	36	3	68
Reversals of impairment losses	-	-11	-3	-	-14
<b>EBITDA<sup>4</sup></b>	<b>3,257</b>	<b>2,146</b>	<b>1,070</b>	<b>-527</b>	<b>5,946</b>
Adjustments <sup>2</sup>	29	8	58	62	157
<b>EBITDA pre (segment result)<sup>2</sup></b>	<b>3,286</b>	<b>2,153</b>	<b>1,128</b>	<b>-465</b>	<b>6,103</b>
EBITDA pre margin (in % of net sales) <sup>2</sup>	36.6%	30.4%	31.3%	-	31.0%
Assets by business sector	21,917	7,809	10,306	5,329	45,362
Liabilities by business sector	-2,094	-2,807	-720	-18,326	-23,947
Investments in property, plant and equipment <sup>5</sup>	461	350	237	16	1,066
Investments in intangible assets <sup>5</sup>	45	277	19	15	355
Non-cash changes in provisions (according to consolidated cash flow statement) <sup>6</sup>	122	176	5	85	387

<sup>1</sup> Excluding intersegment sales.<sup>2</sup> Not defined by International Financial Reporting Standard (IFRS).<sup>3</sup> Without impairments on financial assets<sup>4</sup> Not defined by International Financial Reporting Standards (IFRS); EBITDA corresponds to operating result (EBIT) adjusted by depreciation, amortization, impairment losses, and reversals of impairment losses.<sup>5</sup> According to the consolidated cash flow statement.<sup>6</sup> Excluding provisions for pensions and other post-employment benefits.

## Information by business sector – 2020

€ million	Life Science	Healthcare	Electronics	Corporate and Other	Group
<b>Net sales<sup>1</sup></b>	<b>7,515</b>	<b>6,639</b>	<b>3,380</b>	<b>-</b>	<b>17,534</b>
Intersegment sales <sup>2</sup>	46	-	-	-46	-
<b>Operating result (EBIT)<sup>3</sup></b>	<b>1,599</b>	<b>1,804</b>	<b>240</b>	<b>-658</b>	<b>2,985</b>
Depreciation	786	324	561	84	1,756
Impairment losses <sup>4</sup>	3	56	123	-	183
Reversals of impairment losses	-	-	-	-	-
<b>EBITDA<sup>5</sup></b>	<b>2,387</b>	<b>2,184</b>	<b>925</b>	<b>-573</b>	<b>4,923</b>
Adjustments <sup>3</sup>	18	83	99	78	279
<b>EBITDA pre (segment result)<sup>3</sup></b>	<b>2,405</b>	<b>2,267</b>	<b>1,024</b>	<b>-495</b>	<b>5,201</b>
EBITDA pre margin (in % of net sales) <sup>3</sup>	32.0%	34.1%	30.3%	-	29.7%
Assets by business sector	20,145	7,358	9,735	4,558	41,796
Liabilities by business sector	-1,589	-2,494	-666	-20,030	-24,780
Investments in property, plant and equipment <sup>6</sup>	653	480	230	49	1,413
Investments in intangible assets <sup>6</sup>	51	43	46	10	150
Non-cash changes in provisions (according to consolidated cash flow statement) <sup>7</sup>	83	-218	29	124	18

<sup>1</sup> Excluding intersegment sales.<sup>2</sup> Values adjusted.<sup>3</sup> Not defined by International Financial Reporting Standard (IFRS).<sup>4</sup> Without impairments on financial assets<sup>5</sup> Not defined by International Financial Reporting Standards (IFRS); EBITDA corresponds to operating result (EBIT) adjusted by depreciation, amortization, impairment losses, and reversals of impairment losses.<sup>6</sup> According to the consolidated cash flow statement.<sup>7</sup> Excluding provisions for pensions and other post-employment benefits.

**Information by country and region – 2021**

€ million	Europe	thereof: Germany	thereof: Switzerland	North America	thereof: USA	Asia- Pacific	thereof: China	Latin America	Middle East and Africa	Group
Net sales by customer location <sup>1</sup>	5,675	1,067	385	5,397	5,145	7,020	2,887	990	605	19,687
Net sales by company location <sup>1</sup>	6,218	1,655	529	5,478	5,253	6,640	2,549	947	404	19,687
Goodwill and other intangible assets <sup>2</sup>	5,051	1,712	1,686	18,851	18,840	713	67	2	–	24,617
Property, plant and equipment	3,902	1,717	998	1,974	1,968	1,118	385	167	55	7,217
Research and development costs	-2,016	-947	-945	-304	-304	-61	-24	-15	-11	-2,408
Number of employees	27,216	13,339	2,465	14,070	13,875	14,285	4,606	3,526	1,237	60,334

<sup>1</sup> Excluding intersegment sales.<sup>2</sup> Goodwill and other intangible assets show an allocation by currency area.**Information by country and region – 2020**

€ million	Europe	thereof: Germany	thereof: Switzerland	North America	thereof: USA	Asia- Pacific	thereof: China	Latin America	Middle East and Africa	Group
Net sales by customer location <sup>1</sup>	4,991	979	292	4,739	4,524	6,313	2,529	910	581	17,534
Net sales by company location <sup>1</sup>	5,515	1,501	462	4,830	4,639	5,962	2,224	868	361	17,534
Goodwill and other intangible assets <sup>2</sup>	4,930	1,585	1,628	17,876	17,866	804	63	1	–	23,612
Property, plant and equipment	3,581	1,610	877	1,664	1,657	973	343	147	56	6,421
Research and development costs	-1,931	-884	-905	-269	-269	-63	-21	-14	-10	-2,288
Number of employees	26,586	13,292	2,383	13,312	13,131	13,518	4,275	3,384	1,296	58,096

<sup>1</sup> Excluding intersegment sales.<sup>2</sup> Goodwill and other intangible assets show an allocation by currency area.

The Group divides its business activities into three business sectors: The Life Science business sector comprises products for scientific institutions and research and analytical laboratories in the pharmaceutical/biotechnology industry and applications for customers manufacturing pharmaceuticals. In line with the product portfolio, customers in this business sector primarily include companies of the pharmaceutical and biotechnology sector as well as retailers and public research organizations. The Healthcare business sector contains the business with prescription pharmaceuticals. Its customers mainly comprise wholesalers, hospitals, and pharmacies. The Electronics business sector bundles all specialty chemical business and almost exclusively serves industrial companies. The fields of activity of the individual segments are described in detail in the sections on the business sectors in the combined management report.

No single customer accounted for more than 10% of the Group's total net sales in fiscal 2021 or 2020. Transfer prices for intragroup net sales were determined on an arm's-length basis.

The following table presents the reconciliation of segment results of all operating businesses to the profit before income tax of the Group:

€ million	2021	2020
<b>EBITDA pre of the operating businesses<sup>1</sup></b>	<b>6,567</b>	<b>5,696</b>
Corporate and Other	-465	-495
<b>EBITDA pre of the Group<sup>1</sup></b>	<b>6,103</b>	<b>5,201</b>
Depreciation/amortization/impairment losses/reversals of impairment losses	-1,767	-1,938
Adjustments <sup>1</sup>	-157	-279
<b>Operating result (EBIT)<sup>1</sup></b>	<b>4,179</b>	<b>2,985</b>
Financial result	-255	-354
<b>Profit before income tax</b>	<b>3,924</b>	<b>2,630</b>

<sup>1</sup> Not defined by International Financial Reporting Standard (IFRS).

The adjustments comprised the following:

€ million	2021	2020
Restructuring expenses	-79	-162
Integration expenses/IT expenses	-81	-108
Gains (+)/losses (-) on the divestment of businesses	3	-10
Acquisition-related adjustments	18	10
Other adjustments	-19	-9
<b>Adjustments before impairment losses/reversals of impairment losses<sup>1</sup></b>	<b>-157</b>	<b>-279</b>
Impairment losses <sup>2</sup>	-56	-128
Reversals of impairment losses	3	-
<b>Adjustments (total)<sup>1</sup></b>	<b>-210</b>	<b>-407</b>

<sup>1</sup> Not defined by International Financial Reporting Standard (IFRS).

<sup>2</sup> Without impairments on financial assets.

Expenses of € 26 million related to various restructuring measures in the Life Science business sector (2020: € 15 million). A further € 22 million in restructuring expenses in the Electronics business sector related to the Bright Future transformation program in particular (2020: € 20 million).

At € 44 million in fiscal 2021 (2020: € 50 million), integration and IT expenses related to expenses for launching new ERP systems.

As in the previous year, impairment losses related in particular to intangible assets in the Electronics business sector.



The adjustments are reported in the consolidated income statement as part of the respective functional costs and allocated to them as follows:

## 2021

€ million	thereof: cost of sales	thereof: marketing and selling expenses	thereof: administration expenses	thereof: research and development expenses	thereof: other operating income and expenses	Total
Restructuring expenses	-21	-17	-29	-8	-5	-79
Integration expenses/IT expenses	-5	-1	-53	-	-22	-81
Gains (+)/losses (-) on the divestment of businesses	-	-	-1	-	5	3
Acquisition-related adjustments	-	-	-	-	18	18
Other adjustments	-	-	-	-	-19	-19
<b>Adjustments before impairment losses/reversals of impairment losses<sup>1</sup></b>	<b>-25</b>	<b>-17</b>	<b>-83</b>	<b>-8</b>	<b>-24</b>	<b>-157</b>
Impairment losses <sup>2</sup>	-	-	-	-	-56	-56
Reversals of impairment losses	-	-	-	-	3	3
<b>Adjustments in the operating result (total)<sup>1</sup></b>	<b>-25</b>	<b>-17</b>	<b>-83</b>	<b>-8</b>	<b>-76</b>	<b>-210</b>

<sup>1</sup> Not defined by International Financial Reporting Standards (IFRS).

<sup>2</sup> Without impairments on financial assets.

## 2020

€ million	thereof: cost of sales	thereof: marketing and selling expenses	thereof: administration expenses	thereof: research and development expenses	thereof: other operating income and expenses	Total
Restructuring expenses	-33	-55	-28	-25	-21	-162
Integration expenses/IT expenses	-1	-5	-71	-1	-30	-108
Gains (+)/losses (-) on the divestment of businesses	-	-	-	-	-10	-10
Acquisition-related adjustments	-19	-	-	-	29	10
Other adjustments	-	-	-	-	-9	-9
<b>Adjustments before impairment losses/reversals of impairment losses<sup>1</sup></b>	<b>-53</b>	<b>-60</b>	<b>-98</b>	<b>-27</b>	<b>-41</b>	<b>-279</b>
Impairment losses <sup>2</sup>	-	-	-	-	-128	-128
Reversals of impairment losses	-	-	-	-	-	-
<b>Adjustments in the operating result (total)<sup>1</sup></b>	<b>-53</b>	<b>-60</b>	<b>-98</b>	<b>-27</b>	<b>-169</b>	<b>-407</b>

<sup>1</sup> Not defined by International Financial Reporting Standards (IFRS).

<sup>2</sup> Without impairments on financial assets.

## (9) Net sales

### Accounting and measurement policies

#### Nature and timing of revenue recognition

Net sales are recognized when (or as) the customer obtains control of the asset. For sales of goods, the customer typically obtains control as soon as delivery is made, given that the customer is generally not able to obtain any benefits from the asset before that point in time. In the case of equipment sales, the criteria for revenue recognition are only met after installation has been successfully completed – to the extent that the installation requires specialized knowledge, does not represent a clear ancillary service and the relevant equipment can only be used by the customer once successfully set up.

For service contracts and customer-specific contract manufacturing of goods and equipment, the Group recognizes revenue over time based on the progress towards complete satisfaction of the performance obligation, if there is a contractual claim for payment against the customer for the services already performed. Input- and output-oriented methods are used to appropriately determine progress on a contract-specific basis. Specifically, they are mainly calculated on the basis of the time elapsed, milestones reached, units delivered, or costs incurred as of the reporting date.

Intellectual property is out-licensed to a limited extent in the Life Science and Healthcare business sectors. Unlike in the Life Science business sector, these transactions do not usually form part of ordinary activities in the Healthcare business sector, meaning that the corresponding income is reported in other operating income (see Note (7) "[Collaboration and licensing agreements](#)" and Note (13) "[Other operating income](#)").

Net sales from contracts comprising several separate performance obligations are recognized on a pro rata basis when the respective performance obligation has been fulfilled. Multiple-element arrangements of this nature exist to a limited extent in the Applied Solutions business unit in the Life Science business sector and in the Semiconductor Solutions business unit in the Electronics business sector.

### **Determining the transaction price**

The Group grants customers various kinds of rebates and discounts. These, as well as anticipated customer refund claims, state compulsory charges and rebates from health plans and programs, are deducted from sales. The most significant portion of these deductions from sales is attributable to the Healthcare business sector and, in particular, sales in the United States.

Sales deductions provided on the invoice as price-reducing items, which will likely be applied by customers when making the respective payments, are recognized as reduction of trade accounts receivable. Expected refunds, such as bonus payments, reimbursements for rights of return or rebates from health plans and programs, are reported in the consolidated balance sheet under refund liabilities.

The measurement of sales deductions and refund liabilities resulting from expected rebates and discounts considers the following:

- past experience;
- pricing information;
- expected sales volume growth rates.

The measurement of sales deductions and refund liabilities resulting from rights of return takes into account historical rates of return for individual product groups, information from distributors on inventory levels and publicly available information on product sales from sector-specific service providers (in the Healthcare business sector).

### **Contractual payment terms**

Given that the Group generates the large majority of its net sales through transactions with simple structures, the company usually has an enforceable right to payment after the performance obligation has been fulfilled. The payment targets contractually agreed between the Group and its customers usually range between 30 and 60 days.

### **Practical expedients**

The Group uses the practical expedient of IFRS 15 in which the promised amount of consideration is not adjusted for the effects of a significant financing component if the period between the fulfillment of a performance obligation and the payment by the customer only amounts to up to one year.

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## Significant discretionary decisions and sources of estimation uncertainty

### Sales deductions

The measurement of sales deductions and the corresponding refund liabilities requires extensive estimates. Uncertainties exist in particular concerning the extent to which past experience serves as a reliable basis for estimating the future development of expected refunds, such as bonus payments, reimbursements for rights of return or rebates from health plans and programs. External information from distributors and industry services outside of the Group's control, which are also subject to uncertainty, are used to determine sales deductions.

Due to a lack of past experience, the estimation uncertainty referenced above is particularly relevant for product launches in the Healthcare business sector.

Any changes in estimates of the parameters listed above have a cumulative impact on the net sales for the respective adjustment period.

If the carrying amount of refund liabilities had been 10% higher as of the reporting date, this would have resulted in a € 84 million (2020: € 67 million) reduction in profit before tax.

The following tables present a breakdown of net sales by key product lines/products:

### Life Science

€ million	2021		2020 <sup>1</sup>	
Process Solutions	4,645	52%	3,595	48%
Research Solutions	2,512	28%	2,215	29%
Applied Solutions	1,833	20%	1,705	23%
<b>Total</b>	<b>8,990</b>	<b>100%</b>	<b>7,515</b>	<b>100%</b>

<sup>1</sup> Previous year's figures have been adjusted due to an internal realignment.

### Healthcare

€ million	2021		2020	
<b>Oncology</b>	<b>1,411</b>	<b>20%</b>	<b>1,116</b>	<b>17%</b>
thereof: Erbitux®	987	14%	891	13%
thereof: Bavencio®	373	5%	156	2%
<b>Neurology &amp; Immunology</b>	<b>1,645</b>	<b>23%</b>	<b>1,662</b>	<b>25%</b>
thereof: Rebif®	952	13%	1,131	17%
thereof: Mavenclad®	693	10%	531	8%
<b>Fertility</b>	<b>1,337</b>	<b>19%</b>	<b>1,079</b>	<b>16%</b>
thereof: Gonal-f®	767	11%	630	9%
<b>Cardiovascular, Metabolism &amp; Endocrinology</b>	<b>2,540</b>	<b>36%</b>	<b>2,585</b>	<b>39%</b>
thereof: Glucophage®	864	12%	903	14%
thereof: Concor®	523	7%	529	8%
thereof: Euthyrox®	470	7%	455	7%
thereof: Saizen®	248	3%	234	4%
<b>Other</b>	<b>157</b>	<b>2%</b>	<b>197</b>	<b>3%</b>
<b>Total</b>	<b>7,089</b>	<b>100%</b>	<b>6,639</b>	<b>100%</b>

## Electronics

€ million	2021		2020 <sup>1</sup>	
Semiconductor Solutions	2,151	60%	1,894	56%
Display Solutions	1,046	29%	1,115	33%
Surface Solutions	410	11%	370	11%
Other	–	–	1	–
<b>Total</b>	<b>3,608</b>	<b>100%</b>	<b>3,380</b>	<b>100%</b>

<sup>1</sup> Within the scope of the integration of Versum Materials Inc., USA, two products previously allocated to the Semiconductor Solutions business unit have now been assigned to Display Solutions. The previous year's figures have been adjusted accordingly.

The following tables present a more detailed breakdown of net sales by business sector from contracts with customers.

## 2021

€ million

Net sales by product type	Life Science		Healthcare		Electronics		Group	
Goods	7,906	88%	7,011	99%	3,182	88%	18,099	92%
Equipment	469	5%	2	–	336	9%	807	4%
Services	603	7%	26	–	88	3%	718	4%
License income	12	–	–	–	1	–	14	–
Commission income	–	–	18	–	–	–	18	–
Income from co-commercialization agreements	–	–	31	1%	–	–	31	–
<b>Total</b>	<b>8,990</b>	<b>100%</b>	<b>7,089</b>	<b>100%</b>	<b>3,608</b>	<b>100%</b>	<b>19,687</b>	<b>100%</b>

Net sales by region (customer location)								
Europe	3,138	35%	2,268	32%	269	7%	5,675	29%
North America	3,187	36%	1,673	23%	536	15%	5,397	27%
Asia-Pacific	2,286	25%	1,997	28%	2,737	76%	7,020	36%
Latin America	278	3%	682	10%	30	1%	990	5%
Middle East and Africa	100	1%	468	7%	36	1%	605	3%
<b>Total</b>	<b>8,990</b>	<b>100%</b>	<b>7,089</b>	<b>100%</b>	<b>3,608</b>	<b>100%</b>	<b>19,687</b>	<b>100%</b>

## 2020

€ million

Net sales by product type	Life Science		Healthcare		Electronics		Group	
Goods	6,585	88%	6,496	98%	3,029	90%	16,111	92%
Equipment	386	5%	5	-	254	7%	645	4%
Services	535	7%	56	1%	96	3%	686	4%
License income	9	-	-	-	1	-	10	-
Commission income	-	-	18	-	-	-	18	-
Income from co-commercialization agreements	-	-	65	1%	-	-	65	-
<b>Total</b>	<b>7,515</b>	<b>100%</b>	<b>6,639</b>	<b>100%</b>	<b>3,380</b>	<b>100%</b>	<b>17,534</b>	<b>100%</b>

Net sales by region (customer location)								
Europe	2,583	35%	2,158	32%	250	8%	4,991	29%
North America	2,701	36%	1,554	23%	484	14%	4,739	27%
Asia-Pacific	1,900	25%	1,831	28%	2,582	76%	6,313	36%
Latin America	241	3%	641	10%	28	1%	910	5%
Middle East and Africa	89	1%	455	7%	37	1%	581	3%
<b>Total</b>	<b>7,515</b>	<b>100%</b>	<b>6,639</b>	<b>100%</b>	<b>3,380</b>	<b>100%</b>	<b>17,534</b>	<b>100%</b>

Group net sales amounted to € 19,687 million in fiscal 2021 (2020: € 17,534 million). As in the previous year, around 4% of this figure was recognized over time (2021: € 726 million; 2020: € 697 million). This mainly related to net sales from services and from customer-specific equipment in the Applied Solutions and Process Solutions business units in the Life Science business sector and net sales from the project business of the Semiconductor Solutions business unit in the Electronics business sector.

The table below shows future net sales from orders already received:

€ million	Year of expected revenue recognition		Total
	2022	2023 or later fiscal years	
As of Dec. 31, 2021	5,729	364	6,093

€ million	Year of expected revenue recognition		Total
	2021	2022 or later fiscal years	
As of Dec. 31, 2020	3,892	376	4,268

The significant increase as against the previous year resulted, in particular, from the positive performance of the Process Solutions business unit in the Life Science business sector.

The following table shows the change in refund liabilities:

## 2020

€ million	Rebates/Bonus payments		Rights of return		Total
	Total	thereof: United States	Total	thereof: United States	
<b>Jan. 1, 2020</b>	<b>522</b>	<b>315</b>	<b>43</b>	<b>29</b>	<b>565</b>
Additions due to business combinations	-	-	-	-	-
Other additions	1,713	1,234	41	20	1,754
Disposals due to divestments/Reclassification to assets held for sale	-8	-	-	-	-8
Utilizations	-1,501	-1,081	-33	-17	-1,534
Cumulative increase (-)/decrease (+) in net sales	-66	-67	-3	-4	-69
thereof: attributable to performance obligations satisfied in prior periods	-48	-48	-3	-3	-51
Currency translation	-39	-35	-4	-3	-42
Other	1	-	-	-	1
<b>Dec. 31, 2020</b>	<b>622</b>	<b>368</b>	<b>44</b>	<b>26</b>	<b>666</b>

## 2021

€ million	Rebates/Bonus payments		Rights of return		Total
	Total	thereof: United States	Total	thereof: United States	
<b>Jan. 1, 2021</b>	<b>622</b>	<b>368</b>	<b>44</b>	<b>26</b>	<b>666</b>
Additions due to business combinations	-	-	-	-	-
Other additions	2,216	1,528	58	34	2,273
Disposals due to divestments/Reclassification to assets held for sale	-	-	-	-	-
Utilizations	-1,995	-1,392	-48	-27	-2,044
Cumulative increase (-)/decrease (+) in net sales	-102	-94	-2	-1	-105
thereof: attributable to performance obligations satisfied in prior periods	-86	-82	2	2	-83
Currency translation	43	35	3	3	47
Other	1	-	-	-	1
<b>Dec. 31, 2021</b>	<b>784</b>	<b>445</b>	<b>55</b>	<b>35</b>	<b>839</b>

The development in contract assets and contract liabilities is shown in Note (26) "[Contract assets](#)" and in Note (29) "[Other non-financial liabilities](#)".

## (10) Cost of sales

### Accounting and measurement policies

#### Cost of sales

The cost of sales primarily includes the cost of manufactured products sold and the merchandise sold.

Cost comprises the following items: directly attributable costs, such as cost of materials, personnel and energy costs, depreciation and amortization, overheads attributable to the production process, inventory impairment losses and their reversals.

Cost of sales included amortization of intangible assets (excluding amortization of internally generated or separately acquired software) in the amount of € 201 million (2020: € 210 million). Material costs amounted to € 3,535 million in fiscal 2021 (2020: € 3,074 million) and were largely reported under cost of sales.

Impairment losses on inventories amounted to € 221 million (2020: € 312 million) in the reporting period; reversals of impairment losses came to € 171 million (2020: € 97 million).

## (11) Marketing and selling expenses

### Accounting and measurement policies

#### Marketing and selling expenses

Marketing and selling expenses within logistics costs also include expenses for transportation services performed on behalf of customers. The corresponding income from these services is reported under net sales.

Amortization of the intangible assets under marketing and selling expenses is mainly attributable to customer relationships, marketing authorizations, licenses and similar rights, brands, and trademarks, which can be functionally allocated to Marketing and selling.

Marketing and selling expenses comprised the following items:

€ million	2021	2020
Sales force	-891	-910
Internal sales services	-886	-862
Sales promotion	-461	-413
Logistics	-985	-899
Amortization of intangible assets <sup>1</sup>	-589	-636
Royalty and license expenses	-166	-164
Other marketing and selling expenses	-325	-324
<b>Marketing and selling expenses</b>	<b>-4,304</b>	<b>-4,207</b>

<sup>1</sup> Excluding amortization of internally generated or separately acquired software.

The increase in expenses for sales promotion is due to increased advertising activity following the relaxation of measures to combat the Covid-19 pandemic. In addition to the higher sales volume, the increase in logistics expenses was due to price rises resulting from capacity bottlenecks in international goods transportation.

The decrease in amortization of intangible assets was related to the regional expiration of distribution rights for Xalkori® in the business sector Healthcare. The downturn in the Life Science business sector was due to assets reaching the end of their scheduled useful lives.

Of the royalty and license expenses, € 48 million (2020: € 41 million) related to the commercialization of Erbitux®, while € 44 million (2020: € 51 million) related to license expenses in connection with the commercialization of Glucophage® in China.

## (12) Research and development costs

### Accounting and measurement policies

#### Research and development costs

The item comprises the costs of the Group's own research and development departments, the expenses incurred as a result of research and development collaborations as well as the costs of clinical trials in the Healthcare business sector (both before and after approval is granted).

For information on the capitalization of development costs, see Note (19) "[Other intangible assets](#)".

Cost reimbursements for research and development are offset against research and development costs.

The net income from repayments of subsidies received and reimbursements recognized within research and development costs amounted to € 100 million in fiscal 2021 (2020: € 127 million). This decline was essentially due to lower reimbursements of development costs from the strategic alliance with GlaxoSmithKline plc, United Kingdom, in the field of immuno-oncology (see Note (7) "[Collaboration and licensing agreements](#)").

## (13) Other operating income

### Accounting and measurement policies

#### Other operating income

Other operating income comprises all income that cannot be allocated to net sales or finance income on account of its character.

#### Income from upfront payments, milestone payments, and royalties

Income from upfront payments, milestone payments and royalties, comprises consideration received by the Group from contract partners that are not customers. This relates in particular to collaboration and out-licensing agreements in the Healthcare business sector (see Note (7) "[Collaboration and licensing agreements](#)").

#### Income from the revaluation of contingent considerations

The accounting treatment of contingent consideration agreed at the sale of a business as defined in IFRS 3 is shown in Note (36) "[Other financial assets](#)".

Other operating income was broken down as follows:

€ million	2021	2020
Income from upfront payments, milestone payments and royalties	304	229
Income from disposal of businesses and assets	67	97
Income from the reversal of provisions for litigation	27	424
Reversal of impairment losses on non-financial asset	14	–
Income from the revaluation of contingent considerations	7	1
Income from miscellaneous services	5	5
Income from fair value measurement of assets	3	–
Remaining other operating income	101	81
<b>Other operating income</b>	<b>528</b>	<b>838</b>



The income from upfront payments, milestone payments, and royalties included € 123 million (2020: € 85 million) from the collaboration agreement with GlaxoSmithKline plc, United Kingdom, and milestone payments of € 50 million received from Pfizer Inc., United States, for Bavencio®. For further explanations see Note (7) "[Collaboration and licensing agreements](#)". License income primarily resulted from interferon beta products (Biogen Inc., United States) in the amount of € 60 million (2020: € 74 million) and a license for the antidepressant Viibryd® (AbbVie Inc., United States) in the amount of € 50 million (2020: € 38 million).

Further information on income from disposals of businesses and assets can be found in Note (6) "[Acquisitions and divestments](#)".

Income from the reversal of provisions for litigation mostly related to the reversal of a provision for EU antitrust proceedings in connection with the acquisition of Sigma-Aldrich Corporation, United States, that was not fully utilized. In the previous year they essentially related to the end of the legal dispute with Biogen Inc., United States. Further information can be found in Note (27) "[Other provisions](#)".

## (14) Other operating expenses

### Accounting and measurement policies

#### Other operating expenses

Other operating expenses comprise all expenses that cannot be reasonably allocated to a functional cost type or finance costs.

The breakdown of other operating expenses was as follows:

€ million	2021	2020
Profit share agreements	-178	-80
Impairment losses on non-financial assets	-68	-183
Project expenses (including integration and IT projects)	-60	-93
Non-income related taxes	-58	-56
Premiums, fees and contributions	-42	-36
Expenses on revaluation of contingent considerations	-28	-17
Expenses from Litigation	-19	-52
Expenses for miscellaneous services	-12	-15
Expenses from fair value measurement of assets	-8	-2
Restructuring expenses	-7	-29
Expenses from disposal of businesses and assets	-4	-3
Currency effects from operating activities	-1	-57
Remaining other operating expenses	-248	-240
<b>Other operating expenses</b>	<b>-734</b>	<b>-863</b>

Expenses from profit share agreements primarily related to the strategic alliance with Pfizer Inc., United States, in the field of immuno-oncology (see Note (7) "[Collaboration and licensing agreements](#)").

Impairments of non-financial assets were attributable to intangible assets (see Note (19) "[Other intangible assets](#)") in the amount of € 47 million (2020: € 160 million) and to property, plant, and equipment (see Note (20) "[Property, plant, and equipment](#)") in the amount of € 22 million (2020: € 23 million).

The remaining other operating expenses included, among other things, personnel expenses where a reliable allocation to the functional areas was not possible.

## (15) Income tax

### Accounting and measurement policies

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#### Current income taxes

Current income taxes for the reporting period and, where applicable, for prior periods are calculated in the amounts that the tax authorities are expected to demand or reimburse. The calculation is based on the company-specific tax rate applicable in the relevant tax year.

#### Uncertain income tax assets and liabilities

Factual assessments are made to calculate uncertain income tax assets and liabilities. Uncertain income tax matters are recognized depending on the likelihood that the responsible tax authorities will accept the respective income tax treatment. If recognition by the tax authorities is considered unlikely, the respective uncertain tax asset or uncertain tax liability is measured at the most likely amount. Uncertain income tax liabilities are reported within income tax liabilities. Expected income tax-related penalties and interest that do not fall within the scope of IAS 12 are treated as provisions in line with IAS 37.

#### Deferred taxes

Deferred tax assets resulting from deductible temporary differences that exceed deferred tax liabilities relating to the same taxation authority and the same taxable entity are recognized if it is considered probable that taxable profit will be available against which they can be utilized. This corresponds to the procedure for recognizing deferred tax assets on unused tax credits and tax loss and interest carryforwards.

The recognition of deferred tax assets requires an estimate of the probability of future use. The influencing factors considered as part of this assessment include the following:

- temporary differences relating to the same taxation authority and the same taxable entity that will be subject to taxation in the future,
- results history,
- results planning, and
- existing tax planning of the respective Group company.

Deferred tax liabilities are recognized for planned dividend payments of subsidiaries within the next 12 months.

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### Significant discretionary decisions and sources of estimation uncertainty

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#### Income taxes

The calculation of the reported assets and liabilities from current and deferred income taxes requires extensive discretionary judgments, assumptions and estimates.

When assessing income tax assets and liabilities, the interpretation of tax provisions may be subject to particular uncertainty. The possibility that the relevant tax authorities will take a differing view concerning the application and interpretation of tax standards cannot be ruled out. Changes to the assumptions underlying the interpretation of tax standards, for example as a result of changes in legislation, are recognized in the balance sheet when the change comes into force.

Regarding deferred tax items, there is uncertainty as to when an asset will be realized or a liability settled. This applies in particular to deferred taxes recognized in the course of company acquisitions. Assessing the

recoverability, particularly of tax credits and tax loss and interest carryforwards, requires assumptions and estimates concerning the future taxable income of the respective Group company. Furthermore, the extent to which a subsidiary's planned dividend distribution is probable within the next twelve months is discretionary.

Income taxes in the consolidated income statement were broken down as follows:

€ million	2021	2020
Current income taxes in the period	-1,078	-959
Income taxes for previous periods	45	-11
Deferred taxes in the period	174	333
thereof: from temporary differences	206	334
thereof: from changes in tax rates	-23	6
thereof: from tax loss carryforwards	-9	-7
<b>Income taxes</b>	<b>-859</b>	<b>-637</b>

## Tax reconciliation

The following table presents the reconciliation from the theoretical income tax expense to the income tax expense according to the consolidated income statement. The theoretical income tax expense is determined by applying the statutory tax rate of a corporation headquartered in Darmstadt of 31.7% (2020: 31.7%).

€ million	2021	2020
Profit before income tax	3,924	2,630
Tax rate	31.7%	31.7%
Theoretical income tax expense	-1,245	-834
Tax rate differences	424	307
Tax effect of companies with a negative contribution to consolidated profit	-33	-31
Income tax for previous periods	45	-11
Tax credits	-30	-32
Tax effect on tax loss carryforwards	29	5
Tax effect of non-deductible expenses/Tax-free income/Other tax effects	-49	-41
<b>Income tax expense according to consolidated income statement</b>	<b>-859</b>	<b>-637</b>
<b>Tax ratio according to consolidated income statement</b>	<b>21.9%</b>	<b>24.2%</b>

Income taxes consisted of corporation and trade taxes for the German companies and comparable income taxes for non-German companies. Income taxes relating to previous periods recognized in fiscal 2021 resulted mainly from completed tax audits and mutual agreement procedures as well as from additions to liabilities for risks from tax audits.

### Deferred taxes (consolidated income statement)

The reconciliation between deferred taxes on the consolidated balance sheet and deferred taxes on the consolidated income statement is presented in the following table:

€ million	2021	2020
Change in deferred tax assets (consolidated balance sheet)	-40	121
Change in deferred tax liabilities (consolidated balance sheet)	30	384
Deferred taxes credited/debited to equity	119	-116
Changes in scope of consolidation/Currency translation/other changes	66	-58
<b>Deferred taxes (consolidated income statement)</b>	<b>174</b>	<b>333</b>

As in the previous year, the item “Changes in consolidated group/currency translation/other changes” mainly comprised exchange rate effects for items translated from U.S. dollars to the reporting currency (euro).

### Changes in tax loss carryforwards

Tax loss carryforwards were structured as follows:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Germany	Outside Germany	Total	Germany	Outside Germany	Total
<b>Tax loss carryforwards</b>	<b>136</b>	<b>1,023</b>	<b>1,159</b>	<b>94</b>	<b>1,110</b>	<b>1,204</b>
Tax loss carryforwards for which a deferred tax asset is recognized	2	60	62	4	161	165
Tax loss carryforwards for which no deferred tax asset is recognized	134	963	1,097	90	949	1,039
<b>Potential deferred tax assets for tax loss carryforwards</b>	<b>41</b>	<b>251</b>	<b>292</b>	<b>27</b>	<b>257</b>	<b>284</b>
Recognized deferred tax assets on tax loss carryforwards	-	11	11	-	20	20
Not recognized deferred tax assets on tax loss carryforwards	41	240	281	27	237	264

The majority of the tax loss carryforwards either has no expiry date or can be utilized for up to 20 years.

## Deferred taxes (consolidated balance sheet)

Deferred tax assets and liabilities related to the following balance sheet items:

€ million	Dec. 31, 2021		Dec. 31, 2020	
	Assets	Liabilities	Assets	Liabilities
Intangible assets	99	1,527	114	1,600
Property, plant and equipment	35	103	27	101
Current and non-current financial assets	1	7	-	26
Inventories	757	20	679	13
Current and non-current receivables/Other assets	90	9	19	6
Current and non-current provisions	859	57	948	35
Current and non-current liabilities	85	68	94	22
Tax loss carryforwards	11	-	20	-
Tax refund claims/Other	42	99	51	48
<b>Deferred taxes (before offsetting)</b>	<b>1,980</b>	<b>1,889</b>	<b>1,951</b>	<b>1,849</b>
Offset deferred tax assets and liabilities	-478	-478	-408	-408
<b>Deferred taxes (consolidated balance sheet)</b>	<b>1,502</b>	<b>1,411</b>	<b>1,543</b>	<b>1,441</b>

In fiscal 2021, net deferred tax assets increased by € 174 million as a result of items recognized in profit or loss, which primarily related to the reduction in deferred taxes recognized for temporary differences on intangible assets. This development was more than offset by items not recognized in profit or loss, which related to deferred tax effects resulting from items recognized through other comprehensive income such as the remeasurement of the net defined benefit obligation, changes in the fair value of financial assets and derivatives held for hedging purposes and currency translation effects. In both fiscal 2021 and 2020, the latter were attributable in particular to deferred tax liabilities recognized for temporary differences on intangible assets.

Given the positive earnings forecasts, it was assumed that it will be possible to realize recognized deferred tax assets of € 82 million (December 31, 2020: € 72 million), which exceeded deferred tax liabilities relating to the same taxation authority and the same taxable entity, even though there was a loss in the current or previous period.

For deductible temporary differences in the amount of € 57 million (December 31, 2020: € 0 million) no deferred tax assets were recognized in the balance sheet.

Deferred tax liabilities from outside basis differences for planned dividend payouts were recognized in the amount of € 93 million (December 31, 2020: € 46 million). Retained earnings of subsidiaries for which no deferred taxes are recognized amounted to € 8,553 million as of December 31, 2021 (December 31, 2020: € 12,609 million). The resulting temporary differences that will be taxable in future periods in the event of dividend payments amounted to € 476 million as of December 31, 2021 (December 31, 2020: € 672 million).

## Income tax receivables and income tax liabilities

Income tax receivables amounted to € 502 million as of December 31, 2021 (December 31, 2020: € 530 million) and mainly resulted from tax prepayments that exceeded the actual amount of tax payable for the past fiscal year and earlier fiscal years, from refund claims for previous years, and from withholding tax claims. As of December 31, 2021, income tax liabilities including liabilities for uncertain tax obligations totaled € 1,462 million (December 31, 2020: € 1,505 million).

## (16) Operating cash flow

### Accounting and measurement policies

#### Operating cash flow

The operating cash flow is calculated and presented based on the following principles:

- The operating cash flow is presented using the indirect method based on profit after taxes.
- The option to recognize interest received and interest payments made is exercised to the extent that such transactions are recognized in cash flow from operating activities.
- Tax payments are reported in operating cash flow. Only significant transactions where the associated tax payments can be practically calculated are recognized in the relevant item of the consolidated cash flow statement.

Tax payments made totaled € 1,135 million in fiscal 2021 (2020: € 1,006 million). Tax refunds received amounted to € 90 million (2020: € 140 million).

Interest paid totaled € 216 million (2020: € 340 million).

The changes in provisions in the previous year were primarily influenced by the reversal of the provision for the patent dispute with Biogen Inc., United States (see Note (27) "[Other provisions](#)").

## (17) Earnings per share

### Accounting and measurement policies

#### Earnings per share

Basic earnings per share is calculated by dividing the profit after taxes attributable to the shareholders of Merck KGaA, Darmstadt, Germany (net income) by the weighted average number of theoretical shares outstanding. The calculation of the theoretical number of shares is based on the fact that the general partner's equity is not represented by shares. Corresponding to the division of the subscribed capital of € 168 million into 129,242,252 shares (see Note (34) "[Equity](#)"), the general partner's equity of € 397 million equates to 305,535,626 theoretical shares. Overall, equity capital thus amounted to € 565 million or 434,777,878 theoretical shares outstanding.

As in the previous year, equity capital remained unchanged in fiscal 2021. The weighted average (basic) number of shares was 434,777,878 and thus corresponded to the number of theoretical shares outstanding. In fiscal 2021 and 2020, there were no shares with a potential diluting effect; as a result, the diluted earnings per share were equivalent to basic earnings per share.

# Operating Assets, Liabilities, and Contingent Liabilities

## (18) Goodwill

### Accounting and measurement policies

#### Goodwill

In the course of business combinations, goodwill is recognized on the acquisition date. The option to measure non-controlling interests at fair value on the date of their acquisition (full goodwill method) is not utilized.

#### Method for impairment testing

Impairment testing for goodwill takes place at the level of the Life Science, Healthcare, and Electronics business sectors. These groups of cash-generating units (CGUs) are the lowest level at which goodwill within the Group is monitored for internal management purposes.

Impairment testing is performed annually and on an ad hoc basis where there are indications of impairment. The existence of indications of impairment may be analyzed using various factors, particularly changes in short-term and medium-term planning, sector studies, analyst forecasts, validation multiples based on peer group information, the Group's average market capitalization compared to its balance sheet equity, and the development of its order books.

For both value in use and fair value less cost of disposal the recoverable amount is calculated in accordance with the discounted cash flow method (Level 3 in the IFRS 13 fair value hierarchy). The determination of the recoverable amount for the Life Science CGU and Healthcare CGU was based on the value in use in fiscal 2021 as well as in the previous year. In fiscal 2021, the recoverable amount for the impairment test of the Electronics CGU was based on the value in use (2020: fair value less costs of disposal). The last medium-term plan approved by the Executive Board, with a detailed planning period of four years, served as the basis for planning. The value of the net cash flows was determined on the basis of the following principles:

	Value in use	Fair value less costs of disposal
<b>Sales growth in the detailed planning period</b>	Based on plans approved by the Executive Board, taking into account internal past experience and largely non-observable input factors in the market, for example regarding future market shares, selling prices and volumes, and excluding new products from the development pipeline and other expansion investments	Based on plans approved by the Executive Board, taking into account internal past experience and largely non-observable input factors in the market, for example regarding future market shares, selling prices and volumes, and including new products from the development pipeline and other expansion investments
<b>Profit margins in the detailed planning period</b>	Based on past experiences, adjusted for expected profitability developments	

The discount factor after taxes is derived on the basis of the following input parameters:

<b>Risk-free interest rate</b>	Derived from the returns of long-term government bonds
<b>Beta factor</b>	Derived from the respective peer group
<b>Market risk premium</b>	Based on a combination of different estimating methods; e.g. historical and implied stock yields
<b>Cost of debt and capital structure</b>	Derived from the market data of the respective peer group companies

The long-term growth rate after the detailed planning period is determined taking into account expected long term growth and long-term inflation expectations.

### Significant measurement assumptions

The planning used in conjunction with impairment testing in fiscal 2021 was based, in contrast to the previous year, only on one baseline scenario.

The expected average sales growth used to determine the value in use in the Life Science CGU in the detailed planning period was a high single-digit percentage (2020: high single-digit percentage). Taking into account Group costs allocated on a pro rata basis, the EBITDA pre margin applied in the detailed planning period was around 32% in fiscal 2021 (2020: around 30%).

The expected average sales growth in the Healthcare CGU amounted to a low single-digit percentage in the detailed planning period (2020 low single-digit percentage in the baseline scenario). In line with the value-in-use concept, this did not include net sales from the launch of new products.

The calculation of the value in use of the Electronics CGU included expected average sales growth in the detailed planning period at a mid-single-digit percentage rate (2020: mid-single-digit percentage rate in the baseline scenario). Taking into account Group costs allocated on a pro rata basis, the EBITDA pre margin applied in the detailed planning period in fiscal 2021 was unchanged as against the previous year at around 30%.

Owing to the greater planning uncertainty on account of the Covid-19 pandemic, two planning scenarios had been used for impairment testing in the previous year. The baseline scenario ("V" scenario) applied in the previous year assumes that global economic growth will recover at a comparable pace after a sharp slump, and that growth rates will then return to those seen before the outbreak of the pandemic. An additional negative scenario (extended "U" scenario) was included in the previous year with a probability of occurrence of just under 20%. In the previous year, this scenario assumed a slower recovery from the impact of the Covid-19 pandemic and a prolonged reduction in average global GDP growth across the entire detailed planning period. The negative scenario in the previous year assumed a reduction in annual net sales of between 2% and 3% compared with the base scenario for the Life Science CGU (Healthcare CGU: between 1% and 7%; Electronics CGU: between 6% and 7%). With regard to annual EBITDA pre, the negative scenario assumed an annual reduction of between 2% and 3% in the Life Science CGU (Healthcare CGU: between 1% and 10%; Electronics CGU: between 10% and 13%).

The additional significant value-relevant assumptions for underlying the goodwill impairment tests are quantified below.

in %	Long-term growth rate		Discount factor					
	2021	Q2/Q3 2020	Weighted cost of capital after tax			Weighted cost of capital before tax		
			2021	Q2 2020	Q3 2020	2021	Q2 2020	Q3 2020
Life Science	1.75%	1.75%	5.5%		6.0%	6.7%		7.4%
Healthcare <sup>1</sup>	0.00%	0.00%	5.5%	5.6%	5.5%	7.4%	7.5%	7.5%
Electronics <sup>1, 2</sup>	1.00%	1.00%	5.4%	5.8%	5.7%	6.7%	7.2%	7.1%

<sup>1</sup> The figures for impairment testing in Q2 2020 relate to the ad hoc tests performed in response to the Covid-19 pandemic.

<sup>2</sup> In the prior year, the pre-tax weighted average cost of capital was determined based on the fair value less costs of disposal concept.

Net cash flows were discounted using cost of capital after tax. The aforementioned cost of capital before tax was subsequently derived iteratively.



## Significant discretionary decisions and sources of estimation uncertainty

### Goodwill

The determination of the recoverable amount is subject to discretion and significant estimation uncertainty. Assumptions regarding the amount of net cash flows, long-term growth rates and discount factors are considered a material source of estimation uncertainty due to their inherent uncertainty.

In all the impairment tests performed, the recoverable amount in both fiscal 2021 and the previous year was more than 15% higher than the carrying amount of the respective CGU. Regardless of this, the planning data used was checked for plausibility against external analyst assessments and the recoverable amounts determined were validated using validation multiples based on peer group information.

In addition, sensitivity analyses of the key assumptions were performed as part of the impairment tests. As a result, no change of a significant assumption deemed possible by management would have resulted in an impairment. Even the sole application of the negative scenario presented above (extended "U" scenario) would not have resulted in the need to recognize impairment losses for any of the CGUs in the previous year. The following table presents the minimum amount by which key assumptions could have changed before the impairment test triggered the recognition of an impairment loss. The figures for fiscal 2020 apply to both the ad hoc and scheduled impairment tests:

	Decrease in net cash flows		Decrease in long-term growth rate		Increase in cost of capital after tax	
	%		percentage points		percentage points	
	2021	2020	2021	2020	2021	2020
Life Science	>10	>10	>2	>2	>2	>2
Healthcare	>10	>10	>2	>2	>2	>2
Electronics	>10	>10	>2	>2	>2	>1.5

Goodwill shown below was incurred mainly in the course of the acquisitions of the Versum Materials Inc., United States, the Sigma-Aldrich Corporation, United States, the AZ Electronic Materials S.A., Luxembourg, the Millipore Corporation, United States, and the Serono SA, Switzerland.

€ million	Goodwill			
	Life Science	Healthcare	Electronics	Total
<b>Cost as at Jan. 1, 2020</b>	<b>11,130</b>	<b>1,534</b>	<b>4,449</b>	<b>17,114</b>
Other additions	18	-	-	18
Disposals due to divestments/Reclassification to assets held for sale	-	-9	-	-9
Transfers	-	-	-	-
Impairment losses	-	-	-	-
Currency translation difference	-862	-	-303	-1,165
<b>Dec. 31, 2020</b>	<b>10,287</b>	<b>1,525</b>	<b>4,146</b>	<b>15,959</b>
<b>Cost as of Jan. 1, 2021</b>	<b>10,287</b>	<b>1,525</b>	<b>4,146</b>	<b>15,959</b>
Additions	-	-	-	-
Disposals due to divestments/Reclassification to assets held for sale	-	-	-	-
Transfers	-4	-	-	-4
Impairment losses	-	-	-	-
Currency translation difference	776	-	273	1,050
<b>Dec. 31, 2021</b>	<b>11,059</b>	<b>1,525</b>	<b>4,420</b>	<b>17,004</b>

The changes in goodwill caused by foreign exchange rates resulted almost exclusively from translating the goodwill from the acquisitions of Versum Materials, Inc., United States, the Sigma-Aldrich Corporation, United States, AZ Electronic Materials S.A., Luxembourg, and the Millipore Corporation, United States, which were mostly denominated in U.S. dollars.

Goodwill impairment testing did not give rise to the need to recognize any impairment losses in either fiscal 2020 or fiscal 2021.

## (19) Other intangible assets

### Accounting and measurement policies

#### Recognition and initial measurement of purchased intangible assets

In in-licensing, the portion of the consideration paid by the Group to acquire intellectual property is recognized as an intangible asset. If research and development services to be performed by the seller are also agreed in conjunction with the transaction, the related share of consideration is separated and recognized in research and development expenses in line with the service performance.

Contingent consideration linked to milestone payments in connection with the purchase of intangible assets arising outside a business combination is recognized as an intangible asset and as a financial liability once the milestone is reached.

Intangible assets acquired in business combinations are recognized at fair value on the acquisition date.

#### Recognition and initial measurement of internally generated intangible assets

Owing to the high level of uncertainty until pharmaceutical products are approved, the criteria for the capitalization of development costs in accordance with IAS 38 are not met in the Healthcare business sector for the development of drug candidates. Costs incurred after regulatory approval are insignificant and are therefore not recognized as intangible assets. In the Life Science and Electronics business sectors, development expenses are capitalized as soon as all the recognition criteria are met and can be verified accordingly. This also includes expenses that were required for REACH registration. Furthermore, development expenses for internal software

projects and the enhancement of purchased ERP programs are capitalized providing that the relevant criteria have been fulfilled.

### **Subsequent measurement**

Subsequent measurement is at amortized cost.

Purchased and internally generated intangible assets with finite useful lives are amortized using the straight-line method over their useful lives. The useful lives of customer relationships, brand names and trademarks as well as marketing authorizations, acquired patents, licenses and similar rights, and software are usually between three and 24 years. In determining these useful lives, the Group considers factors including the typical product life cycles for each asset and publicly available information about the estimated useful lives of similar assets.

An impairment test is performed if there are indications of impairment. These are determined once a year and on an ad hoc basis with the involvement of the responsible departments, and taking external and internal information sources into consideration. The Group examines the existence of indications of impairment using various factors, particularly deviations from sales and earnings forecasts and the analysis of changes in medium-term planning. In the event of impairment, an impairment loss is recognized under other operating expenses. Impairment losses are reversed up to amortized cost and reported in other operating income if the original reasons for impairment no longer apply.

Intangible assets with indefinite useful lives and purchased as well as internally generated intangible assets not yet available for use are not amortized, but rather tested for impairment when a triggering event arises or at least once a year.

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## **Significant discretionary decisions and sources of estimation uncertainty**

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### **Purchased intangible assets**

The identification and measurement of intangible assets acquired in the course of business combinations are subject to significant discretion and estimation uncertainty.

In connection with in-licensing agreements in the Healthcare business sector, a discretionary estimate is made of the extent to which upfront payments and milestone payments are remuneration for development services yet to be performed or whether such payments are acquisition costs of an intangible asset to be capitalized.

### **Determination of useful life**

Significant assumptions and estimates are required to determine the appropriate amount of amortization of other intangible assets. This relates in particular to the determination of the underlying useful life.

If the amortization of intangible assets from customer relationships, brands, trademarks, marketing authorizations, patents, licenses and similar rights, and other had been 10% higher, for example due to shortened useful lives, profit before income tax would have been € 80 million lower in fiscal 2021 (previous year: € 86 million).

### **Identification of a need to recognize impairment loss and reverse impairment loss**

Discretionary decisions are required in assessing substantial evidence of impairment as well as in identifying the need to reverse the impairment of other intangible assets. Significant valuation-related assumptions and estimates are also required to calculate the appropriate write-down amount in impairment testing.

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	Customer relationships, brands and trademarks	Marketing authorizations, patents, licenses, similar rights, and other items	Software and software in development	Advance payments	Total
		Finite useful life	Not yet available for use		
€ million					
<b>Cost as of Jan. 1, 2020</b>	<b>9,893</b>	<b>11,141</b>	<b>1,101</b>	<b>906</b>	<b>23,040</b>
Additions due to business combinations	-	4	-	-	4
Other additions	-	26	33	97	157
Disposals due to divestments/ Reclassification to assets held for sale	-4	-2	-	-6	-12
Other disposals	-	-11	-27	-25	-63
Transfers	-	5	-5	-	-
Currency translation difference	-741	-147	-16	-28	-933
<b>Dec. 31, 2020</b>	<b>9,148</b>	<b>11,015</b>	<b>1,086</b>	<b>944</b>	<b>22,193</b>
<b>Accumulated amortization and impairment losses as of Jan. 1, 2020</b>	<b>-2,829</b>	<b>-9,853</b>	<b>-634</b>	<b>-503</b>	<b>-13,820</b>
Depreciation, amortization, and write-downs	-577	-281	-	-82	-940
Impairment losses	-26	-68	-62	-4	-160
Reversals of impairment losses	-	-	-	-	-
Disposals due to divestments/ Reclassification to assets held for sale	4	2	-	1	7
Other disposals	-	5	-	24	29
Transfers	-	-	-	-	-
Currency translation difference	217	104	1	21	343
<b>Dec. 31, 2020</b>	<b>-3,211</b>	<b>-10,091</b>	<b>-695</b>	<b>-543</b>	<b>-14,540</b>
<b>Net carrying amounts as of Dec. 31, 2020</b>	<b>5,937</b>	<b>924</b>	<b>391</b>	<b>401</b>	<b>7,653</b>
<b>Cost as of Jan. 1, 2021</b>	<b>9,148</b>	<b>11,015</b>	<b>1,086</b>	<b>944</b>	<b>22,193</b>
Additions due to business combinations	-	-	-	-	-
Other additions	-	103	186	85	375
Disposals due to divestments/ Reclassification to assets held for sale	-	-	-	-	-
Other disposals	-6	-26	-12	-2	-45
Transfers	3	58	-39	-1	21
Currency translation difference	678	154	13	32	878
<b>Dec. 31, 2021</b>	<b>9,825</b>	<b>11,305</b>	<b>1,235</b>	<b>1,058</b>	<b>23,423</b>
<b>Accumulated depreciation and impairment losses as of Jan. 1, 2021</b>	<b>-3,211</b>	<b>-10,091</b>	<b>-695</b>	<b>-543</b>	<b>-14,540</b>
Depreciation, amortization, and write-downs	-551	-252	-	-90	-893
Impairment losses	-	-	-38	-9	-47
Reversals of impairment losses	-	-	14	-	14
Disposals due to divestments/ Reclassification to assets held for sale	-	-	-	-	-
Other disposals	6	21	1	1	28
Transfers	-3	-13	-	-1	-17
Currency translation difference	-229	-108	-2	-17	-356
<b>Dec. 31, 2021</b>	<b>-3,989</b>	<b>-10,443</b>	<b>-720</b>	<b>-659</b>	<b>-15,810</b>
<b>Net carrying amounts as of Dec. 31, 2021</b>	<b>5,836</b>	<b>862</b>	<b>515</b>	<b>400</b>	<b>7,612</b>

Additions to market authorizations, patents, licenses, similar rights, and other items with a finite useful life amounted to € 103 million in fiscal 2021 (2020: € 26 million). Of this figure, a high double-digit million euro amount related to the acquisition of a right to fast-track U.S. FDA approval in the Healthcare business sector.

A further € 186 million (2020: € 33 million) related to additions for assets not yet ready for use that were mainly attributable to the Healthcare business sector. This essentially concerned the recognition of an intangible asset in connection with the in-licensing agreement with Debiopharm International SA, Switzerland, for the exclusive rights for the development and global commercialization of the drug candidate Xevinapant (Debio 1143).

The gross carrying amounts and accumulated amortization for the capitalized software primarily relates to purchased software as well as internally generated applications and enhancements of purchased ERP programs that are already available for use. Software additions of € 85 million (2020: € 97 million) primarily related to the internal development of software solutions.

Reclassifications of marketing authorizations, patents, licenses, similar rights, and other items primarily related to the successful completion and attainment of availability for use of development projects in the Electronics business sector

The currency translation effects essentially resulted from the translation of other intangible assets denominated in U.S. dollars.

### Overview of material other intangible assets

The carrying amounts of customer relationships, brands, and trademarks as well as marketing authorizations, patents, licenses, similar rights, and other items were attributable to the business sectors as follows:

€ million	Remaining useful life in years	Life Science	Healthcare	Electronics	Total Dec. 31, 2021	Total Dec. 31, 2020
<b>Customer relationships, brands and trademarks</b>		<b>3,778</b>	<b>–</b>	<b>2,058</b>	<b>5,836</b>	<b>5,937</b>
Customer relationships	4.5–16.8	3,294	–	2,027	5,321	5,329
thereof from the following acquisitions:						
Sigma-Aldrich Corporation	14.9–15.9	2,946	–	132	3,078	3,023
Versum Materials, Inc.	4.8–16.8	–	–	1,895	1,895	1,921
Millipore Corporation	4.5–5.5	298	–	–	298	362
Brands and trademarks	1.5–5.9	485	–	30	515	608
thereof from the following acquisition:						
Sigma-Aldrich Corporation	5.9	416	–	–	416	450
<b>Marketing authorizations, patents, licenses and similar rights and other</b>						
<b>Finite useful life</b>		<b>208</b>	<b>123</b>	<b>531</b>	<b>862</b>	<b>924</b>
Marketing authorizations	–	–	1	–	1	17
Patents, licenses and similar rights	0.3–11.3	206	–	516	722	840
thereof from the following acquisitions:						
AZ Electronic Materials S.A.	0.3–11.3	–	–	257	257	333
Versum Materials, Inc.	2.8–4.8	–	–	201	201	206
Others		1	123	15	138	67
<b>Not yet available for use</b>		<b>12</b>	<b>370</b>	<b>134</b>	<b>515</b>	<b>391</b>
thereof from the following acquisition:						
Versum Materials, Inc.	–	–	–	118	118	151

## (20) Property, plant, and equipment

### Accounting and measurement policies

#### Recognition and initial measurement

In the course of determining cost, government grants received within the scope of IAS 20 are deducted. Grants receivable for financial support that are no longer linked to future costs are recognized in profit or loss.

#### Subsequent measurement

Subsequent measurement is based on amortized cost. Property, plant, and equipment is depreciated using the straight-line method over the useful life of the asset concerned and the corresponding expenses are allocated to the respective functional costs. Depreciation of property, plant, and equipment is based on the following useful lives:

	Useful life
Production buildings	No more than 33 years
Administration buildings	No more than 40 years
Plant and machinery	6 to 25 years
Operating and office equipment, other facilities	3 to 10 years

The useful lives of the assets are reviewed regularly and adjusted if necessary.

An impairment test is performed if there are indications of impairment. External and internal information is used in this context. In the event of impairment, an impairment loss is recognized under other operating expenses. Impairment losses are reversed up to amortized cost and reported in other operating income if the original reasons for impairment no longer apply.

### Significant discretionary decisions and sources of estimation uncertainty

#### Determination of the useful life and residual value

Assumptions and estimates are required in determining the appropriate useful life and the expected residual value in order to calculate the amount of depreciation on property, plant, and equipment. This applies in particular to the determination of the underlying remaining useful life. In making these estimates, the Group considers the useful lives of the property, plant, and equipment derived from past experience.

#### Identification of a need to recognize impairment loss and reverse impairment loss

Discretionary decisions are required in the identification of objective evidence of impairment as well as in identifying the need to reverse impairment of property, plant and equipment.

€ million	Land, land rights and buildings	Plant and machinery	Other facilities, operating and office equipment	Construction in progress and advance payments to vendors and contractors	Total
<b>Cost at January 1, 2020</b>	<b>4,816</b>	<b>4,910</b>	<b>1,532</b>	<b>1,278</b>	<b>12,537</b>
Additions due to business combinations	1	1	–	–	2
Other Additions	363	49	87	1,031	1,530
Disposals due to divestments/Reclassification to assets held for sale	-66	-44	-7	-1	-117
Other Disposals	-217	-62	-53	-4	-336
Transfers	249	510	142	-901	–
Currency translation difference	-177	-119	-52	-39	-386
<b>Dec. 31, 2020</b>	<b>4,969</b>	<b>5,245</b>	<b>1,649</b>	<b>1,365</b>	<b>13,229</b>
<b>Accumulated depreciation and impairment losses as of Jan. 1, 2020</b>	<b>-1,854</b>	<b>-3,390</b>	<b>-1,097</b>	<b>-4</b>	<b>-6,345</b>
Depreciation	-297	-346	-175	–	-818
Impairment losses	-5	-5	–	-13	-23
Reversals of impairment losses	–	–	–	–	–
Disposals due to divestments/Reclassification to assets held for sale	17	27	7	–	51
Disposals	85	44	43	1	174
Transfers	1	–	–	-1	–
Currency translation difference	56	65	32	–	153
<b>Dec. 31, 2020</b>	<b>-1,997</b>	<b>-3,605</b>	<b>-1,189</b>	<b>-17</b>	<b>-6,808</b>
<b>Net carrying amounts as of Dec. 31, 2020</b>	<b>2,972</b>	<b>1,640</b>	<b>460</b>	<b>1,348</b>	<b>6,421</b>
<b>Cost as of Jan. 1, 2021</b>	<b>4,969</b>	<b>5,245</b>	<b>1,649</b>	<b>1,365</b>	<b>13,229</b>
Changes in the scope of consolidation	–	–	–	–	–
Additions	130	35	73	1,205	1,443
Reclassification to assets held for sale	–	–	–	–	–
Disposals	-72	-74	-99	-3	-247
Transfers	254	348	101	-702	1
Currency translation difference	182	132	30	39	383
<b>Dec. 31, 2021</b>	<b>5,464</b>	<b>5,687</b>	<b>1,754</b>	<b>1,905</b>	<b>14,810</b>
<b>Accumulated depreciation and impairment losses January 1, 2021</b>	<b>-1,997</b>	<b>-3,605</b>	<b>-1,189</b>	<b>-17</b>	<b>-6,808</b>
Depreciation	-293	-359	-168	–	-819
Impairment losses	-3	-14	–	-4	-22
Reversals of impairment losses	–	–	–	–	–
Disposals due to divestments/Reclassification to assets held for sale	–	–	–	–	–
Disposals	46	66	92	1	206
Transfers	–	-4	–	5	–
Currency translation difference	-56	-71	-21	–	-149
<b>Dec. 31, 2021</b>	<b>-2,304</b>	<b>-3,987</b>	<b>-1,287</b>	<b>-15</b>	<b>-7,593</b>
<b>Net carrying amounts as of Dec. 31, 2021</b>	<b>3,160</b>	<b>1,700</b>	<b>467</b>	<b>1,890</b>	<b>7,217</b>

Disposals due to divestments essentially included the sale of the Allergopharma allergy business in fiscal 2020.

The individual additions to construction in progress in fiscal 2021 with an investment volume of more than € 30 million are presented below:

Business sector	Investment project	Country
Life Science	Production plant	Germany
Life Science	Filling and logistics center	Germany
Life Science	Production plant	United States
Life Science	Production plant	United States
Healthcare	Biotech development system	Switzerland
Healthcare	Filling and packaging center	Switzerland

## (21) Leasing

### Accounting and measurement policies

#### Leasing

##### IFRS 16 scope

The Group exercises the option provided by IFRS 16 to not recognize leases of intangible and low-value assets as leases. Right-of-use assets under leases are reported in the balance sheet item "Property, plant, and equipment" (see Note (20) "[Property, plant, and equipment](#)").

Where the provision of company cars to employees qualifies as an employee benefit within the meaning of IAS 19, IFRS 16 is not applied. In this case, its balance-sheet treatment is governed solely by IAS 19.

##### Separation of lease and non-lease components

Leases for land, land rights and buildings are separated into lease and non-lease components. The Group otherwise elects to exercise the option not to separate non-lease components from lease components.

##### Depreciation of the right-of-use assets arising from leases

Basically, right-of-use assets are depreciated over the lease term. If it is considered sufficiently probable that an existing purchase option will be exercised or ownership will be automatically transferred at the end of the lease term, however, depreciation takes place over the period that applies for corresponding assets under property, plant, and equipment (see Note (20) "[Property, plant, and equipment](#)").

##### Determining the incremental borrowing rate

If the interest rate for the lease cannot be reliably determined, the incremental borrowing rate is applied in measuring the lease liability. Within the Group, the incremental borrowing rate is determined on the basis of the risk-free interest rate of the respective Group company over a similar term and in the same currency. This interest rate is adjusted using a risk surcharge specific to the Group. The Group applies the repayment model to determine the current portion of the lease. The current portion of the lease corresponds to the repayment share of the next twelve months.

##### Determining the lease term

Where renewal or termination options are available, their exercise is assessed on a case-by-case basis, considering factors such as location strategies, leasehold improvements and the degree of specificity.



## Significant discretionary decisions and sources of estimation uncertainty

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### Leasing

#### Identification of a lease

Discretionary decisions can arise during the identification of leases in answering the question of whether a lessor's right of substitution is substantive. The Group classifies rights of substitution as not substantive if the facts and circumstances of the case do not support a different assessment.

#### Measurement of lease and non-lease components

In the case of leases for land, land rights, and buildings, separating the lease into lease and non-lease components is subject to discretion and estimation uncertainty if observable prices are not available from the contract partner or other potential lessors.

#### Determining the lease term

When determining the lease term, existing renewal and termination options must be evaluated to determine the probability that such options will be exercised.

The assessment of the probability of exercise may be discretionary even though it relies on existing and material information on the general economic context, such as location strategies, leasehold improvements, or the degree of specificity. If the available information does not allow a reliable assessment, the Group uses historical experience for comparable situations.

The largest 30 of more than 5,500 leases accounted for around 50% of total lease liabilities in fiscal 2021 and 2020. They are essentially for right-of-use assets for office, warehouse, and laboratory buildings. If options to renew these leases were exercised in future, which is not yet considered likely, this would result in additional potential undiscounted cash outflows of up to € 145 million (2020: € 200 million).

Where individual contracts include termination options, it was considered unlikely that these would be exercised so that additional lease payments were already considered in the corresponding lease liability.

#### Determining the incremental borrowing rate

Determining the risk-free interest rate and determining the risk surcharge are both discretionary.

#### Initial measurement of the lease liability and the right-of-use asset

In measuring the lease liability, there is discretionary scope and significant estimation uncertainty regarding:

- measuring any payments in the course of promised residual value guarantees and
- assessing the probability that existing purchase and termination options and renewal options will be exercised.

In measuring right-of-use assets under leases, the Group is subject to estimation uncertainty regarding any demolition obligations and their resulting payments.

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The reconciliation of net carrying amounts of right-of-use assets from leases was as follows:

€ million	Right-of-use assets			Total
	Land, land rights and buildings	Plant and machinery	Other facilities, operating and office equipment	
<b>Net carrying amounts as of Jan. 1, 2020</b>	<b>487</b>	<b>13</b>	<b>58</b>	<b>557</b>
Changes in the scope of consolidation	-1	-	-	-2
Additions	130	2	55	187
Disposals	-119	-1	-9	-129
Depreciation	-107	-5	-42	-153
Impairment losses	-	-	-	-
Reversal of impairment losses	-	-	-	-
Other	-30	2	-3	-32
<b>Net carrying amounts as of Dec. 31, 2020</b>	<b>360</b>	<b>11</b>	<b>58</b>	<b>429</b>

€ million	Right-of-use assets			Total
	Land, land rights and buildings	Plant and machinery	Other facilities, operating and office equipment	
<b>Net carrying amounts as of Jan. 1, 2021</b>	<b>360</b>	<b>11</b>	<b>58</b>	<b>429</b>
Changes in the scope of consolidation	-	-	-	-
Additions	118	1	40	159
Disposals	-19	-	-4	-22
Depreciation	-96	-5	-39	-140
Impairment losses	-	-	-	-
Reversal of impairment losses	-	-	-	-
Other	19	2	2	22
<b>Net carrying amounts as of Dec. 31, 2021</b>	<b>382</b>	<b>9</b>	<b>56</b>	<b>447</b>

The net carrying amounts of other facilities, operating and office equipment mainly include the right-of-use assets for vehicles.

The additions to land, land rights, and buildings primarily related to the extension of existing rental agreements and the conclusion of new rental agreements for office, laboratory, and warehouse space. The disposals under land, land rights, and buildings in previous year primarily resulted from the acquisition of the previously leased land and buildings of the Life Science Campus in Burlington, United States.

The expenses and income and the payments under the leases in accordance with IFRS 16 were reported in the consolidated income statement and the consolidated statement of cash flows as follows:

€ million	2021	2020
Right-of-use assets		
Depreciation	-140	-153
Impairment losses	-	-
Reversals of impairment losses	-	-
Expenses for leasing low-value assets	-18	-18
Expenses for leases with variable lease payments	-	-
Income from subleasing right-of-use assets	-	-
Income from sale-and-lease-back transactions	-	-
Interest expenses for lease liabilities	-10	-15
<b>Total</b>	<b>-168</b>	<b>-186</b>

€ million	2021	2020
Operating Cash flow	-28	-34
Financing Cash Flow	-141	-144
<b>Total</b>	<b>-169</b>	<b>-178</b>

The future lease payments are distributed over the following periods:

#### December 31, 2021

€ million	Within 1 year	1-5 years	After more than 5 years	Total
Future lease payments	122	282	81	485
Interest portion of future payments	-7	-15	-6	-28
<b>Present value of future lease payments</b>	<b>116</b>	<b>267</b>	<b>75</b>	<b>457</b>

#### December 31, 2020

€ million	Within 1 year	1-5 years	After more than 5 years	Total
Future lease payments	118	262	88	468
Interest portion of future payments	-8	-16	-7	-31
<b>Present value of future lease payments</b>	<b>110</b>	<b>246</b>	<b>81</b>	<b>436</b>

## (22) Other non-financial assets

### Accounting and measurement policies

#### Other non-financial assets

Other non-financial assets are carried at amortized cost. Impairments are recognized for any credit risks.

Other non-financial assets are broken down as follows:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Current	Non-current	Total	Current	Non-current	Total
Receivables from non-income related taxes	428	7	434	368	4	372
Prepaid expenses	142	15	157	151	14	164
Assets from defined benefit plans	5	–	5	2	–	2
Remaining other assets	89	73	162	76	63	139
<b>Other non-financial assets</b>	<b>663</b>	<b>95</b>	<b>758</b>	<b>597</b>	<b>81</b>	<b>677</b>

## (23) Cash flow from investing activities

In particular, the payments for investments in intangible assets primarily included payments to Debiopharm International SA, Switzerland, for the acquisition of the exclusive rights to the development and commercialization of the drug candidate xevinapant (see Note (7) "[Collaboration and licensing agreements](#)") and payments for the acquisition of a right to fast-track U.S. FDA approval in the Healthcare business sector.

Net cash outflows for investments in financial assets amounting to € 269 million (2020: € 278 million) mainly resulted from short-term investments in securities that did not meet the requirements for classification as cash and cash equivalents.

Net cash inflows from the disposal of other financial assets amounted to € 340 million in the previous year and essentially related to the sale of short-term investments in securities.

The payments made and received from the acquisition and the disposal of other non-financial assets resulted from the short-term investment of available funds in the previous year.

The proceeds from the disposal of assets held for sale less transferred cash and cash equivalents reported in the previous year essentially resulted from the sale of the Allergopharma allergy business (see Note (6) "[Acquisitions and divestments](#)").

## (24) Inventories

### Accounting and measurement policies

#### Inventories

In addition to directly attributable unit costs, the cost of sales also includes overheads attributable to the production process, which are determined on the basis of normal capacity utilization of the production facilities. Goods for resale are recognized at cost. When determining amortized cost, the "first-in, first-out" (FIFO) and weighted average cost formulas are used.

Inventories are tested for impairment using a business sector-specific method. Under this method, cost is compared to the net realizable values. If the net realizable value is lower than the amortized cost, the asset is written down by a corresponding amount, which is recognized as an expense in the cost of sales.

In addition to the impairment derived from the sales market, impairment losses may also be necessary for quality reasons or due to a lack of usability of the items or their remaining shelf life. If the reason for impairment no longer applies, the carrying amount is adjusted to the lower of cost or the new net realizable value.

Since inventories are, for the most part, not manufactured within the scope of long-term production processes, borrowing costs are not included.

Inventory prepayments are reported under other non-financial assets.

## Significant discretionary decisions and sources of estimation uncertainty

### Identification of impairments or reversal of impairments

Discretionary decisions are required in the identification of impairment as well as in identifying the need to reverse impairment of inventories. There are estimation uncertainties with respect to the calculation of the net realizable value. In particular, changes in selling prices and expected costs of completion are considered in calculating this value.

Inventories consisted of the following:

€ million	Dec. 31, 2021	Dec. 31, 2020
Raw materials and supplies	814	633
Work in progress	990	905
Finished goods/goods for resale	2,096	1,756
<b>Inventories</b>	<b>3,900</b>	<b>3,294</b>

The increase in inventories in fiscal 2021 was driven by all three business sectors. Whereas the upturn in the Healthcare business sector was minor, the Life Science and Electronics business sectors saw significant growth in inventories as stocks of raw materials were built up in order to secure production, as well as due to delays in logistics processes.

Impairment losses on inventories amounted to € 592 million in the reporting period (2020: € 545 million). Impairment losses that are included in the cost of sales are shown in Note (10) "[Cost of sales](#)".

## (25) Trade and other receivables

### Accounting and measurement policies

#### Trade and other receivables

Trade accounts receivable without significant financing components that are not the subject of a factoring agreement are measured at the amount of the unconditional claim for consideration on initial recognition. For additions to trade accounts receivable, loss allowances are recognized to allow for expected credit losses.

At initial recognition, other receivables are measured at fair value plus the direct transaction costs incurred upon acquisition of the asset.

Trade accounts receivable that are potentially designated to be sold on account of a factoring agreement are measured at fair value through other comprehensive income.

The measurement policies applied in determining loss allowances for trade and other receivables are shown in Note (42) "[Management of financial risks](#)" in the "[Credit risks](#)" section.

Loss allowances and reversals of loss allowances are reported under "Impairment losses and reversals of impairment losses on financial assets (net)" in the consolidated income statement if the asset can be

characterized as operational. If the asset can be characterized as financial, it is recognized in financial income or financial expenses.

Further information on the accounting and measurement policies governing financial assets can be found in Note (36) "[Other financial assets](#)".

## Significant discretion and sources of estimation uncertainty

### Trade and other receivables

Information on the significant discretion and estimation uncertainty concerning trade and other receivables can be found in Note (42) "[Management of financial risks](#)".

Trade and other receivables were measured as follows:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Subsequently measured at amortized cost	Subsequently measured at fair value through other comprehensive income	Total	Subsequently measured at amortized cost	Subsequently measured at fair value through other comprehensive income	Total
Gross trade accounts receivable	3,556	20	3,576	3,106	19	3,125
Gross other receivables	156	–	156	196	–	196
<b>Gross trade and other receivables</b>	<b>3,712</b>	<b>20</b>	<b>3,732</b>	<b>3,302</b>	<b>19</b>	<b>3,321</b>
Loss allowances on trade accounts receivable	-58	–	-59	-73	–	-73
Loss allowances on other receivables	-2	–	-2	-2	–	-2
<b>Net trade and other receivables</b>	<b>3,652</b>	<b>20</b>	<b>3,672</b>	<b>3,227</b>	<b>19</b>	<b>3,246</b>
thereof: current	3,626	20	3,646	3,202	19	3,221
thereof: non-current	25	–	25	25	–	25

The increase in trade accounts receivable was driven by all business sectors, particularly Life Science.

## (26) Contract assets

### Accounting and measurement policies

#### Contract assets

Contract assets represent contractual claims to receive payment from customers for whom the contractual performance obligation has already been fulfilled, although an unconditional claim to payment has yet to arise.

The following table shows the change in contract assets:

€ million	2021	2020
<b>Jan. 1</b>	<b>169</b>	<b>156</b>
Additions due to business combinations	–	–
Other additions	553	420
thereof: attributable to performance obligations satisfied in prior periods	2	15
Disposals due to divestments/Reclassification to assets held for sale	–	–
Reclassification to trade accounts receivable	-522	-402
Currency effects	7	-5
Other	–	–
<b>Dec. 31</b>	<b>207</b>	<b>169</b>

Contract assets resulted in particular from rendering services and manufacturing of products in the Life Science and Electronics business sectors.

## (27) Other provisions

Other provisions developed as follows:

€ million	Litigation	Restructuring	Environmental protection	Acceptance and follow-on obligations	Interest and penalties related to income taxes	Other	Total
<b>Jan. 1, 2021</b>	<b>155</b>	<b>168</b>	<b>148</b>	<b>47</b>	<b>78</b>	<b>146</b>	<b>741</b>
Additions	102	53	15	72	44	78	364
Utilizations	-30	-66	-4	-16	-7	-40	-164
Release	-132	-29	–	-26	-26	-83	-297
Interest effect	–	–	-6	–	–	–	-6
Currency translation	2	1	–	–	1	4	8
Changes in scope of consolidation/other	1	–	–	–	4	-5	–
Reclassification to assets held for sale	–	–	–	–	–	–	–
<b>Dec. 31, 2021</b>	<b>97</b>	<b>126</b>	<b>153</b>	<b>77</b>	<b>94</b>	<b>100</b>	<b>647</b>
thereof: current	80	65	14	61	94	63	377
thereof: non-current	17	61	139	16	–	37	269

## Accounting and measurement policies

### Provisions for litigation

To assess a recognition obligation in relation to provisions for litigation and to quantify future outflows of resources, the Group draws on the knowledge of the legal department as well as outside counsel.

Assessing the need for recognizing provisions for litigation is based on the likelihood of possible outcomes for proceedings. In particular, the factors influencing this likelihood are:

- the validity of the arguments brought forward by the opposing party, and
- the legal situation and current court rulings in comparable proceedings in the jurisdiction in question.

The following factors are also relevant in measuring provisions for litigation:

- the duration of proceedings in pending legal disputes,
- the applicable license rate plus an expected infringement surcharge,
- the usual damages and fines for comparable legal disputes, and
- the discount factor to be used.

### **Provisions for restructuring**

The Group uses formal restructuring plans to assess recognition obligation for provisions for restructuring projects and the amount of the expected outflow of resources.

### **Provisions for environmental protection**

To assess a recognition obligation in relation to provisions for environmental protection and to quantify future outflows of resources, the Group draws on appraisals by independent external experts and the knowledge of in-house specialists.

The following are key parameters in calculating the present value of the future settlement amount of provisions for environmental protection:

- the future settlement date,
- the extent of environmental damage,
- the applicable remediation methods,
- the associated future costs, and
- the discount factor.

### **Provisions for acceptance and follow-on obligations**

The assessment of the recognition obligation for provisions for acceptance and follow-on obligations and the quantification of future outflows of resources is based on internal project plans as well as on the assessment of the respective matters by in-house and external specialists.

The main parameters in determining the amount of the provision are:

- the ability to use or potential for modification of secured manufacturing capacities at third-party providers, particularly for pharmaceutical compounds,
- the number of affected patients and the expected duration of their continued treatment in clinical development programs,
- the expected date or period of the outflow of resources, and
- the expectations concerning future events influencing the obligations.

### **Provisions for interest and penalties related to income taxes**

Objective assessments are performed to determine the need to recognize provisions for interest and penalties related to income taxes not covered by IAS 12. These assessments rely on internal and external expertise.

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## **Significant discretion and sources of estimation uncertainty**

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### **Provisions for litigation**

Like the measurement of provisions, the assessment of a recognition obligation for provisions for litigation is to a particular extent subject to a degree of estimation uncertainty. The uncertainties relate, in particular, to the assessment of the likelihood and the amount of the outflow of resources.

### **Provisions for restructuring**

Estimation uncertainty about the provisions for restructuring primarily relate to determining the amount of the expected outflow of resources. This is largely influenced by the assumptions made concerning the change in or termination of the employment relationships of the affected employees and the planned implementation date of the restructuring plan.

### **Provisions for environmental protection**

The assessment of a recognition obligation and the measurement of the provisions for environmental protection are subject to discretionary decisions and estimation uncertainties to a particular degree.

The estimation uncertainties relate in particular to the assessment of the timing and likelihood of a future outflow of resources and assessment of the extent of necessary remediation measures and the related calculation of the amount of the liability.

### **Provisions for acceptance and follow-on obligations**

Estimation uncertainty regarding the provisions for acceptance and follow-on obligations primarily relates to determining the amount of the expected outflow of resources.

### **Provisions for interest and penalties related to income taxes**

Estimation uncertainty concerning the provisions for interest and penalties related to income taxes mainly relate to the interpretation of tax codes and the effects of amended case law.

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The most important legal matters in the reporting period are detailed below.

### **Product-related and patent disputes**

**PS-VA liquid crystals mixtures:** In the Electronics business sector, the Group was involved in a legal dispute with JNC Corporation, Japan (JNC). JNC claimed that, by manufacturing and marketing certain liquid crystal mixtures, the Group had infringed JNC patents in China, Taiwan, and Korea. The Group maintained that these patents are invalid owing to relevant prior art. Patent infringement proceedings brought by JNC and the Group's patent nullity proceedings in Korea – that were, until recently, still pending – were resolved as a result of the two parties reaching an agreement in March 2021. On the basis of the agreement, the Group was not required to make any further payments to JNC. The provision, a low double-digit million euro amount, was reversed in the first quarter of fiscal 2021.

**Rebif®:** The Group was involved in a patent dispute with Biogen Inc., United States (Biogen), in the United States. Biogen claimed that the sale of Rebif® in the United States infringed on a Biogen patent. The disputed patent was granted to Biogen in the United States in 2009. Subsequently, Biogen sued the Group and other pharmaceutical companies for damages due to the infringement of this patent. The Group defended itself against all allegations and brought a countersuit against Biogen claiming that the patent was invalid and not infringed by the Group's actions. In the first instance (district court), a jury found the patent to be invalid. This jury verdict was overturned by the judge in the same instance in September 2018. The patent was thus deemed to be legally valid for the time being. The Group filed a complaint with the United States Court of Appeals for the Federal Circuit (second instance) against the first-instance ruling in October 2018. On September 28, 2020, this court overturned the verdict of the judge in the first instance, declared Biogen's

patent to be invalid and instructed the District Court to reinstate the original jury verdict. A complaint filed by Biogen against the ruling was definitively rejected in fiscal 2021, meaning that the proceedings have been concluded and can no longer be contested. The provision of € 365 million that had been recognized for the case was reversed in fiscal 2020 and the resulting income was reported in other operating income.

**Bone cement:** On July 19, 2021, the Group was served an extended suit for damages by Heraeus Medical GmbH, Wehrheim, Germany (Heraeus). Heraeus has been involved proceedings against Biomet Deutschland GmbH, Freiburg im Breisgau, Germany (Biomet), Zimmer Nederland B.V., Netherlands (Zimmer), and Biomet, Inc., United States, since 2017 with the aim of being awarded damages for the unauthorized exploitation of business secrets. It extended its suit to include the Group in July 2021. Based on the accusation, the Group believes it is exposed to the possibility of having to pay damages for having enabled the unlawful imitation of bone cement products by the original defendants, Biomet and Zimmer, owing to a breach of contractual obligations of good faith. The suit has been extended based on the declaratory judgment obtained by Heraeus against the Group in 2013. This judgment found that, in 2004, in dissolving the joint venture that existed with Biomet from 1997 to 2004, the Group breached its duties to Heraeus under a distribution arrangement with Heraeus that existed until 2001. In the second quarter of fiscal 2021 a provision in a mid-double-digit million euro amount had been recognized for this matter. Further developments gave new insights that led to the estimation that a payment of damages by the Group is unlikely. The previously recognized provision was released.

### Antitrust and other proceedings

**Citalopram:** In connection with the generics business that was divested in 2007, the Group was accused of breaching EU antitrust law through agreements entered into by its former subsidiary Generics (UK) Ltd., United Kingdom, relating to the antidepressant Citalopram patented by Lundbeck A/S, Denmark. The European Commission imposed a fine in June 2013. The Group filed a lawsuit against the Commission's decision with the European Court in August 2013. The lawsuit was rejected in 2016. The Group subsequently filed an appeal against this decision with the European Court of Justice, which confirmed the first instance ruling in March 2021. Although the fine of € 18 million was paid in 2013, additional potential claims were considered to be probable. A provision in a mid-double-digit million euro amount was recognized for these proceedings as of December 31, 2021. A cash outflow within the next 12 months is considered possible.

**Paroxetine:** In the United Kingdom, the Group was subject to antitrust investigations by the British Competition and Market Authority in connection with the generics business that was divested in 2007. In March 2013, the authorities informed the Group of the assumption that a settlement agreement entered into in 2002 between Generics (UK) Ltd., United Kingdom, and several subsidiaries of GlaxoSmithKline plc, United Kingdom, in connection with the antidepressant drug paroxetine, violated British and European competition law. They stated that the Group was liable as the then owner of Generics (UK) Ltd. and because it was involved in the negotiations for the settlement agreement. The investigations into Generics (UK) Ltd. started in 2011, without this being known to the Group. After the European Court of Justice confirmed in January 2020 that such settlement agreements can violate European competition law, the Competition Appeal Tribunal set a low single-digit million euro fine in May 2021 that the Group paid in the September of fiscal 2021. A provision in a low double-digit million euro amount was recognized for the risk of additional potential claims as of December 31, 2021. A cash outflow within the next 12 months is considered possible.

**Antitrust review of the acquisition of Sigma-Aldrich Corporation, United States (Sigma-Aldrich):** In May 2021, the European Commission fined Sigma-Aldrich € 8 million as it held that key information on an innovation project had been withheld in conjunction with its approval of the Group's acquisition of Sigma-Aldrich. The European Commission had approved the registration of the merger in 2015, subject to the condition that the Group and Sigma-Aldrich divest parts of the European solvents and inorganic chemicals businesses of Sigma-Aldrich in order to resolve antitrust concerns. In July 2017, it reported that its antitrust review of the acquisition had come to the preliminary conclusion that the Group and Sigma-Aldrich had provided incorrect or misleading information. This allegation against the Group was dropped in 2020. The proceedings were concluded with the imposition of the fine, its payment in June 2021 and the decision to take no further legal action. As no further

outflows of resources are expected, the remainder of the provision was reversed in the second quarter of fiscal 2021. This resulted in income of a low double-digit million euro amount that was reported in other operating income.

### Restructuring

The restructuring provisions recognized as of December 31, 2021, primarily relate to obligations for workforce reduction measures in connection with communicated restructuring projects in all segments. In particular, this resulted from a program for the reorganization of the global sales organization and research and development activities in the Healthcare business sector.

Outflows of resources under the restructuring provisions are expected within the next five years.

### Environmental protection

Provisions for environmental protection resulted in particular from obligations for soil remediation and groundwater protection in connection with the crop protection business in Germany and Latin America that was discontinued in 1987.

### Acceptance and follow-on obligations

Provisions for acceptance and follow-on obligations primarily related to costs in connection with discontinued development projects in the Healthcare business sector as well as obligation surpluses from onerous contracts. The additions were mainly due to the discontinuation of development projects under the strategic alliance with GlaxoSmithKline, United Kingdom (see Note (7) "[Collaboration and licensing agreements](#)"), and relate to the winding up of clinical trials.

### Interest and penalties related to income taxes

Provisions for interest and penalties related to income taxes mainly comprised interest payables associated with or resulting from tax payables.

### Miscellaneous other provisions

Miscellaneous other provisions included provisions for asset retirement obligations, for other tax risks not constituting income tax in accordance with IAS 12, for warranty obligations, and for remaining risks in connection with the disposal of the Consumer Health business.

## (28) Contingent liabilities

### Accounting and measurement policies

#### Contingent liabilities

To identify contingent liabilities from litigation and tax matters, the Group draws on the knowledge of the legal department and the tax department as well as the opinions of external consultants and attorneys.

The key factors in the identification of contingent liabilities are:

- the validity of the arguments brought forward by the opposing party or the tax authority and
- the legal situation and current court rulings in comparable proceedings in the jurisdiction in question.

The amount of the contingent liability is based on the best possible estimate which in turn is based on likelihood of possible outcomes of proceedings and on the applicable license rate in patent disputes.

## Significant discretionary decisions and sources of estimation uncertainty

### Contingent liabilities

The identification and the measurement of contingent liabilities are both subject to considerable uncertainty.

This applies with regard to assessing the likelihood of an outflow of resources as well as determining its amount.

Contingent liabilities were composed as follows:

€ million	Dec. 31, 2021	Dec. 31, 2020
Contingent liabilities from litigation and tax matters	109	87
Other contingent liabilities	–	–

Contingent liabilities from litigation mainly related to obligations under labor law and tort law. Contingent liabilities from tax matters primarily related to the determination of earnings under tax law, customs regulations, and excise tax matters.

In addition, there are contingent liabilities from various legal disputes with Merck & Co., Inc., Kenilworth, NJ, United States (outside the United States and Canada: MSD), among other things due to breach of the coexistence agreement entered into between the two companies and/or trademark/name right infringement regarding the use of the designation “Merck”. In this context, the Group has sued MSD in various countries and has been sued by MSD in the United States. An outflow of resources – except costs for legal defense – was not deemed sufficiently probable as of the balance sheet date to justify the recognition of a provision. Since the contingent liability from these legal disputes could not be reliably quantified as of the balance sheet date, this matter was not considered in the table presented above.

## (29) Other non-financial liabilities

### Accounting and measurement policies

#### Other non-financial liabilities

Accruals for personnel expenses included in other non-financial liabilities comprise, in particular, liabilities resulting from vacation entitlements, bonuses and social security contributions.

Contract liabilities include payments received by the Group prior to completion of contractual performance. In addition to consideration received within the scope of collaboration agreements, this applies particularly to service agreements.

Other non-financial liabilities comprise the following:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Current	Non-current	Total	Current	Non-current <sup>1</sup>	Total
Accruals for personnel expenses	980	–	980	823	–	823
Liabilities from non-income related taxes	226	1	228	157	1	158
Contract liabilities	198	3	202	304	47	351
Other accruals	64	10	74	76	7	82
<b>Other non-financial liabilities</b>	<b>1,468</b>	<b>15</b>	<b>1,483</b>	<b>1,360</b>	<b>55</b>	<b>1,415</b>

<sup>1</sup> Previous year's figures have been adjusted, see Note (2) "[Reporting principles](#)".

The increase in accruals for personnel expenses is attributable in particular to higher bonus liabilities due to the positive course of business.

The decline in contract liabilities is essentially due to the end of the strategic alliance with GlaxoSmithKline plc, United Kingdom, in the field of immuno-oncology (see Note (7) "[Collaboration and licensing agreements](#)").

The following table shows the development of contract liabilities in the period under review:

€ million	2021			2020		
	Current	Non-current	Total	Current	Non-current	Total
<b>Jan. 1</b>	<b>304</b>	<b>47</b>	<b>351</b>	<b>291</b>	<b>87</b>	<b>379</b>
Additions due to business combinations	–	–	–	1	–	1
Other additions	1,283	2	1,284	849	1	850
Disposals due to divestments/Reclassification to assets held for sale	–	–	–	–	–	–
Recognition of income/reversal	-1,435	-1	-1,437	-888	–	-888
Cumulative catch-up adjustments to revenue	-9	–	-9	21	-2	19
Reclassification from non-current to current	44	-44	–	39	-39	–
Currency translation	12	–	12	-9	–	-9
Other	–	–	–	–	–	–
<b>Dec. 31</b>	<b>198</b>	<b>3</b>	<b>202</b>	<b>304</b>	<b>47</b>	<b>351</b>

As of January 1, 2021, contract liabilities amounted to € 351 million (January 1, 2020: € 379 million), of which a total of € 308 million (2020: € 232 million) was recognized through profit or loss in fiscal 2021.

## (30) Trade and other payables

### Accounting and measurement policies

#### Trade and other payables

Trade and other payables are subsequently measured at amortized cost.

Trade and other payables included accrued amounts of € 838 million (December 31, 2020: € 673 million) from outstanding invoices.

## Employees

### (31) Number of employees

As of December 31, 2021, the number of employees within the Group was 60,334 (December 31, 2020: 58,096 employees).

The following table shows the average number of employees broken down by function.

	2021	2020
Production	19,782	17,624
Administration	11,820	11,338
Research and development	7,167	7,503
Supply chain	4,557	4,298
Marketing and sales	14,298	14,101
Other	1,082	2,716
<b>Average number of employees</b>	<b>58,706</b>	<b>57,580</b>

### (32) Personnel expenses

Personnel expenses comprised the following:

€ million	2021	2020
Wages and salaries	4,824	4,669
Compulsory social security contributions and other costs	748	694
Pension expenses	461	408
<b>Personnel expenses</b>	<b>6,033</b>	<b>5,771</b>

Personnel expenses comprised expenses of € 170 million (2020: € 162 million) for defined contribution plans which are funded exclusively using external funds and therefore do not represent any obligation for the Group other than making contribution payments. In addition, employer contributions amounting to € 87 million (2020: € 85 million) were transferred to the German statutory pension insurance system and € 88 million (2020: € 77 million) to statutory pension insurance systems abroad.

### (33) Provisions for employee benefits

Provisions for employee benefits are composed as follows:

€ million	Dec. 31, 2021	Dec. 31, 2020
Provisions for pensions and other post-employment benefits	3,001	3,594
Non-current other employee benefit provisions	401	286
<b>Non-current provisions for employee benefits</b>	<b>3,402</b>	<b>3,880</b>
<b>Current provisions for employee benefits</b>	<b>224</b>	<b>152</b>
<b>Provisions for employee benefits</b>	<b>3,625</b>	<b>4,032</b>

Provisions for other employee benefits include provisions for share-based payments, which are discussed in greater detail in the section on share-based payments in this note.

### Provisions for pensions and other post-employment benefits

#### Accounting and measurement policies

#### Provisions for pensions and other post-employment benefits

In addition to retirement benefit obligations, provisions for pensions and other post-employment benefits include obligations for other post-employment benefits, such as medical care.

The present value of the defined benefit obligation is determined by expert third parties according to the actuarial projected unit credit method. The discount rates are generally determined on the basis of the yields of high-quality corporate bonds with similar maturities and currencies.

The discount factors for defined benefit pension plans are typically determined by reference to discount rates for similar maturities calculated by an external, globally active actuary. This was based on bonds with ratings of at least "AA" or a comparable rating from at least one of the leading rating agencies as of the reporting date.

The other actuarial assumptions used as the basis for calculating the defined benefit obligation, such as rates of salary increases and pension trends, were determined on a country-by-country basis in line with the economic conditions prevailing in each country. The latest country-specific mortality tables are also applied (Germany: Heubeck 2018G, Switzerland: BVG 2020G, United Kingdom: S3PA and S2PA). The potential effects of the Covid-19 pandemic are not shown in these tables and hence were not taken into account.

Apart from the net balance of interest expense for the defined benefit obligations and interest income from the plan assets, which is reported in financial income and financial expenses, the expenses for defined benefit plans are allocated to the individual functional areas in the consolidated income statement.

The calculation of the defined benefit obligations was based on the following actuarial parameters and durations:

	Germany		Switzerland		United Kingdom		Other countries	
	2021	2020	2021	2020	2021	2020	2021	2020
Discount rate	1.28%	0.70%	0.30%	0.06%	1.79%	1.43%	2.22%	1.75%
Future salary increases	2.51%	2.51%	1.89%	1.57%	–	–	3.14%	2.92%
Future pension increases	1.74%	1.75%	–	–	3.11%	2.77%	1.52%	1.48%
Duration	22	24	17	19	20	20	13	14

These were average values weighted by the present value of the respective defined benefit obligation.

### Significant discretionary decisions and sources of estimation uncertainty

#### Provisions for pensions and other post-employment benefits

The determination of the present value of the obligation from defined benefit pension plans primarily requires discretionary judgment as regards the selection of methods to determine the discount rate and to select suitable mortality tables, as well as estimates of future salary and pension increases.

The following overview shows how the present value of all defined benefit obligations would have been impacted by changes to relevant actuarial assumptions:

#### December 31, 2021

€ million	Germany	Switzerland	United Kingdom	Other countries	Total
Increase (+)/decrease (–) in present value of all defined benefit obligations if					
the discount rate were 50 basis points higher	-414	-81	-55	-24	-574
the discount rate were 50 basis points lower	487	93	64	25	669
the expected rate of future salary increase were 50 basis points higher	148	6	–	11	165
the expected rate of future salary increase were 50 basis points lower	-133	-6	–	-10	-149
the expected rate of future pension increase were 50 basis points higher	235	47	22	8	312
the expected rate of future pension increase were 50 basis points lower	-212	–	-21	-7	-240

#### December 31, 2020

€ million	Germany	Switzerland	United Kingdom	Other countries	Total
Increase (+)/decrease (–) in present value of all defined benefit obligations if					
the discount rate were 50 basis points higher	-480	-88	-54	-25	-647
the discount rate were 50 basis points lower	569	102	62	30	763
the expected rate of future salary increase were 50 basis points higher	180	7	–	14	201
the expected rate of future salary increase were 50 basis points lower	-163	-6	–	-12	-181
the expected rate of future pension increase were 50 basis points higher	272	50	21	7	350
the expected rate of future pension increase were 50 basis points lower	-245	–	-20	-7	-272



Sensitivities are determined on the basis of the respective parameters in question, with all other measurement assumptions remaining unchanged.

Both the benefit obligations as well as the plan assets are subject to fluctuations over time. The reasons for such fluctuations could include changes in market interest rates and thus the discount rate, as well as adjustments to other actuarial assumptions (such as life expectancy or expected future increases in pension). This could lead to – or cause an increase in – underfunding. Depending on statutory regulations, it may become necessary in some countries to reduce underfunding through additions of liquid assets.

In order to minimize fluctuations of the net defined benefit liability, in managing its plan assets, the Group also pays attention to potential fluctuations in liabilities. The portfolio is structured in such a way that, in the ideal scenario, plan assets and defined benefit obligations develop in opposing directions when exposed to exogenous factors. This applies in particular to interest rate fluctuations.

Depending on the legal, economic and fiscal circumstances prevailing in each country, different retirement benefit systems are provided for the employees. Generally, these systems are based on the years of service and salaries of the employees. Pension obligations comprise both obligations from current pensions and accrued benefits for pensions payable in the future.

In order to limit the risks of changing capital market conditions and other developments, for the past number of years newly hired employees have been offered plans that are not based on final salary.

The value recognized in the consolidated balance sheet for pensions and other post-employment benefits was derived as follows:

€ million	Dec. 31, 2021	Dec. 31, 2020
<b>Present value of all defined benefit obligations</b>	<b>5,995</b>	<b>6,352</b>
Fair value of the plan assets	-2,999	-2,760
<b>Funded status</b>	<b>2,996</b>	<b>3,592</b>
Effects of the asset ceilings	–	–
<b>Net defined benefit liability</b>	<b>2,996</b>	<b>3,592</b>
Assets from defined benefit plans	5	2
<b>Provisions for pensions and other post-employment benefits</b>	<b>3,001</b>	<b>3,594</b>

The defined benefit obligations were based on the following types of benefits provided by the respective plan:

<b>Dec. 31, 2021</b>					
€ million	Germany	Switzerland	United Kingdom	Other countries	Total
Benefit based on final salary					
Annuity	3,016	–	593	96	3,705
Lump sum	–	–	–	138	138
Installments	2	–	–	–	2
Benefit not based on final salary					
Annuity	981	999	–	83	2,063
Lump sum	1	–	6	38	45
Installments	6	–	–	–	6
Other	–	–	–	8	8
Medical plan	–	–	–	28	28
<b>Present value of defined benefit obligations</b>	<b>4,006</b>	<b>999</b>	<b>599</b>	<b>391</b>	<b>5,995</b>
<b>Fair value of the plan assets</b>	<b>1,308</b>	<b>946</b>	<b>570</b>	<b>176</b>	<b>2,999</b>

<b>Dec. 31, 2020</b>					
€ million	Germany	Switzerland	United Kingdom	Other countries	Total
Benefit based on final salary					
Annuity	3,313	1	571	108	3,993
Lump sum	–	–	–	141	141
Installments	1	–	–	–	1
Benefit not based on final salary					
Annuity	1,054	1,002	–	83	2,139
Lump sum	–	–	6	33	39
Installments	7	–	–	–	7
Other	–	–	–	5	5
Medical plan	–	–	–	27	27
<b>Present value of defined benefit obligations</b>	<b>4,375</b>	<b>1,003</b>	<b>577</b>	<b>397</b>	<b>6,352</b>
<b>Fair value of the plan assets</b>	<b>1,250</b>	<b>820</b>	<b>516</b>	<b>174</b>	<b>2,760</b>

The vast majority of defined benefit obligations of German entities were attributable to plans that encompass old-age, disability, and surviving dependent pensions. These obligations were based on benefit rules comprising benefit commitments dependent on years of service and final salary, as well as two different direct commitments for employees newly hired since January 1, 2005, that is not based on the final salary. The benefit entitlement for new members from January 1, 2005, to December 31, 2020, resulted from the cumulative total of annually determined pension components calculated on the basis of a defined benefit expense and an age-based annuity table. The benefit entitlement for new members from January 1, 2021, resulted from the performance of salary-based employer contributions and voluntary employee contributions, topped up by the employer, to an external fund. A minimum return on contributions has been guaranteed. Statutory minimum funding obligations did not exist.

Pension obligations in Switzerland mainly comprised retirement, disability and surviving dependent benefits regulated by law. The employer and the employees made contributions to the plans. Statutory minimum funding obligations existed.

Pension obligations in the United Kingdom resulted primarily from benefit plans which are based on years of service and final salary and were closed to newly hired employees from 2006 onward. The agreed benefits

comprised retirement, disability and surviving dependent benefits. The employer and the employees made contributions to the plans. Statutory minimum funding obligations existed.

The development of the net defined benefit liability was as follows:

## 2020

€ million	Present value of the defined benefit obligations	Fair value of the plan assets	Effects of the asset ceilings	Net defined benefit liability
<b>January 1, 2020</b>	<b>-5,644</b>	<b>2,692</b>	<b>-1</b>	<b>-2,953</b>
Current service cost	-197	-	-	-197
Interest expense	-69	-	-	-69
Interest income	-	30	-	30
Plan administration costs recognized in income	-	-3	-	-3
Past service cost	-1	-	-	-1
Gains (+) or losses (-) on settlement	-1	-	-	-1
Currency effects recognized in income	-1	-	-	-1
Other effects recognized in income	-	-	-	-
<b>Items recognized in income</b>	<b>-269</b>	<b>27</b>	<b>-</b>	<b>-242</b>
Remeasurements of defined benefit obligations				
Actuarial gains (+)/losses (-) arising from changes in demographic assumptions	-4	-	-	-4
Actuarial gains (+)/losses (-) arising from changes in financial assumptions	-678	-	-	-678
Actuarial gains (+)/losses (-) arising from experience adjustments	-	-	-	-
Remeasurements of plan assets				
Actuarial gains (+)/losses (-) arising from experience adjustments	-	78	-	78
Changes in the effects of the asset ceilings				
Actuarial gains (+)/losses (-)	-	-	1	1
<b>Actuarial gains (+)/losses (-)</b>	<b>-682</b>	<b>78</b>	<b>1</b>	<b>-602</b>
Pension payments	134	-53	-	81
Employer contributions	-	38	-	38
Employee contributions	-16	16	-	-
<b>Payment transactions</b>	<b>118</b>	<b>1</b>	<b>-</b>	<b>119</b>
Changes in the scope of consolidation	72	-	-	72
Currency translation recognized in equity	49	-34	-	15
Other changes	4	-4	-	-
<b>Other</b>	<b>125</b>	<b>-38</b>	<b>-</b>	<b>87</b>
<b>December 31, 2020</b>	<b>-6,352</b>	<b>2,760</b>	<b>-</b>	<b>-3,592</b>

2021

€ million	Present value of the defined benefit obligations	Fair value of the plan assets	Effects of the asset ceilings	Net defined benefit liability
<b>January 1, 2021</b>	<b>-6,352</b>	<b>2,760</b>	<b>-</b>	<b>-3,592</b>
Current service cost	-228	-	-	-228
Interest expense	-46	-	-	-46
Interest income	-	19	-	19
Plan administration costs recognized in income	-	-3	-	-3
Past service cost	3	-	-	3
Gains (+) or losses (-) on settlement	-	-	-	-
Currency effects recognized in income	-29	27	-	-2
Other effects recognized in income	1	-	-	1
<b>Items recognized in income</b>	<b>-299</b>	<b>43</b>	<b>-</b>	<b>-256</b>
Remeasurements of defined benefit obligations				
Actuarial gains (+)/losses (-) arising from changes in demographic assumptions	60	-	-	60
Actuarial gains (+)/losses (-) arising from changes in financial assumptions	626	-	-	626
Actuarial gains (+)/losses (-) arising from experience adjustments	-80	-	-	-80
Remeasurements of plan assets				
Actuarial gains (+)/losses (-) arising from experience adjustments	-	145	-	145
Changes in the effects of the asset ceilings				
Actuarial gains (+)/losses (-)	-	-	-	-
<b>Actuarial gains (+)/losses (-)</b>	<b>606</b>	<b>145</b>	<b>-</b>	<b>751</b>
Pension payments	135	-52	-	83
Employer contributions	-	35	-	35
Employee contributions	-18	17	-	-1
<b>Payment transactions</b>	<b>117</b>	<b>-</b>	<b>-</b>	<b>117</b>
Changes in the scope of consolidation	-	-	-	-
Currency translation recognized in equity	-76	60	-	-16
Other changes	9	-9	-	-
<b>Other</b>	<b>-67</b>	<b>51</b>	<b>-</b>	<b>-16</b>
<b>December 31, 2021</b>	<b>-5,995</b>	<b>2,999</b>	<b>-</b>	<b>-2,996</b>

The actual income from plan assets amounted to € 164 million in the year under review (2020: € 108 million).

Covering the benefit obligations with financial assets represents a means of providing for future cash outflows, which are required in some countries (for example Switzerland and the United Kingdom) on the basis of legal requirements and in other countries (for example Germany) on a voluntary basis.

The fair value of the plan assets was allocated to the following categories:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Quoted market price in an active market	No quoted market price in an active market	Total	Quoted market price in an active market	No quoted market price in an active market	Total
Cash and cash equivalents	85	–	85	80	–	80
Equity instruments	769	–	769	645	–	645
Debt instruments	1,281	–	1,281	1,317	–	1,317
Direct investments in real estate	–	146	146	–	125	125
Investment funds	246	266	512	285	208	493
Insurance contracts	–	71	71	–	72	72
Other	129	6	135	23	5	28
<b>Fair value of the plan assets</b>	<b>2,510</b>	<b>489</b>	<b>2,999</b>	<b>2,350</b>	<b>410</b>	<b>2,760</b>

Plan assets did not directly include financial instruments issued by Group companies or real estate used by Group companies.

Employer contributions to plan assets and direct payments to plan beneficiaries for the next year are expected to amount to € 37 million (2020: € 32 million) and € 84 million (2020: € 81 million) respectively.

The expected payments of undiscounted benefits were as follows:

#### December 31, 2021

€ million	Expected payments of undiscounted benefits				
	Germany	Switzerland	United Kingdom	Other countries	Total
2022	75	21	22	37	156
2023	81	21	22	25	149
2024	83	21	23	22	149
2025	88	21	23	26	158
2026	91	21	24	24	160
2027-2031	515	101	134	139	888

#### December 31, 2020

€ million	Expected payments of undiscounted benefits				
	Germany	Switzerland	United Kingdom	Other countries	Total
2021	72	19	18	23	132
2022	78	19	18	27	142
2023	79	19	18	19	135
2024	82	20	19	19	140
2025	86	19	19	25	149
2026-2030	485	95	106	121	807

The weighted duration of defined benefit obligations amounted to 21 years (2020: 22 years).

## Other employee benefit provisions

### Accounting and measurement policies

#### Other employee benefit provisions

Other employee benefit provisions include obligations from share-based compensation programs. More information on these compensation programs can be found below.

Obligations for partial retirement programs and other severance payments not recognized in connection with restructuring programs as well as obligations in connection with long-term working hour accounts and anniversary bonuses are also included in other employee benefit provisions.

Other employee benefit provisions developed as follows:

€ million	Non-current other employee benefit provisions	Current other employee benefit provisions	Total
<b>Jan. 1, 2021</b>	<b>286</b>	<b>152</b>	<b>438</b>
Additions	253	160	413
Utilizations	-27	-139	-165
Release	-38	-48	-86
Interest effect	1	-	1
Currency translation	16	8	23
Reclass non-curr to curr	-90	90	-
Changes in scope of consolidation/other	-	-	-
<b>Dec. 31, 2021</b>	<b>401</b>	<b>224</b>	<b>624</b>

## Share-based payments

### Accounting and measurement policies

#### Share-based payments

Provisions are recognized for the share-based compensation program with cash settlement within the Group ("Long-Term Incentive Plan of Merck KGaA, Darmstadt, Germany") and reported in other employee benefit provisions.

The fair value of the obligations is calculated by an external expert using a Monte Carlo simulation on each balance sheet date. The main parameters in the measurement of the share-based compensation programs with cash-settlement are long-term indicators of company performance and the price movement of the shares of Merck KGaA, Darmstadt, Germany, in relation to the DAX®. The effects of the expansion of the DAX®-30 to create the DAX®-40 in fiscal 2021 were reflected in the measurement of the compensation program as part of the net expenses.

The expected volatilities are based on the implicit volatility of the shares of Merck KGaA, Darmstadt, Germany, and the DAX® in accordance with the remaining term of the respective tranche. The dividend payments incorporated into the valuation model are based on medium-term dividend expectations.

Changes to the intrinsic value of share-based compensation programs are allocated to the respective functional costs according to the causation principle. Time value changes are recognized in financial income or finance costs.

## Significant discretionary decisions and sources of estimation uncertainty

### Share-based payments

The measurement of long-term share-based compensation programs implies extensive estimation uncertainty. The following overview shows the amounts by which the non-current provisions from share-based compensation programs (carrying amount as of December 31, 2021: € 184 million/carried amount as of December 31, 2020: € 99 million) would have been impacted by changes in the DAX® or the closing price of the share of Merck KGaA, Darmstadt, Germany, on the balance sheet date. The amounts stated would have led to a corresponding reduction or increase in profit before income tax.

€ million		Increase (+)/decrease (-) of the provision	
		Dec. 31, 2021	Dec. 31, 2020
Variation of the share price of Merck KGaA, Darmstadt, Germany	10%	5	17
	-10%	-9	-16
Change in the DAX®	10%	-2	-6
	-10%	-	6

Sensitivities were determined on the basis of the respective parameters in question, with all other measurement assumptions remaining unchanged. The 2019 tranche reported under current provisions will not be subject to any value fluctuations between December 31, 2021, and the payout date and was therefore excluded from the sensitivity analysis (December 31, 2020: exclusion of 2018 tranche).

These share-based compensation programs with cash settlement in place within the Group are aligned with target achievement based on key performance indicators as well as the long-term performance of the shares of Merck KGaA, Darmstadt, Germany. Certain employees are eligible to receive a certain number of virtual shares – Share Units of Merck KGaA, Darmstadt, Germany (MSUs) – at the end of a three-year performance cycle. The number of MSUs that could be received depends on the individual grant defined for the respective person and the average closing price of the shares of Merck KGaA, Darmstadt, Germany, in Xetra® trading during the last 60 trading days prior to January 1 of the respective performance cycle (reference price). When the three-year performance cycle ends, the number of MSUs to then be granted is determined based on the development of defined key performance indicators (KPIs).

The calculation is based on the performance of the share price of Merck KGaA, Darmstadt, Germany, compared to the performance of the DAX® with a weighting of 50%, the development of the EBITDA pre margin during the performance cycle as a proportion of a defined target value with a weighting of 25%, and the development of organic sales growth as a proportion of a defined target value, also with a weighting of 25%.

Depending on the development of the KPIs, at the end of the respective performance cycle the eligible participants are granted between 0% and 150% of the MSUs they could be eligible to receive. A cash payment is made based on the MSUs granted after the three-year performance cycle has ended. The value of a granted MSU, which is relevant for payment, corresponds to the average closing price of the shares of Merck KGaA, Darmstadt, Germany, in Xetra® trading during the last 60 trading days prior to the end of the performance cycle. The payout amounts of the respective tranches are limited to two and a half times the individual grant.

The following table presents the key parameters as well as the development of the potential number of Share Units of Merck KGaA, Darmstadt, Germany (MSUs) for the individual tranches:

	2019 tranche	2020 tranche	2021 tranche
Performance cycle	Jan. 1, 2019 - Dec. 31, 2021	Jan. 1, 2020 - Dec. 31, 2022	Jan. 1, 2021 - Dec. 31, 2023
Term	3 Years	3 Years	3 Years
Reference price of the shares of Merck KGaA, Darmstadt, Germany, in € (60-day average of the share price of Merck KGaA, Darmstadt, Germany, prior to the start of the performance cycle)	93.75	105.52	132.43
DAX® value (60-day average of the DAX® prior to the start of the performance cycle)	11,304.33	12,971.22	12,995.23
<b>Potential number of MSU</b>			
Potential number offered for the first time in 2019	876,061	-	-
Forfeited	37,122	-	-
Dec. 31, 2019	838,939	-	-
Potential number offered for the first time in 2020	-	871,700	-
Forfeited	47,622	33,825	-
Paid out	1,417	217	-
Dec. 31, 2020	789,900	837,658	-
Potential number offered for the first time in 2021	-	-	685,700
Forfeited	67,867	74,364	41,813
Paid out	4,038	2,006	-
<b>Dec. 31, 2021</b>	<b>717,995</b>	<b>761,288</b>	<b>643,887</b>

The value of the provisions as of December 31, 2021, was € 348 million (December 31, 2020: € 213 million). Net expenses of € 249 million were incurred in fiscal 2021 (2020: net expenses of € 149 million). The three-year tranche issued in fiscal 2018 ended at the end of 2020; an amount of € 110 million was paid out in fiscal 2021. The three-year tranche issued in fiscal 2019 ended at the end of 2021; a payout of € 163 million is expected for fiscal 2022. At the reporting date, the average closing prices of the shares of Merck KGaA, Darmstadt, Germany, in Xetra® trading over the last 60 trading days was € 207.24.



# Capital Structure, Investments, and Financing Activities

## (34) Equity

### Accounting and measurement policies

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#### Accounting treatment of the general partner's equity

As a partnership limited by shares, Merck KGaA, Darmstadt, Germany, has two different shareholder groups who have contributed to the company: the general partner E. Merck KG, Darmstadt, Germany, as the personally liable partner, and the shareholders.

From an accounting perspective, the contributions of both shareholder groups are treated as equity, regardless of the general partner's option to terminate its capital share. This treatment is based on the provision in the Articles of Association of Merck KGaA, Darmstadt, Germany, stating that the limited liability shareholders may decide on the conversion of the company into a stock corporation and thus limit the general partner's settlement claim to fulfillment in equity instruments.

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#### Equity capital/capital reserves

The equity capital of the company consisted of the subscribed capital composed of shares and the equity interest held by the general partner E. Merck KG, Darmstadt, Germany (general partner's equity). As of the balance sheet date, the company's subscribed capital amounting to € 168 million was divided into 129,242,251 no-par value bearer shares plus one registered share. Each share therefore corresponded to € 1.30 of the subscribed capital. The amount resulting from the issue of shares by Merck KGaA, Darmstadt, Germany, exceeding the nominal amount was recognized in the capital reserves. The equity interest held by the general partner amounted to € 397 million. As in the previous year, there were no changes in subscribed capital in the fiscal year.

## Retained earnings

Retained earnings developed as follows:

€ million	Retained earnings/net retained profit	Remeasurement of defined benefit plans	Fair value reserve for equity instruments	Retained earnings
<b>Jan. 1, 2020</b>	<b>13,134</b>	<b>-1,729</b>	<b>79</b>	<b>11,483</b>
Profit after tax	1,987	-	-	1,987
Gains/losses recognized in equity	-	-473	116	-357
<b>Comprehensive income</b>	<b>1,987</b>	<b>-473</b>	<b>116</b>	<b>1,631</b>
Dividend payments	-168	-	-	-168
Profit transfer to/from E. Merck KG, Darmstadt, Germany, including changes in reserves	-567	-	-	-567
Transactions with no change of control	-1	-	-	-1
Change in scope of consolidation/Other	68	23	-91	-
<b>Dec. 31, 2020</b>	<b>14,453</b>	<b>-2,179</b>	<b>105</b>	<b>12,378</b>
<b>Jan. 1, 2021</b>	<b>14,453</b>	<b>-2,179</b>	<b>105</b>	<b>12,378</b>
Profit after tax	3,055	-	-	3,055
Gains/losses recognized in equity	-	632	-33	599
<b>Comprehensive income</b>	<b>3,055</b>	<b>632</b>	<b>-33</b>	<b>3,653</b>
Dividend payments	-181	-	-	-181
Profit transfer to/from E. Merck KG, Darmstadt, Germany, including changes in reserves	-716	-	-	-716
Transactions with no change of control	-	-	-	-
Change in scope of consolidation/Other	-	8	-8	-
<b>Dec. 31, 2021</b>	<b>16,610</b>	<b>-1,539</b>	<b>63</b>	<b>15,134</b>

## Gains/losses recognized in equity

Gains/losses recognized in equity developed as follows (see also Note (39) "[Derivative financial instruments](#)"):

€ million	Fair value reserve for debt instruments	Cash flow hedge reserve	Cost of cash flow hedge reserve	Currency translation difference	Gains/losses recognized in equity
<b>Jan. 1, 2020</b>	<b>-1</b>	<b>-118</b>	<b>-33</b>	<b>2,131</b>	<b>1,980</b>
Profit after tax	-	-	-	-	-
<b>Gains/losses recognized in equity</b>	<b>-</b>	<b>69</b>	<b>-1</b>	<b>-1,859</b>	<b>-1,790</b>
Fair value adjustment	-	54	-13	-1,862	-1,821
Reclassification to profit or loss	-	45	12	4	61
Reclassification to assets	-	-	-	-	-
Tax effect	-	-30	1	-	-29
<b>Comprehensive income</b>	<b>-</b>	<b>69</b>	<b>-1</b>	<b>-1,859</b>	<b>-1,790</b>
<b>Dec. 31, 2020</b>	<b>-</b>	<b>-49</b>	<b>-34</b>	<b>273</b>	<b>189</b>
<b>Jan. 1, 2021</b>	<b>-</b>	<b>-49</b>	<b>-34</b>	<b>273</b>	<b>189</b>
Profit after tax	-	-	-	-	-
<b>Gains/losses recognized in equity</b>	<b>-</b>	<b>-95</b>	<b>11</b>	<b>1,719</b>	<b>1,635</b>
Fair value adjustment	-	-127	-13	1,725	1,584
Reclassification to profit or loss	-	27	27	-6	49
Reclassification to assets	-	-	-	-	-
Tax effect	-	5	-3	-	2
<b>Comprehensive income</b>	<b>-</b>	<b>-95</b>	<b>11</b>	<b>1,719</b>	<b>1,635</b>
<b>Dec. 31, 2021</b>	<b>-</b>	<b>-145</b>	<b>-23</b>	<b>1,992</b>	<b>1,824</b>

## The share of net profit of E. Merck KG, Darmstadt, Germany

E. Merck KG, Darmstadt, Germany, and Merck KGaA, Darmstadt, Germany, engage in reciprocal net profit transfers. This makes it possible for E. Merck KG, Darmstadt, Germany, the general partner of Merck KGaA, Darmstadt, Germany, and the shareholders to participate in the net profit/loss of Merck KGaA, Darmstadt, Germany, in accordance with the ratio of the general partner's equity interest and the subscribed capital (70.274% or 29.726% of the equity capital).

The allocation of net profit/loss is based on the net income of both E. Merck KG, Darmstadt, Germany, and Merck KGaA, Darmstadt, Germany, determined in accordance with the provisions of the German Commercial Code. These figures are adjusted for trade tax and/or corporation tax and create the basis for the allocation of net profit/loss. The adjustment for corporation tax is made to compensate for the difference in the tax treatment between the general partner and the limited liability shareholders. Corporation tax is only calculated on the income received by the limited liability shareholders. Its equivalent is the income tax applicable to the partners of E. Merck KG, Darmstadt, Germany, which must be paid by them directly. The adjustment thus ensures that the share in net profit corresponds to the respective interests held by the two shareholder groups.

## Appropriation of profits

The profit distribution to be resolved upon by shareholders also defines the amount of that portion of net profit/loss freely available to E. Merck KG, Darmstadt, Germany. If the shareholders resolve to carry forward or to allocate to retained earnings a portion of the net retained profit of Merck KGaA, Darmstadt, Germany, to which they are entitled, E. Merck KG, Darmstadt, Germany, shall be obliged to allocate to the profit brought forward/retained earnings of Merck KGaA, Darmstadt, Germany, a comparable sum determined according to the ratio of subscribed capital to general partner's equity. This ensures that the retained earnings and the profit carried forward of Merck KGaA, Darmstadt, Germany, correspond to the ownership ratios of the shareholders.

on the one hand and E. Merck KG, Darmstadt, Germany, on the other hand. Consequently, for distributions to E. Merck KG, Darmstadt, Germany, the available amount is the amount that results from netting the profit transfer of Merck KGaA, Darmstadt, Germany, with the amount either allocated or withdrawn by E. Merck KG, Darmstadt, Germany, from retained earnings/profit carried forward. This amount corresponds to the sum paid as a dividend to the shareholders and reflects their pro rata shareholding in the company.

The reciprocal net profit/loss transfer between E. Merck KG, Darmstadt, Germany, and Merck KGaA, Darmstadt, Germany, as stipulated by the Articles of Association was as follows:

€ million		2021		2020	
		E. Merck KG, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany	E. Merck KG, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany
Result of E. Merck KG, Darmstadt, Germany, before reciprocal profit transfer, adjusted for trade tax		19	–	-44	–
Net income of Merck KGaA, Darmstadt, Germany, before reciprocal profit transfer		–	1,031	–	701
Corporation tax		–	33	–	20
<b>Basis for appropriation of profits</b>	<b>(100%)</b>	<b>19</b>	<b>1,065</b>	<b>-44</b>	<b>721</b>
Profit transfer to E. Merck KG, Darmstadt, Germany (ratio of general partner's equity to equity capital)	(70.274%)	748	-748	506	-506
Profit/loss transfer to Merck KGaA, Darmstadt, Germany (ratio of subscribed capital to equity capital)	(29.726%)	-6	6	13	-13
Corporation tax		–	-33	–	-20
<b>Net income</b>		<b>761</b>	<b>289</b>	<b>475</b>	<b>181</b>

The result of E. Merck KG, Darmstadt, Germany, on which the appropriation of profits adjusted for trade tax is based, amounted to € 19 million (2020: € -44 million). This resulted in a profit/loss transfer to Merck KGaA, Darmstadt, Germany, of € 6 million (2020: € -13 million). The net income of Merck KGaA, Darmstadt, Germany, adjusted for corporation tax, on which the appropriation of its profit is based, amounted to € 1,065 million (2020: € 721 million). Merck KGaA, Darmstadt, Germany, transferred a profit in the amount of € 748 million to E. Merck KG, Darmstadt, Germany (2020: € 506 million). In addition, an expense from corporation tax charges was reported in the amount of € 33 million (2020: expense of € 20 million).

€ million		2021		2020	
		E. Merck KG, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany	E. Merck KG, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany
Net income		761	289	475	181
Profit carried forward previous year		63	27	63	26
Withdrawal from revenue reserves		–	–	–	–
Transfer to revenue reserves		–	–	–	–
<b>Retained earnings Merck KGaA, Darmstadt, Germany</b>			<b>315</b>		<b>208</b>
Withdrawal by E. Merck KG, Darmstadt, Germany		-644	–	-474	–
Dividend proposal		–	-239	–	-181
<b>Profit carried forward</b>		<b>180</b>	<b>76</b>	<b>63</b>	<b>27</b>

A dividend of € 1.40 per share was distributed for fiscal 2020. The dividend proposal for fiscal 2021 will be € 1.85 per share. The proposed dividend payment to shareholders amounts to € 239 million (2020: € 181 million). On this basis, the amount E. Merck KG, Darmstadt, Germany, is entitled to withdraw is € 644 million (2020: € 474 million).

### Appropriation of profits and changes in reserves

€ million	2021			2020		
	Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany	Total	Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany	Merck KGaA, Darmstadt, Germany	Total
Profit transfer to E. Merck KG, Darmstadt, Germany	-90	-748	-838	-48	-506	-555
Profit/loss transfer from E. Merck KG, Darmstadt, Germany	-	6	6	-	-13	-13
Transfer to revenue reserves/change in profit carried forward	-	117	117	-	-	-
<b>Profit transfer to E. Merck KG, Darmstadt, Germany, including changes in reserves</b>	<b>-90</b>	<b>-626</b>	<b>-716</b>	<b>-48</b>	<b>-519</b>	<b>-567</b>
Result of E. Merck KG, Darmstadt, Germany, before reciprocal profit transfer adjusted for trade tax	-	19	-	-	-44	-
<b>Profit transfer to E. Merck KG, Darmstadt, Germany/withdrawal by E. Merck KG, Darmstadt, Germany</b>	<b>-90</b>	<b>-644</b>	-	<b>-48</b>	<b>-474</b>	-

Based on the assumed appropriation of profits, the profit/loss transfer to E. Merck KG, Darmstadt, Germany, for fiscal 2021, including changes in reserves, amounted to € -716 million. This consisted of the profit transfer to E. Merck KG, Darmstadt, Germany (€ -748 million), the profit/loss transfer from E. Merck KG, Darmstadt, Germany, to Merck KGaA, Darmstadt, Germany (€ 6 million), the change in profit carried forward by E. Merck KG, Darmstadt, Germany (€ 117 million) and the profit transfer from Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany, to E. Merck KG, Darmstadt, Germany (€ -90 million). In the previous year, the profit/loss transfer to E. Merck KG, Darmstadt, Germany, including changes in reserves amounted to € -567 million. This consisted of the profit transfer to E. Merck KG, Darmstadt, Germany (€ -506 million), the profit/loss transfer from E. Merck KG, Darmstadt, Germany, to Merck KGaA, Darmstadt, Germany (€ -13 million) and the profit transfer from Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany, to E. Merck KG, Darmstadt, Germany (€ -48 million) and was paid to E. Merck KG, Darmstadt, Germany, in fiscal 2021. Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany, is a partnership under Swiss law that is controlled by Merck KGaA, Darmstadt, Germany, but distributes its operating result directly to E. Merck KG, Darmstadt, Germany. This distribution is a payment to shareholders and is therefore also presented under changes in equity.

### Non-controlling interests

The calculation of non-controlling interests was based on the reported equity of the subsidiaries concerned.

The non-controlling interests in consolidated equity and profit or loss essentially related to the non-controlling interests in Versum Materials Taiwan Co., Ltd., Taiwan, and Merck Ltd., Thailand, a subsidiary of Merck KGaA, Darmstadt, Germany, and in the listed company PT Merck Tbk., Indonesia, a subsidiary of Merck KGaA, Darmstadt, Germany.

## (35) Cash and cash equivalents

### Accounting and measurement policies

#### Cash and cash equivalents

Cash and cash equivalents include short-term investments with a maximum maturity of up to three months, which can be readily converted to a determined amount of cash.

Cash and cash equivalents comprised the following items:

€ million	Dec. 31, 2021	Dec. 31, 2020
Cash, bank balances and cheques	1,072	910
Short-term cash investments (up to 3 months)	827	446
<b>Cash and cash equivalents</b>	<b>1,899</b>	<b>1,355</b>

Changes in cash and cash equivalents as defined by IAS 7 are presented in the consolidated cash flow statement.

Cash and cash equivalents included restricted cash amounting to € 388 million (December 31, 2020: € 246 million). This mainly related to cash and cash equivalents at subsidiaries that are subject to capital controls.

The maximum default risk was equivalent to the carrying amount of cash and cash equivalents.

## (36) Other financial assets

### Accounting and measurement policies

#### Other financial assets

This section does not cover the accounting and measurement policies for derivative financial instruments. They are presented in Note (39) "[Derivative financial instruments](#)".

#### Recognition and initial measurement

Financial assets are initially measured at fair value and recognized as of the settlement date. For financial assets not subsequently measured at fair value through profit or loss in subsequent periods, initial measurement also includes directly attributable transaction costs.

Detailed information on the measurement methods for financial assets measured at fair value are presented in Note (43) "[Information on fair value measurement](#)".

#### Classification and subsequent measurement

On initial recognition, financial assets are assigned to one of the following measurement categories which also correspond to the financial instrument classes as defined in IFRS 9:

- subsequent measurement at amortized cost,
- subsequent measurement at fair value through other comprehensive income, or
- subsequent measurement at fair value through profit or loss.

This classification is based on the business model and the structure of contractual payment flows. Financial assets subsequently measured at amortized cost are accounted for using the effective interest method and considering any impairment losses. The procedure for calculating impairment losses is described in Note (42) "[Management of financial risks](#)". Financial assets of this class are held in order to collect their contractual cash flows, which are exclusively principal repayments and interest payments on the outstanding capital amount.

Except for derivative financial instruments with positive market value, the Group only applies subsequent measurement at fair value through profit or loss for debt instruments with contractual properties resulting in cash flows that do not exclusively represent principal repayments and interest payments on the outstanding capital amount. In particular, this includes contingent consideration that was contractually agreed with the acquirer within the context of the disposal of businesses within the meaning of IFRS 3 (see Note (43) "[Information on fair value measurement](#)"). The Group does not utilize the option of the subsequent measurement of debt instruments at fair value through profit or loss.

Equity instruments not subject to mandatory subsequent measurement at fair value through profit or loss are measured at fair value through other comprehensive income in subsequent periods if they are intended to be held for the longer term. Further details on the measurement of equity instruments at fair value are presented in Note (43) "[Information on fair value measurement](#)".

Financial assets would only be reclassified in the rare event of the Group changing its business model with regard to the management of financial assets.

### **Derecognition**

Financial assets are derecognized if the claim for the compensation is fulfilled by the other counterparty, if there is no longer a reasonable expectation that the counterparty will fulfill its contractual obligations, or if the Group transfers the contractual rights including all material risks and rewards of the financial asset to another counterparty.

## Recognition

The following table provides details on the measurement effects of debt instruments on the consolidated balance sheet and the consolidated income statement:

Category	Asset type	Impairment losses/reversals of impairment losses	Net gain and net loss on disposal/value adjustments	Foreign currency gains or losses	Interest income or expenses
Subsequent measurement at amortized cost	Operational	Impairment losses, and reversals of impairment losses of financial assets (net)	Other operating income or other operating expenses	Other operating income or other operating expenses	Financial income and expenses (applying the effective interest method)
	Financial	Financial income and expenses	Financial income and expenses	Financial income and expenses	
Subsequent measurement at fair value through other comprehensive income	Operational	Impairment losses, and reversals of impairment losses of financial assets (net)	Group equity (upon derecognition: reclassification to other operating income or other operating expenses)	Other operating income or other operating expenses	Financial income and expenses
	Financial	Financial income and expenses	Group equity (upon derecognition: reclassification to financial income and expenses)	Financial income and expenses	
Subsequent measurement at fair value through profit or loss	Operational		Other operating income or other operating expenses	Other operating income or other operating expenses	Financial income and expenses
	Financial		Financial income and expenses	Financial income and expenses	

The following table provides details on the measurement effects of equity instruments on the consolidated balance sheet and the consolidated income statement:

Category	Asset type	Value adjustments	Foreign currency gains or losses	Dividend income
Subsequent measurement at fair value through other comprehensive income	Operational	Results recognized directly in equity (value adjustments)	Foreign currency gains and losses recognized directly in equity	Other operating income
		Reclass of the cumulative results previously recognized directly in equity in the retained earnings when asset is disposed		
	Financial	Results recognized directly in equity (value adjustments)	Foreign currency gains and losses recognized directly in equity	Financial income
		Reclass of the cumulative results previously recognized directly in equity in the retained earnings when asset is disposed		
Subsequent measurement at fair value through profit or loss	Operational	Other operating income or other operating expenses	Other operating income or other operating expenses	Other operating income
	Financial	Financial income and expenses	Financial income and expenses	Financial income



Other financial assets were composed as follows:

€ million	Dec. 31, 2021			Dec. 31, 2019		
	current	non-current	Total	current	non-current	Total
<b>Subsequent measurement at amortized cost</b>	<b>57</b>	<b>4</b>	<b>61</b>	<b>1</b>	<b>7</b>	<b>7</b>
Loans against third parties	–	4	5	–	7	7
Other	56	–	56	–	–	–
<b>Subsequent measurement at fair value through other comprehensive income</b>	<b>43</b>	<b>463</b>	<b>506</b>	<b>5</b>	<b>504</b>	<b>509</b>
Equity instruments	–	462	462	–	499	499
Debt instruments	43	1	44	5	4	9
<b>Subsequent measurement at fair value through profit and loss</b>	<b>49</b>	<b>444</b>	<b>493</b>	<b>23</b>	<b>312</b>	<b>335</b>
Contingent consideration	–	271	271	–	260	260
Other debt instruments	12	149	161	7	34	41
Derivatives without a hedging relationship (financial transactions)	37	–	37	16	10	26
Derivatives without a hedging relationship (operational)	–	24	24	–	8	8
<b>Derivatives with a hedging relationship (operational)</b>	<b>25</b>	<b>–</b>	<b>25</b>	<b>96</b>	<b>–</b>	<b>96</b>
<b>Financial assets</b>	<b>174</b>	<b>911</b>	<b>1,085</b>	<b>125</b>	<b>822</b>	<b>947</b>

The increase in other debt instruments with subsequent measurement at fair value through profit or loss is primarily due to the acquisition of units of an index fund.

As in the previous year, contingent consideration included claims arising from the divestments of the biosimilars business to Fresenius SE & Co. KGaA, Bad Homburg vor der Höhe, in 2017 and the Kuvan® business to BioMarin Pharmaceuticals Inc., United States, in 2015.

Equity interests with subsequent measurement at fair value through other comprehensive income primarily related to shares in M Ventures portfolio companies as well as Precigen Inc., United States. Please refer to Note (48) "[List of shareholdings](#)" for a detailed list of all investments made in equity instruments with subsequent measurement at fair value through other comprehensive income.

## (37) Financial debt/Capital management

### Accounting and measurement policies

#### Financial debt/capital management

Except for lease liabilities and derivatives with negative market values, financial debt is initially recognized at fair value and subsequently measured at amortized cost using the effective interest method.

The accounting and measurement policies for lease liabilities and derivatives are presented in Notes (21) "[Leasing](#)" and (39) "[Derivative financial instruments](#)".

The composition of financial debt as well as a reconciliation to net financial debt are presented in the following table:

	Dec. 31, 2021 € million	Dec. 31, 2020 € million	Maturity	Interest rate %	Nominal value	
					€ million	Currency
Hybrid bond 2014/2074	–	315	Dec. 2074 <sup>1</sup>	2.625	317	€
USD bond 2015/2022	884	–	March 2022	2.950	1,000	USD
Eurobond 2015/2022	550	–	Sept. 2022	1.375	550	€
<b>Bonds (current)</b>	<b>1,434</b>	<b>315</b>				
Commercial paper	–	200				
Bank loans	36	835				
Liabilities to related parties	896	817				
Loans from third parties and other financial debt	13	15				
Liabilities from derivatives (financial transactions)	35	62				
Lease liabilities (IFRS 16)	117	112				
<b>Current financial debt</b>	<b>2,531</b>	<b>2,357</b>				
USD bond 2015/2022	–	812	March 2022	2.950	1,000	USD
Eurobond 2015/2022	–	549	Sept. 2022	1.375	550	€
Eurobond 2019/2023	600	600	Dec. 2023	0.005	600	€
USD bond 2015/2025	1,410	1,295	March 2025	3.250	1,600	USD
Eurobond 2020/2025	746	745	July 2025	0.125	750	€
Eurobond 2019/2027	597	597	July 2027	0.375	600	€
Eurobond 2020/2028	747	746	July 2028	0.500	750	€
Eurobond 2019/2031	797	796	July 2031	0.875	800	€
Hybrid bond 2014/2074	499	499	Dec. 2074 <sup>2</sup>	3.375	500	€
Hybrid bond 2019/2079	497	496	June 2079 <sup>3</sup>	1.625	500	€
Hybrid bond 2019/2079	996	996	June 2079 <sup>4</sup>	2.875	1,000	€
Hybrid bond 2020/2080	997	996	Sept. 2080 <sup>5</sup>	1.625	1,000	€
<b>Bonds (non-current)</b>	<b>7,886</b>	<b>9,126</b>				
Bank loans	–	250				
Loans from third parties and other financial debt	42	42				
Liabilities from derivatives (financial transactions)	–	40				
Lease liabilities (IFRS 16)	342	327				
<b>Non-current financial debt</b>	<b>8,270</b>	<b>9,785</b>				
<b>Financial debt</b>	<b>10,801</b>	<b>12,142</b>				
<b>less:</b>						
Cash and cash equivalents	1,899	1,355				
Current financial assets <sup>6</sup>	149	28				
<b>Net financial debt<sup>7</sup></b>	<b>8,753</b>	<b>10,758</b>				

<sup>1</sup> The Group exercised the right to prematurely repay this tranche of the hybrid bond issued in December 2014 in June 2021.

<sup>2</sup> The Group has the right to prematurely repay this tranche of the hybrid bond issued in December 2014 for the first time in December 2024.

<sup>3</sup> The Group has the right to prematurely repay this tranche of the hybrid bond issued in June 2019 for the first time in December 2024.

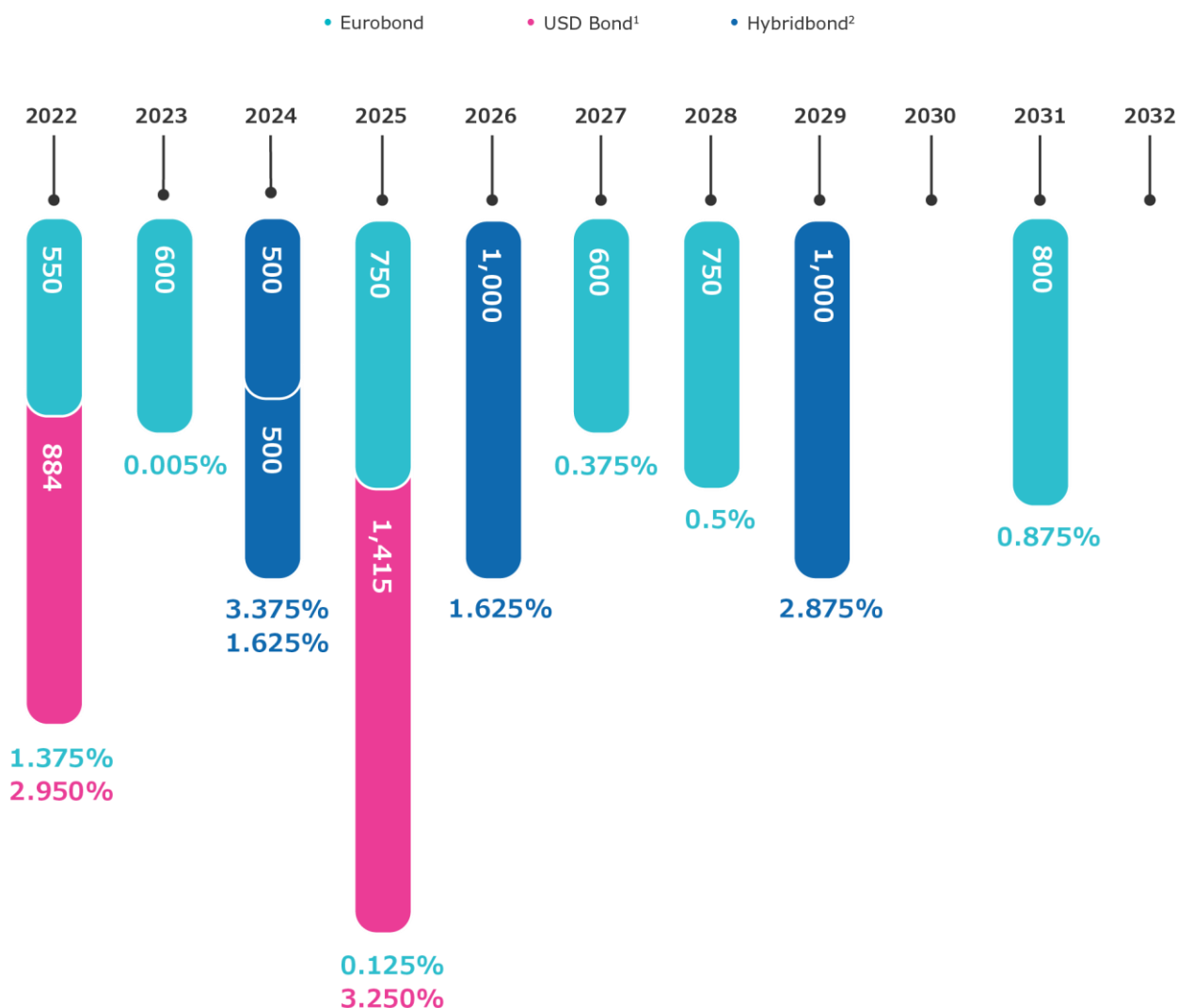
<sup>4</sup> The Group has the right to prematurely repay this tranche of the hybrid bond issued in June 2019 for the first time in December 2029.

<sup>5</sup> The Group has the right to prematurely repay this hybrid bond issued in September 2020 for the first time in September 2026.

<sup>6</sup> Excluding current derivatives with a hedging relationship (operational).

<sup>7</sup> Not defined by International Financial Reporting Standard (IFRS).

The repayment profile of the bonds was as follows:



<sup>1</sup> The nominal volumes of bonds denominated in U.S. dollars were converted into euros at the closing rate on December 31, 2021.

<sup>2</sup> For the hybrid bonds repayment is assumed at the earliest possible date.

The hybrid bonds issued by Merck KGaA, Darmstadt, Germany, and/or some of its affiliates are bonds for which the leading rating agencies have given equity credit treatment to half of the issuances, thus making the issuances more favorable to the Group's credit rating than traditional bond issues. The bonds are recognized in full as financial liabilities in the balance sheet.

Exercising a right of termination that applied every time there was a change in the interest rate, the KfW loan in the amount of € 250 million that was reported in non-current liabilities to banks in the previous year was repaid ahead of schedule on September 29, 2021.

The financial debt was not secured by liens or similar forms of collateral. The loan agreements do not contain any financial covenants. The average borrowing cost on December 31, 2021, was 1.7% (December 31, 2020: 1.6%).

Information on liabilities to related parties can be found in Note (45) "[Related party disclosures](#)".

## Capital management

The objective of capital management is to ensure the necessary financial flexibility in order to maintain long-term business operations and realize strategic options. Maintaining a stable investment grade rating, ensuring liquidity, limiting financial risks, as well as optimizing the cost of capital are the objectives of our financial policy and set important framework conditions for capital management. In this context, net financial debt is one of the leading capital management indicators within the Group.

Traditionally, the capital market represents a major source of financing for the Group, for instance via bond issues. As of December 31, 2021, there were liabilities of € 4.05 billion from a debt issuance program most recently renewed in 2020 (December 31, 2020: € 4.05 billion). In addition, the Group had access to a commercial paper program to meet short-term capital requirements with a volume of € 2 billion, none of which were utilized as of December 31, 2021 (December 31, 2020: € 200 million).

Loan agreements represent a further source of financing for the Group. At the balance sheet date, the bank financing commitments vis-à-vis the Group were as follows:

€ million	Dec. 31, 2021		Dec. 31, 2020		Interest	Maturity of financing commitments
	Financing commitments from banks	Utilization	Financing commitments from banks	Utilization		
Syndicated loan	2,000	–	2,000	–	variable	2025
Loan agreement with banking syndicate for acquisition financing	–	–	569	569	variable	2022
Bilateral credit agreement with banks	–	–	250	250	variable	2022
Various bank credit lines	36	36	1,266	266	variable	< 1 year
	<b>2,036</b>	<b>36</b>	<b>4,085</b>	<b>1,085</b>		

In fiscal 2020, the Group concluded extensive lines of credit with a term of one year in connection with the Covid-19 pandemic. These were not renewed in fiscal 2021.

There were no indications that the availability of extended credit lines was restricted.

## (38) Other financial liabilities

### Accounting and measurement policies

#### Other financial liabilities

With the exception of liabilities from derivatives and contingent considerations, which are recognized in the context of business combinations according to IFRS 3, other financial liabilities are initially measured at fair value and in subsequent periods at amortized cost, applying the effective interest method. The accounting and measurement policies of derivatives are presented in Note (39) “[Derivative financial instruments](#)”.

Other financial liabilities comprised the following:

€ million	Dec. 31, 2021			Dec. 31, 2020		
	Current	Non-current	Total	Current	Non-current	Total
Miscellaneous other financial liabilities	1,110	96	1,206	963	60	1,023
thereof: liabilities to related parties	708	–	708	558	–	558
thereof: interest accruals	51	–	51	55	–	55
Liabilities from derivatives (operational)	82	10	92	45	2	47
<b>Other financial liabilities</b>	<b>1,192</b>	<b>106</b>	<b>1,297</b>	<b>1,008</b>	<b>62</b>	<b>1,070</b>

The liabilities to related parties primarily consist of liabilities to E. Merck KG, Darmstadt, Germany.

## (39) Derivative financial instruments

### Accounting and measurement policies

#### Derivative financial instruments

The IFRS 9 provisions are applied for hedge accounting. Hedging transactions are entered into for highly probable forecast transactions in foreign currencies and for hedging fair values of assets on the balance sheet. Cash flow hedge accounting for forecast transactions in foreign currency mean the hedged item is recognized at a fixed exchange rate on a net basis instead of being recognized at the spot exchange rate at the transaction date. As a result of hedging fair values of assets on the balance sheet, the compensating changes in value of the corresponding hedged item and hedging instrument offset each other.

The Group only uses derivatives as hedging instruments. The Group uses the dollar offset method as well as regression analyses to measure hedge effectiveness.

Hedging ineffectiveness may occur in the timing of forecasted cash flows or if hedged items are dissolved. Derivatives that do not or no longer meet the documentation or effectiveness requirements for hedge accounting, whose hedged item no longer exists or for which hedge accounting rules are not applied are classified as “financial assets or liabilities at fair value through profit or loss” depending on their balance.

In the case of hedging relationships where the Group uses options as hedging instruments, only the intrinsic value of options is designated as the hedging instrument. Changes in the fair value of the time value component of options that are used for hedge accounting are recognized in other comprehensive income and in the cost of cash flow hedge reserve within equity. The subsequent accounting of these amounts depends on the type of hedged transaction.

In the case of hedging relationships where the Group uses forward contracts as hedging instruments, only the spot element is designated as the hedging instrument. Changes in the fair value of the forward element in forward contracts are recognized in other comprehensive income in the cost of cash flow hedge reserve within equity. The subsequent accounting of these amounts depends on the type of hedged transaction.

Derivative financial instruments are recognized in the consolidated balance sheet, the consolidated income statement and the consolidated statement of comprehensive income – with the exception of the balance sheet

treatment of amounts included directly from the reserve in the initial cost or in the other carrying amount of a non-financial asset or liability – as follows:

					Changes in fair value in the consolidated income statement and the consolidated statement of comprehensive income	
Hedging relationship	Type of collateral	Type of hedged item	Market value	Presentation on the balance sheet	during the term	at maturity
Derivatives with a cash flow hedging relationship	Interest rate	Financial transactions	Positive market values	Other financial assets	Fair value adjustments (in equity)	Financial income and expenses
			Negative market values	Financial debt	Fair value adjustments (in equity)	
	Currency	Transactions in operating business	Positive market values	Other financial assets	Fair value adjustments (in equity)	Other operating income
			Negative market values	Other financial liabilities	Fair value adjustments (in equity)	Other operating income
Derivatives without a hedging relationship	Interest rate	Financial transactions	Positive market values	Other financial assets	Financial income and expenses	
			Negative market values	Financial debt		
	Currency	Financial transactions	Positive market values	Other financial assets	Financial income and expenses	
			Negative market values	Financial debt		
	Virtual power purchase agreement	Transactions in operating business	Positive market values	Other financial assets	Other operating income	
			Negative market values	Other financial liabilities	Other operating expenses	

The nominal amounts of the Group's derivative exposures were as follows:

€ million	Dec. 31, 2021		Dec. 31, 2020	
	current	non-current	current	non-current
Cash flow hedge	5,061	–	5,285	–
Interest rate	–	–	569	–
Currency	5,061	–	4,716	–
No hedge accounting	7,459	–	4,451	1,100
Interest rate	1,100	–	–	1,100
Currency	6,359	–	4,451	–
Virtual power purchase agreement				
	12,519	–	9,736	1,100

The fair values of the derivatives were as follows:

### December 31, 2021

€ million	Positive market values				Negative market values			
	Financial transactions		Transactions in operating business		Financial transactions		Transactions in operating business	
	current	non-current	current	non-current	current	non-current	current	non-current
<b>Cash flow hedge</b>	-	-	25	-	-	-	82	-
Interest	-	-	-	-	-	-	-	-
Currency	-	-	25	-	-	-	82	-
<b>No hedge accounting</b>	37	-	-	24	35	-	-	10
Interest	5	-	-	-	19	-	-	-
Currency	32	-	-	-	15	-	-	-
Virtual power purchase agreement	-	-	-	24	-	-	-	10
	37	-	25	24	35	-	82	10

### December 31, 2020

€ million	Positive market values				Negative market values			
	Financial transactions		Transactions in operating business		Financial transactions		Transactions in operating business	
	current	non-current	current	non-current	current	non-current	current	non-current
<b>Cash flow hedge</b>	-	-	96	-	-	-	45	-
Interest	-	-	-	-	-	-	-	-
Currency	-	-	96	-	-	-	45	-
<b>No hedge accounting</b>	16	10	-	8	62	40	-	2
Interest	-	10	-	-	-	40	-	-
Currency	16	-	-	-	62	-	-	-
Virtual power purchase agreement	-	-	-	8	-	-	-	2
	16	10	96	8	62	40	45	2

As in the previous year, all hedging relationships were transaction related. Netting of derivatives from an economic perspective was possible due to the existing framework agreements on derivatives trading that the Group had entered into with commercial banks. Actual netting only takes place in the case of insolvency of the contract partner. Derivatives were not offset on the face of the balance sheet.

The following table presents the potential netting volume of the reported derivative assets and liabilities:

### December 31, 2021

€ million	Gross presentation	Netting	Net presentation	Potential netting volume		Potential net amount
				due to master netting agreements	due to financial collateral	
Derivative assets	86	–	86	61	–	25
Derivative liabilities	-126	–	-126	-61	–	-65

### December 31, 2020

€ million	Gross presentation	Netting	Net presentation	Potential netting volume		Potential net amount
				due to master netting agreements	due to financial collateral	
Derivative assets	130	–	130	74	–	56
Derivative liabilities	-149	–	-149	-74	–	-75

The reserves for cash flow hedges and the cost of cash flow hedging of the Group related to the following hedging instruments (see also Note (34) “Equity”):

€ million	Cost of hedging cash flows			Cash flow hedging			
	Time value of options	Forward component of currency forwards	Total	Intrinsic value of options	Spot component of currency forwards	Interest rate swaps	Total
<b>Jan. 1, 2020</b>	<b>-8</b>	<b>-25</b>	<b>-33</b>	<b>-13</b>	<b>-70</b>	<b>-36</b>	<b>-118</b>
Fair value adjustment (directly recognized in equity)	-2	-11	-13	31	23	–	54
Reclassification to profit or loss	–	12	12	-5	34	15	45
Reclassification to assets	–	–	–	–	–	–	–
Tax effect	1	–	1	-9	-18	-3	-30
<b>Dec. 31, 2020</b>	<b>-9</b>	<b>-25</b>	<b>-34</b>	<b>5</b>	<b>-31</b>	<b>-23</b>	<b>-49</b>
<b>Jan. 1, 2021</b>	<b>-9</b>	<b>-25</b>	<b>-34</b>	<b>5</b>	<b>-31</b>	<b>-23</b>	<b>-49</b>
Fair value adjustment (directly recognized in equity)	-2	-11	-13	-49	-78	–	-127
Reclassification to profit or loss	–	27	27	-1	12	16	27
Reclassification to assets	–	–	–	–	–	–	–
Tax effect	–	-3	-3	5	3	-3	5
<b>Dec. 31, 2021</b>	<b>-11</b>	<b>-12</b>	<b>-23</b>	<b>-40</b>	<b>-93</b>	<b>-11</b>	<b>-145</b>



## (40) Finance income and expenses/Net gains and losses from financial instruments

Finance income and expenses were as follows:

€ million	2021	2020
Interest income and similar income	46	39
Capital gain from disposal of debt instruments with subsequent measurement at amortized cost	1	-
Income from fair value changes from debt instruments with subsequent measurement at fair value through profit or loss	16	4
<b>Finance income</b>	<b>62</b>	<b>43</b>
Interest expense and similar expenses	-272	-387
Expenses from fair value changes from debt instruments with subsequent measurement at fair value through profit or loss	-3	-3
Expenses from fair value changes of share-based compensation programs	-3	-5
Currency differences from financing activities	-39	-3
<b>Finance costs</b>	<b>-317</b>	<b>-395</b>
<b>Financial result</b>	<b>-255</b>	<b>-354</b>

Interest income and expenses arose as follows:

€ million	2021		2020	
	Interest income	Interest expenses	Interest income	Interest expenses
Financial instruments	19	-176	26	-246
Leases	-	-10	-	-15
Pension provisions	-	-27	-	-39
Other non-current provisions	-	-1	-	-20
Other interest income/expenses and similar income and expenses	27	-69	13	-75
Capitalized borrowing costs for		11		8
Property, plant and equipment		7		4
Other intangible assets		4		4
<b>Interest income/expenses and similar income and expenses</b>	<b>46</b>	<b>-272</b>	<b>39</b>	<b>-387</b>

The year-on-year decline in interest expenses for financial instruments is essentially due to lower interest payments for bonds.

The following table shows the development of net gains and losses, interest income and expenses, and currency differences, as well as dividend income from financial instruments (excluding items recognized in other comprehensive income) by measurement category in the period under review:

2021

€ million	Currency differences	Dividends	Interest result		Net gains and losses			
			Interest income	Interest expenses	Impairment losses	Reversals of impairment losses	Fair value adjustments	Disposal gains/losses
<b>Financial assets</b>								
Subsequent measurement at amortized cost	7		-		-67	68		1
Subsequent measurement at fair value through other comprehensive income								
Equity Instruments		-						
Subsequent measurement at fair value through profit or loss	1	-	19	-			665	
<b>Financial debt</b>								
Subsequent measurement at amortized cost	-13			-174				-
Subsequent measurement at fair value through profit or loss	-		-	-2			-697	
<b>Total</b>	<b>-5</b>	<b>-</b>	<b>19</b>	<b>-176</b>	<b>-67</b>	<b>68</b>	<b>-32</b>	<b>1</b>

2020

€ million	Currency differences	Dividends	Interest result		Net gains and losses			
			Interest income	Interest expenses	Impairment losses	Reversals of impairment losses	Fair value adjustments	Disposal gains/losses
<b>Financial assets</b>								
Subsequent measurement at amortized cost	-10		5		-81	75		-
Subsequent measurement at fair value through other comprehensive income								
Equity Instruments		1						
Debt Instruments	-		-		-	-		-
Subsequent measurement at fair value through profit or loss	-1	-	21	-			822	
<b>Financial debt</b>								
Subsequent measurement at amortized cost	1			-244				-
Subsequent measurement at fair value through profit or loss	-		-	-2			-884	
<b>Total</b>	<b>-10</b>	<b>1</b>	<b>26</b>	<b>-246</b>	<b>-81</b>	<b>75</b>	<b>-62</b>	<b>-</b>

In the table above, interest income or expenses related to derivatives without a hedging relationship are reported as a component of fair value adjustments. The currency result from equity instruments with subsequent measurement at fair value through other comprehensive income was recognized in other comprehensive income.

## (41) Net cash flows from financing activities

### Accounting and measurement policies

#### Net cash flows from financing activities

The option to recognize dividend payments and profit withdrawals in the cash flows from financing activities is exercised in determining the cash flows from financing activities.

Furthermore, the net reporting option has been exercised to report cash receipts and payments for items in which the turnover is quick, the amounts large and the maturities short. This primarily relates to rolling financing by way of commercial papers and short-term bank loans reported under "Payments from new borrowings of other current and non-current financial debt" and "Repayment of other current and non-current financial debt".

The change in financial debt was as follows:

## 2021

€ million	Jan. 1, 2021	Cash			Non-cash				Changes in scope of consolidation	Dec. 31, 2021
		Cash inflows	Repay-ments	Lease interests	Change in lease liabilities	Ex-change rate effects	Fair value adjust-ment	Other		
Bonds	9,442	–	-317	–	–	185	–	10	–	9,320
Liabilities to E. Merck KG, Darmstadt, Germany	816	471	-393	–	–	–	–	–	–	894
Other current and non-current financial liabilities	1,885	388	-2,303	-10	151	-41	517	–	–	586
<b>Financial debt</b>	<b>12,142</b>	<b>859</b>	<b>-3,013</b>	<b>-10</b>	<b>151</b>	<b>144</b>	<b>517</b>	<b>10</b>	<b>–</b>	<b>10,801</b>
Derivative assets (current and non-current)	-26	407	–	–	–	–	-418	–	–	-37

## 2020

€ million	Jan. 1, 2020	Cash			Non-cash				Changes in scope of consolidation	Dec. 31, 2020
		Cash inflows	Repay-ments	Lease interests	Change in lease liabilities	Ex-change rate effects	Fair value adjust-ment	Other		
Bonds	9,854	2,486	-2,724	–	–	-184	–	9	–	9,442
Financial liabilities to E. Merck KG, Darmstadt, Germany	808	390	-382	–	–	–	–	–	–	816
Other current and non-current financial liabilities	2,531	3,561	-4,687	-15	65	33	398	–	-1	1,885
<b>Financial debt</b>	<b>13,194</b>	<b>6,436</b>	<b>-7,793</b>	<b>-15</b>	<b>65</b>	<b>-151</b>	<b>398</b>	<b>9</b>	<b>-1</b>	<b>12,142</b>
Derivative assets (current and non-current)	-33	521	–	–	–	–	-514	–	–	-26

Interest payments for leases were recognized in operating cash flow but served as a reconciliation item in the above table as they were a component of financial liabilities. Changes in lease liabilities included additions and retirements of right-of-use from leases and the effects from unwinding of the discount on lease liabilities. Other non-cash changes resulted from the application of the effective interest method.

Fair value adjustments of other current and non-current financial liabilities were attributable to liabilities from derivatives. In the consolidated cash flow statement, cash changes of assets from derivatives were reported together with repayments of other current and non-current financial liabilities. In the above reconciliation, changes of assets from derivatives were reported separately as they did not form part of financial liabilities.

The amount of unused credit lines that could be employed for future operating activities and to meet obligations and information on changes in financial debt can be found in Note (37) "[Financial debt/Capital management](#)".

## (42) Management of financial risks

Market fluctuations with respect to foreign exchange and interest rates represent significant profit and cash flow risks for the Group. The Group aggregates these Group-wide risks and steers them centrally, partly by using derivative financial instruments. To estimate existing risks of foreign exchange and interest rate fluctuations, the Group uses scenario analyses. The Group is not subject to any material risk concentration from financial transactions.

The Group uses marketable forward exchange contracts, options and interest swaps as hedging instruments. The strategy to hedge interest rate and foreign exchange rate fluctuations arising from forecast transactions and transactions already recognized in the balance sheet is set by a risk committee, which meets on a regular basis. The use of derivatives is regulated by extensive guidelines and subject to ongoing risk controls by Group Treasury. Speculation is prohibited. The strict separation of functions between trading, settlement and control functions is ensured. Derivatives are only entered into with banks that have a good credit rating. Related default risks are continuously monitored.

The [Report on Risks and Opportunities](#) included in the combined management report provides further information on the management of financial risks.

### Foreign exchange risks

Owing to the international nature of its business, the Group is exposed to transactional foreign exchange risks within the scope of both its business activities and financing activities. Foreign exchange risks are continuously analyzed and different hedging strategies used to limit or eliminate these risks.

The entire foreign exchange exposure is divided into several defined subsets with different risk profiles and systematically hedged using suitable hedging instruments. Hedging is performed based on a regularly reviewed basket of currencies. The maximum time horizon for hedging is 12 months.

Foreign exchange risks from the following transactions are economically hedged through the use of foreign exchange contracts and currency options:

- intragroup financing in non-functional currency;
- receivables from and liabilities to third parties in non-functional currency.

Foreign exchange risks from the following transactions are hedged using foreign exchange contracts and currency options applying hedge accounting:

- forecast transactions in non-functional currency, the expected probability of which is very high for the next 12 months;
- firm purchase commitments over the next 12 months in non-functional currency.

The following table shows the net exposure and the effects of transactional exchange rate movements of the key currencies against the euro in relation to the net income and equity of the Group on the balance sheet date:

#### December 31, 2021

€ million		CHF	CNY	JPY	KRW	TWD	USD
<b>Net exposure</b>		<b>-665</b>	<b>1,086</b>	<b>108</b>	<b>208</b>	<b>126</b>	<b>1,116</b>
Exchange rate -10% (appreciation vs. €)	Consolidated income statement	-67	109	108	21	13	112
	Equity (other comprehensive income)	-	-15	-9	-10	-14	-120
Exchange rate +10% (depreciation vs. €)	Consolidated income statement	67	-109	-108	-21	-13	-112
	Equity (other comprehensive income)	-	41	7	9	11	116

#### December 31, 2020

€ million		CHF	CNY	JPY	KRW	TWD	USD
<b>Net exposure</b>		<b>-280</b>	<b>407</b>	<b>98</b>	<b>73</b>	<b>65</b>	<b>457</b>
Exchange rate -10% (appreciation vs. €)	Consolidated income statement	-28	41	10	7	7	46
	Equity (other comprehensive income)	40	-62	-9	-21	-18	-119
Exchange rate +10% (depreciation vs. €)	Consolidated income statement	28	-41	-10	-7	-7	-46
	Equity (other comprehensive income)	-33	64	8	17	17	115

In this presentation, effects of cash flow hedges are taken into consideration in the equity of the Group. The rise in net exposure as against the previous year resulted from lower hedge ratios. The net exposure of each of the above currencies consisted of the following components:

- planned cash flows in the next 12 months in the respective currency, less
- the nominal values of hedging instruments of these planned cash flows.

The planned cash flows in the next 12 months are analyzed and divided into subsets in accordance with the risk management strategy. In the first subset, 25% of a regularly reviewed basket of currencies is hedged. The second subset hedges a more flexible basket of currencies selected on the basis of hedging costs and correlation with the euro. The hedging strategy achieves an economic hedge ratio of at least 40% across all hedging subsets. Depending on scenario analyses, this can be increased to up to 90% using a rule-based approach. As in the previous year, balance sheet items in the above currencies were economically hedged by derivatives in full if they did not correspond to the functional currency of the respective Group company. Accordingly, they do not affect the net exposure presented above.

The impact of cash flow hedge accounting for forecast transactions in foreign currency was as follows for the major currencies:

### December 31, 2021

€ million	CHF	CNY	JPY	KRW	TWD	USD
Notional amount	–	1,445	126	114	180	2,975
thereof: current	–	1,445	126	114	180	2,975
thereof: non-current	–	–	–	–	–	–
Fair Value of the hedging instrument	–	-18	–	-1	-5	-32
thereof: positive market values	–	13	–	–	–	10
thereof: negative market values	–	-31	–	-1	-5	-42
Maturity profile	–	January 2022 – December 2022	January 2022 – December 2022	January 2022 – December 2022	January 2022 – December 2022	January 2022 – December 2022
Hedge ratio <sup>1</sup>	–	1:1	1:1	1:1	1:1	1:1
Change in value of outstanding hedging instruments since January 1, 2021	–	-18	–	-1	-5	-32
Change in value of hedged item used to determine hedge effectiveness since January 1, 2021	–	18	–	1	5	32
Weighted average hedging rate	–	7.79	130.30	1,367.00	32.27	1.16

<sup>1</sup> The hedging instruments and the corresponding hedged items were denominated in the same currency, therefore the hedge ratio was 1:1.

### December 31, 2020

€ million	CHF	CNY	JPY	KRW	TWD	USD
Notional amount	358	1,071	97	295	257	1,802
thereof: current	358	1,071	97	295	257	1,802
thereof: non-current	–	–	–	–	–	–
Fair value of the hedging instrument	-2	-9	2	-5	3	65
thereof: positive market values	–	6	2	3	3	71
thereof: negative market values	-2	-15	–	-8	–	-7
Maturity profile	January 2021 – December 2021	January 2021 – December 2021	January 2021 – December 2021	January 2021 – December 2021	January 2021 – December 2021	January 2021 – December 2021
Hedge ratio <sup>1</sup>	1:1	1:1	1:1	1:1	1:1	1:1
Change in value of outstanding hedging instruments since January 1, 2020	-2	-9	2	-5	3	65
Change in value of hedged item used to determine hedge effectiveness since January 1, 2020	2	9	-2	5	-3	-65
Weighted average hedging rate	1.08	8.25	124.20	1,379.00	33.55	1.17

<sup>1</sup> The hedging instruments and the corresponding hedged items were denominated in the same currency, therefore the hedge ratio was 1:1.

In addition to the transactional foreign exchange risks described previously, the Group was exposed to currency translation risks since many of the Group's subsidiaries are located outside the euro area and have functional currencies other than the reporting currency. Exchange differences resulting from translation of the assets and liabilities of these companies into euro, the reporting currency, are recognized in equity.

## Interest rate risks

The Group's net exposure to interest rate changes comprised the following:

€ million	Dec. 31, 2021	Dec. 31, 2020
Short-term or variable interest rate monetary deposits	2,011	1,368
Short-term or variable interest rate monetary borrowings	-2,531	-2,607
<b>Net interest rate exposure</b>	<b>-521</b>	<b>-1,240</b>

The effects of a parallel shift in the yield curve by +100 or -100 basis points on the consolidated income statement as well as on equity relative to all short-term or variable monetary deposits and monetary borrowings within the scope of IAS 32, except contingent considerations, are presented in the following table. In the event of a downward shift, the interest rate for instruments subject to a contractual interest rate floor of zero percent was limited accordingly:

€ million	2021		2020	
	+ 100 basis points	- 100 basis points	+ 100 basis points	- 100 basis points
<b>Change in market interest rate</b>				
Effects on consolidated income statement	11	-20	-21	11
Effects on equity (other comprehensive income)	-	-	-	-

The Group does not expect the IBOR reform to have a significant impact on its interest rate risk or its net assets, financial position and results of operations.

## Share price risks

The shares in publicly listed companies amounting to € 117 million (December 31, 2020: € 244 million) are generally exposed to a risk of fluctuations in fair value.

## Electricity price risks

The Group has entered into a virtual power purchase agreement with a term of 12 years with a wind energy project developer in the United States for an installed capacity attributable to the Group of 68 megawatts. In fiscal 2021, the contract partners agreed to increase the capacity attributable to the Group from 50 megawatts to 68 megawatts. The wind farm is scheduled to be commissioned in 2022. The Group will receive renewable energy certificates for the quantities of electricity produced. As the agreement is designed as a contract for difference, it fulfills the definition of a derivative financial instrument and is measured at fair value through profit or loss in accordance with IFRS 9. Adjustments to fair value are recognized in other operating income and expenses (see Note (13) "[Other operating income](#)" and (14) "[Other operating expenses](#)"). The carrying amount of the agreement was € 24 million as of the end of the reporting period (2020: € 8 million).

The electricity price of around 40% of the expected production volume under the virtual power purchase agreement is hedged by a separate hedging instrument.

## Liquidity risks

The risk that the Group cannot meet its payment obligations resulting from financial liabilities, is limited by establishing the required financial flexibility and by Group-wide cash management. Information on issued bonds and other sources of financing can be found in Note (37) "[Financial debt/capital management](#)".



Liquidity risks are monitored and reported to management on a regular basis.

The following liquidity risk analysis presents the contractual cash flows such as repayments and interest on financial liabilities and the net cash flows of derivatives with a negative fair value:

### December 31, 2021

€ million	Carrying amount	Cash flows < 1 year		Cash flows 1 – 5 years		Cash flows > 5 years	
		Interest	Repayment	Interest	Repayment	Interest	Repayment
Subsequent measurement at amortized cost							
Bonds and commercial paper	9,320	-146	-1,434	-400	-4,765	-131	-3,150
Bank loans	36	-1	-36	-	-	-	-
Trade accounts payable	2,380	-	-2,380	-	-	-	-
Liabilities to related parties	1,604	-	-1,604	-	-	-	-
Other financial liabilities	458	-	-402	-	-56	-	-
Loans from third parties and other financial debt	56	-4	-12	-9	-42	-	-
Subsequent measurement at fair value through profit or loss							
Contingent considerations	39	-	-	-	-39	-	-
Derivatives without a hedging relationship	45	-15	-32	-	-	-	-
Derivatives with a hedging relationship	82	-	-82	-	-	-	-
Refund liabilities	839	-	-839	-	-	-	-
Lease liabilities	459	-7	-116	-15	-267	-6	-75
	15,318	-173	-6,937	-424	-5,169	-137	-3,225

### December 31, 2020

€ million	Carrying amount	Cash flows <1 year		Cash flows 1 – 5 years		Cash flows >5 years	
		Interest	Repayment	Interest	Repayment	Interest	Repayment
<b>Subsequent measurement at amortized cost</b>							
Bonds and commercial paper	9,642	-167	-517	-478	-5,014	-189	-4,150
Bank loans	1,085	-5	-835	-1	-250	-	-
Trade accounts payable	1,768	-	-1,768	-	-	-	-
Liabilities to related parties	1,375	-	-1,375	-	-	-	-
Other financial liabilities	439	-	-405	-	-34	-	-
Loans from third parties and other financial debt	58	-4	-15	-16	-42	-	-
<b>Subsequent measurement at fair value through profit or loss</b>							
Contingent considerations	26	-	-	-	-26	-	-
Derivatives without a hedging relationship	104	-15	-62	-15	-	-	-
<b>Derivatives with a hedging relationship</b>	<b>45</b>	<b>-</b>	<b>-46</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Refund liabilities</b>	<b>666</b>	<b>-</b>	<b>-666</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Finance lease liabilities</b>	<b>438</b>	<b>-8</b>	<b>-110</b>	<b>-16</b>	<b>-246</b>	<b>-7</b>	<b>-81</b>
	<b>15,646</b>	<b>-199</b>	<b>-5,799</b>	<b>-526</b>	<b>-5,612</b>	<b>-196</b>	<b>-4,231</b>

## Credit risks

Credit risk for the Group means the risk of a financial loss if a customer or other contract partner is not able to meet its contractual payment obligations. The Group is exposed to credit risks mainly due to existing trade accounts receivable, other receivables, other debt instruments, derivatives and contract assets.

Credit risks are monitored on an ongoing basis. The risks arising from extending credit to customers or suppliers and in the course of other business relationships are also managed.

The Group analyzes all financial assets that are more than 90 days past due and examines whether the credit risk has risen significantly and, as a result, there is objective evidence of impairment requiring the recognition of additional loss allowances.

## Accounting and measurement policies

### Credit risks

#### Impairment of trade accounts receivable and contract assets

The Group uses the simplified impairment model for trade accounts receivable and contract assets, pursuant to which any credit losses expected to occur over the entire lifetime of an asset are taken into account. In order to measure expected credit losses, the assets are grouped based on the existing credit risk structure and the respective maturity structure.

The customer groups with comparable default risks to be considered are determined according to the specific business sector and the place of business of the respective customers.

The expected credit loss rates used in the simplified impairment model are derived on the basis of past default rates and current macroeconomic expectations. In doing so, country-specific ratings are taken into consideration since many of the Group's customers depend directly or indirectly on the economic trends in the country where their place of business is located (public and private healthcare systems, universities, and research companies from within the pharmaceutical industry, as well as industries subsidized under development plans, particularly in Asia). These country ratings are aggregated into three separate rating groups. Under the impairment model, past default rates and country ratings are used as an approximation of the defaults to be expected in the future.

When a country's rating changes, the historical default rates of the rating group to which the respective country has been reallocated have to be applied accordingly, rather than the historical default rates of the previous rating group.

If there is objective evidence that certain trade accounts receivable or contract assets are fully or partially impaired, additional loss allowances are recognized to account for expected credit losses.

A default generally exists when the debtor cannot fully meet its liabilities.

A debtor's creditworthiness is assumed to be impaired if there are objective indications that the debtor is in financial difficulties, such as the disappearance of an active market for its products or impending insolvency. On initial recognition, the lifetime expected credit losses are deducted from the nominal amount of trade accounts receivable considered as originated credit-impaired financial assets.

#### Impairment of other receivables

The general three-stage impairment model and the simplified approach are used to recognize loss allowances of financial instruments included in other receivables. The individual credit rating of the contract partner is used to determine the impairment loss of other receivables.

Individual cases are also analyzed to ascertain whether objective findings suggest that the value of other receivables is impaired. Such suggestions may include, for example, economic difficulties of the debtor, contractual breaches, or the renegotiation of contractual payment obligations. If the analysis concludes there is a substantially increased risk of default, the expected credit loss is calculated over the entire lifetime.

### **Impairment of other financial assets**

Investments in debt instruments subsequently measured either at amortized cost or at fair value through other comprehensive income are primarily considered to be investments with low risk, meaning that the expected credit loss in the upcoming 12 months is used to determine the impairment loss.

For financial assets with only a minimal default risk, the rules concerning the mandatory recognition of a risk provision for the lifetime expected credit loss are not applied at initial recognition or during subsequent measurement. Therefore, no assessment of whether there has been a significant increase in the credit risk is carried out for such assets. The Group does not presume an increased credit risk as of the balance sheet date if the contract partner has an investment grade rating.

If there are indications that the debtor's creditworthiness had worsened but that this was not yet reflected in its existing credit rating, the credit risk assessment is adjusted and the impairment allowances recognized for expected credit losses are increased. In all other cases, there are no new risk assessments as of the balance sheet date and the risk profile initially assumed is maintained.

Wherever a considerable increase in the default risk is assumed, the lifetime expected credit loss of the financial asset is considered.

On the balance sheet date, the theoretical maximum default risk for all items referenced above corresponds to the net carrying amounts less any compensation from credit insurance.

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## **Significant discretionary decisions and sources of estimation uncertainty**

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### **Credit risks**

#### **Impairment of trade accounts receivable and contract assets**

In terms of the impairment of trade accounts receivable and of contract assets, there is significant discretion and estimation uncertainty regarding:

- the identification of customer groups with identical default risks,
- the identification of a substantial increase in the credit risk, and
- the calculation of the expected credit losses.

#### **Impairment of other financial assets**

Discretionary judgment is applied in determining individual impairment allowances.

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The following table shows impairments for financial assets from operative transactions and contract assets as well as gains from their reversals recognized in the consolidated income statement:

€ million	2021	2020
<b>Impairment losses</b>	<b>-67</b>	<b>-81</b>
of trade accounts receivable	-67	-78
of contract assets	-	-
of debt instruments subsequently measured at amortized cost	-	-3
of debt instruments subsequently measured at fair value through other comprehensive income	-	-
<b>Reversals of impairment losses</b>	<b>68</b>	<b>75</b>
of trade accounts receivable	68	71
of contract assets	-	-
of other debt instruments subsequently measured at amortized cost	-	4
of other debt instruments subsequently measured at fair value through other comprehensive income	-	-
<b>Net impairment on financial assets</b>	<b>1</b>	<b>-6</b>

The loss allowances and reversals recognized for trade accounts receivable as shown above applied entirely to receivables resulting from contracts with customers.

### Credit risks from trade accounts receivable

The credit risk from trade accounts receivable is largely impacted by the specific circumstances of individual customers. The Group also considers additional factors such as the general default risk in the respective industry and country in which the customer operates.

The credit risk of customers is assessed using established credit management processes that take individual customer risks into account. This is done in particular by analyzing the aging structure of trade accounts receivable.

The Group continuously reviews and monitors the open positions of all its customers in the corresponding countries and takes steps to mitigate credit risks if necessary.

The tables below contain an overview of the credit risk by business sector and country rating as established by leading rating agencies:

### December 31, 2021

€ million	Life Science	Healthcare	Electronics	Other	Group
External rating of at least AA- or comparable	1,164	882	598	6	2,651
External rating of at least BBB- or comparable	150	285	17	-	452
External rating lower than BBB- or comparable	45	427	2	-	473
<b>Trade accounts receivable before loss allowances</b>	<b>1,359</b>	<b>1,594</b>	<b>617</b>	<b>6</b>	<b>3,576</b>

### December 31, 2020

€ million	Life Science	Healthcare	Electronics	Other	Group
External rating of at least AA- or comparable	996	781	481	-	2,257
External rating of at least BBB- or comparable	136	260	13	-	410
External rating lower than BBB- or comparable	31	425	2	-	458
<b>Trade accounts receivable before loss allowances</b>	<b>1,163</b>	<b>1,466</b>	<b>496</b>	<b>-</b>	<b>3,125</b>

Goods were generally sold under retention of title so that a reimbursement claim existed in the event of default. Other guarantees generally were not demanded. The scope of credit-insured receivables was immaterial for the Group.

Loss allowances based on expected credit losses for trade accounts receivable as of December 31, 2021, were as follows:

#### December 31, 2021

€ million	Not yet due	Up to 90 days past due	Up to 180 days past due	Up to 360 days past due	More than 360 days past due	Total
Expected loss rate	0.3%	1.1%	4.4%	11.3%	55.6%	
Trade accounts receivable before loss allowances	3,076	309	67	58	66	3,576
thereof: credit impaired	6	2	3	3	32	45
<b>Loss allowances</b>	<b>-9</b>	<b>-3</b>	<b>-3</b>	<b>-7</b>	<b>-37</b>	<b>-59</b>
thereof: credit impaired	-2	-1	-1	-2	-30	-36

Loss allowances based on expected credit losses for trade accounts receivable as of December 31, 2020, were as follows:

#### December 31, 2020

€ million	Not yet due	Up to 90 days past due	Up to 180 days past due	Up to 360 days past due	More than 360 days past due	Total
Expected loss rate	0.4%	2.2%	3.7%	17.7%	62.9%	
Trade accounts receivable before loss allowances	2,633	312	56	57	68	3,125
thereof: credit impaired	7	6	-	5	42	59
<b>Loss allowances</b>	<b>-11</b>	<b>-7</b>	<b>-2</b>	<b>-10</b>	<b>-43</b>	<b>-73</b>
thereof: credit impaired	-3	-3	-	-3	-39	-49

#### Credit risks from other receivables

Gross other receivables amounted to € 156 million as of December 31, 2021 (December 31, 2020: € 196 million). Other receivables in the amount of € 154 million were allocated to Level 1 of the three-level impairment model (December 31, 2020: € 194 million), meaning that the credit loss expected in the next 12 months was used to determine the amount of impairment when examining the individual credit risk of the respective contract partner. The next table shows the impairment losses recognized for other receivables.

#### Credit risks from other financial assets

The Group limits credit risks from other financial assets by entering into contracts almost exclusively with contract partners whose creditworthiness is good. The credit risk from financial contracts is monitored daily on the basis of market information on credit default swap rates and regularly on the basis of rating information.

Impairment losses on financial assets developed as follows:

## 2021

€ million	Jan. 1	Additions	Derecog- nition	Utilizations	Reclassifica- tion within levels	Effects of currency translation	Changes in scope of consolidation	Dec. 31
<b>Subsequent measurement at amortized cost</b>	<b>-76</b>	<b>-67</b>	<b>68</b>	<b>15</b>	<b>-</b>	<b>-2</b>	<b>-</b>	<b>-61</b>
Trade and other receivables (including current leasing receivables)	-73	-67	68	15	-	-2	-	-59
thereof: Level 1/2	-24	-56	57	-	-	-1	-	-23
thereof: Level 3	-48	-10	11	15	-	-1	-	-33
thereof: POCI <sup>1</sup>	-1	-1	-	-	-	-	-	-2
Contract Assets	-1	-	-	-	-	-	-	-
thereof: Level 1/2	-1	-	-	-	-	-	-	-
thereof: Level 3	-	-	-	-	-	-	-	-
Other Receivables (including non-current leasing receivables)	-2	-	-	-	-	-	-	-2
thereof: Level 1	-1	-	-	-	-	-	-	-
thereof: Level 2	-	-	-	-	-	-	-	-
thereof: Level 3	-2	-	-	-	-	-	-	-1
<b>Loss allowances for financial assets</b>	<b>-76</b>	<b>-67</b>	<b>68</b>	<b>15</b>	<b>-</b>	<b>-2</b>	<b>-</b>	<b>-61</b>

<sup>1</sup> Purchased or originated credit-impaired receivables.

## 2020

€ million	Jan. 1	Additions	Derecog- nition	Utilizations	Reclassifica- tion within levels	Effects of currency translation	Changes in scope of consolidation	Dec. 31
<b>Subsequent measurement at amortized cost</b>	<b>-81</b>	<b>-81</b>	<b>75</b>	<b>7</b>	<b>-</b>	<b>5</b>	<b>-</b>	<b>-76</b>
Trade and other receivables (including current leasing receivables)	-77	-78	71	6	-	5	-	-73
thereof: Level 1/2	-30	-64	66	-	2	2	-	-24
thereof: Level 3	-47	-13	5	6	-2	3	-	-48
thereof: POCI <sup>1</sup>	-	-1	-	-	-	-	-	-1
Contract Assets	-	-	-	-	-	-	-	-1
thereof: Level 1/2	-	-	-	-	-	-	-	-1
thereof: Level 3	-	-	-	-	-	-	-	-
Other Receivables (including non-current leasing receivables)	-4	-3	4	-	-	-	-	-2
thereof: Level 1	-3	-2	4	-	-	-	-	-1
thereof: Level 2	-	-	-	-	-	-	-	-
thereof: Level 3	-1	-1	-	-	-	-	-	-2
<b>Loss allowances for financial assets</b>	<b>-81</b>	<b>-81</b>	<b>75</b>	<b>7</b>	<b>-</b>	<b>5</b>	<b>-</b>	<b>-76</b>

<sup>1</sup> Purchased or originated credit-impaired receivables.

Changes in the expected credit loss rates used in the simplified impairment model did not result in any significant changes in the additions to and reversals of loss allowances in Level 1/2.

## (43) Information on fair value measurement

### Accounting and Measurement Policies

#### Information on fair value measurement

The measurement techniques and main input factors used to determine the fair value of financial instruments are as follows:

#### Fair value determined by official prices and quoted market values (Level 1)

	Financial instruments concerned	Description of the measurement technique	Main input factors used to determine fair values
<b>Financial assets</b>			
Subsequent measurement at fair value through other comprehensive income			
Equity instruments	Shares		
Other debt instruments	Bonds other short-term cash investments	Derived from active market	Quoted prices in an active market
Subsequent measurement at fair value through profit or loss			
Other debt instruments	Publicly-traded funds other short-term cash investments	Derived from active market	Quoted prices in an active market
<b>Financial liabilities</b>			
Subsequent measurement at amortized cost			
Financial debt	Bonds	Derived from active market	Quoted prices in an active market

**Fair value determined using input factors observable in the market (Level 2)**

	Financial instruments concerned	Description of the measurement technique	Main input factors used to determine fair values
<b>Financial assets</b>			
Subsequent measurement at fair value through other comprehensive income			
Equity instruments	Shares	Derived from active market including a liquidity discount	Quoted prices in an active market and volatilities observable on the market
Subsequent measurement at fair value through profit or loss			
Derivatives (without a hedging relationship)	Forward exchange contracts and currency options	Use of recognized actuarial methods	Spot and forward rates observable on the market as well as exchange rate volatilities
	Interest rate swaps		Interest rate curves available on the market
Derivatives (with a hedging relationship)	Forward exchange contracts and currency options	Use of recognized actuarial methods	Spot and forward rates observable on the market as well as exchange rate volatilities
<b>Financial liabilities</b>			
Subsequent measurement at fair value through profit or loss			
Derivatives (without a hedging relationship)	Forward exchange contracts and currency options	Use of recognized actuarial methods	Spot and forward rates observable on the market as well as exchange rate volatilities
	Interest rate swaps		Interest rate curves available on the market
Derivatives (with a hedging relationship)	Forward exchange contracts and currency options	Use of recognized actuarial methods	Spot and forward rates observable on the market as well as exchange rate volatilities
Subsequent measurement at amortized cost			
Financial liabilities	Liabilities to banks and other loan liabilities	Discounting of future cash flows	Interest rates observable on the market



## Fair value determined using input factors unobservable in the market (Level 3)

	Financial instruments concerned	Description of the measurement technique	Main input factors used to determine fair values
<b>Financial assets</b>			
Subsequent measurement at fair value through other comprehensive income			
		Discounting of expected future cash flows	Expected cash flows from recent business planning, average cost of capital, expected long-term growth rate
Equity instruments	Equity investments in unlisted companies	Derived from observable prices within the scope of equity refinancing sufficiently close to the balance sheet date, considered risk allowances	Observable prices derived from equity refinancing
		Cost-based determination	Acquisition cost
Trade and other receivables	Trade accounts receivable that are intended for sale due to a factoring agreement	Nominal value less factoring fees	Nominal value of potentially sold trade accounts receivable, average fees for sales of trade accounts receivable
Subsequent measurement at fair value through profit or loss			
Derivatives (without a hedging relationship)	Virtual power purchase agreement	Discounting of expected future cash flows	Electricity future price curves, expected electricity production volumes, discount factors
Contingent consideration	Contingent considerations from the sale of businesses or shares in corporations	Discounting of probability-weighted future milestone payments and license fees	Sales planning, milestone payments, probabilities of regulatory and commercial events, discount rates
Other debt instruments	Interests in unlisted funds	Consideration of the fair value of companies in which the funds are invested	Net asset values of the fund interests
	Bonds with embedded settlement option for equity in an unlisted company	Use of recognized actuarial methods	Interest rates observable on the market
<b>Financial liabilities</b>			
Subsequent measurement at fair value through profit or loss			
Derivatives (without a hedging relationship)	Hedging instrument for the virtual power purchase agreement	Use of recognized actuarial methods	Electricity future price curves, expected electricity production volumes, discount factors
Contingent consideration	Contingent considerations from the purchase of businesses	Discounting of probability-weighted future milestone payments and license fees	Sales planning, milestone payments, probabilities of regulatory and commercial events, discount rates

Counterparty credit risk was taken into consideration for measurements of financial instruments at fair value. In the case of non-derivative financial instruments, such as other liabilities or interest-bearing securities, this was reflected using risk premiums on the discount rate, while discounts on market value (credit valuation adjustments and debit valuation adjustments) were used for derivatives.

**Equity investments in unlisted companies (Level 3)**

The planning periods used to determine the fair value of equity investments in unlisted companies ranged from three to eight years (December 31, 2020: three to nine years). Cash flows for periods in excess of this are included in the terminal value calculation using long-term growth rates of between 1.0% and 9.0% (December 31, 2020: 1.0% and 2.0%). The applied average cost of capital (after tax) was 7.0% on December 31, 2021 (December 31, 2020: 7.0%).

**Assets from contingent considerations (Level 3)**

The fair values of assets from contingent considerations are calculated by weighting the expected future milestone payments and royalties using their probability of occurrence and discounting them. The main parameters when determining contingent considerations are:

- the estimated probability of reaching the individual milestone events,
- the underlying sales planning used to derive royalties, and
- the discount factor used.

When determining the probability of occurrence of the individual milestones events in connection with the development of drug candidates, the focus is on empirically available probabilities of success of development programs in comparable phases of clinical development in the relevant therapeutic areas. To determine the sales planning, internal sales plans and sales plans of external industry services are used. The discount rate (after tax) of between 5.4% and 6.5% as of December 31, 2021 (December 31, 2020: 5.4% to 6.5%) was calculated using the weighted average cost of capital.

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**Significant discretionary decisions and sources of estimation uncertainty**

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**Equity investments in unlisted companies**

Determining the parameters that are to be included in discounted cash-flow-methods and deriving the fair value from observable prices within the scope of equity refinancing are both subject to discretionary decisions and estimation uncertainty.

**Assets from contingent consideration**

The calculation of the fair value of assets from contingent considerations is subject to significant discretionary judgment.

The most significant contingent consideration was the future purchase price claim from the disposal of the biosimilars business to a subsidiary of Fresenius SE & Co. KGaA, Bad Homburg vor der Höhe, Germany, on August 31, 2017. It was calculated by an external valuation expert on initial recognition in 2017 and continued on this basis. As of December 31, 2021, the carrying amount was € 206 million (December 31, 2020: € 208 million).

If, in the context of determining the fair value of this contingent consideration at the date of transaction, the probability of approval as well as the discount factor of the three major development programs had been estimated to be lower or higher, this would have led to the following changes in the measurement and the corresponding effects on the profit before income tax:

#### December 31, 2021

€ million		Change in probability of regulatory approval		
		-10%	unchanged	10%
	4.9%	-21	4	30
Change of discount rate	5.4% (unchanged)	-25	–	25
	5.9%	-29	-4	20

#### December 31, 2020

€ million		Change in probability of regulatory approval		
		-10%	unchanged	10%
	5.0%	-22	6	33
Change of discount rate	5.5% (unchanged)	-27	–	27
	6.0%	-32	-5	21

The following table presents the carrying amounts and the fair values of the individual financial assets and liabilities as of December 31, 2021, for each individual financial instrument class pursuant to IFRS 9:

### December 31, 2021

		Carrying amount			Fair value <sup>1</sup>			
					Fair value determined by official prices and quoted market values (Level 1)	Fair value determined using input factors observable in the market (Level 2)	Fair value determined using input factors not observable in the market (Level 3)	
€ million	Consolidated notes	Current	Non-current	Total				Total
<b>Financial assets</b>								
Subsequent measurement at amortized cost								
Cash and cash equivalents	35	1,899	–	1,899				
Trade and other receivables (excluding leasing receivables)	25	3,622	24	3,646				
Other debt instruments	36	57	4	61				
Subsequent measurement at fair value through other comprehensive income								
Equity instruments	36	–	462	462	117	–	345	462
Trade and other receivables	25	20	–	20	–	–	20	20
Other debt instruments	36	43	1	44	44	–	–	44
Subsequent measurement at fair value through profit or loss								–
Contingent considerations	36	–	271	271	–	–	271	271
Other debt instruments	36	12	149	161	83	–	78	161
Derivatives without a hedging relationship	36, 39	37	24	61	–	37	24	61
Derivatives with a hedging relationship	36, 39	25	–	25	–	25	–	25
Lease receivables (measured in accordance with IFRS 16) <sup>2</sup>	25	4	1	6				
<b>Total</b>		<b>5,719</b>	<b>937</b>	<b>6,656</b>	<b>244</b>	<b>62</b>	<b>738</b>	<b>1,044</b>
<b>Financial debt</b>								
Subsequent measurement at amortized cost								
Trade payables and other liabilities	30	2,380	–	2,380				
Financial debt	37	2,379	7,928	10,307	9,655	1,213	–	10,868
Other financial liabilities	38	1,110	56	1,166				
Subsequent measurement at fair value through profit or loss								–
Contingent considerations	38	–	39	39	–	–	39	39
Derivatives without a hedging relationship	37, 38, 39	35	10	45	–	35	10	45
Derivatives with a hedging relationship	38, 39	82	–	82	–	82	–	82
Refund liabilities	9	839	–	839				
Lease liabilities (measured in accordance with IFRS 16) <sup>2</sup>	37	117	342	459				
<b>Total</b>		<b>6,942</b>	<b>8,375</b>	<b>15,318</b>	<b>9,655</b>	<b>1,330</b>	<b>49</b>	<b>11,034</b>

<sup>1</sup> The simplification option under IFRS 7.29(a) was used for disclosures of certain fair values.

<sup>2</sup> Measurements within the scope of IFRS 16 are exempted from the requirements of IFRS 13 (IFRS 13.6(b)).

The reduction in Level 2 equity instruments measured at fair value through other comprehensive income resulted from the reclassification of the shares in Precigen Inc., United States, to Level 1.

The following table presents the carrying amounts and the fair values of the individual financial assets and liabilities as of December 31, 2020, for each individual financial instrument class pursuant to IFRS 9:

### December 31, 2020

€ million	Consolidated notes	Carrying amount			Fair value <sup>1</sup>			Total
		Current	Non-current	Total	Fair value determined by official prices and quoted market values (Level 1)	Fair value determined using input factors observable in the market (Level 2)	Fair value determined using input factors not observable in the market (Level 3)	
<b>Financial assets</b>								
Subsequent measurement at amortized cost								
Cash and cash equivalents	35	1,355	–	1,355				
Trade and other receivables (excluding leasing receivables)	25	3,199	24	3,223				
Other debt instruments	36	1	7	7				
Subsequent measurement at fair value through other comprehensive income								
Equity instruments	36	–	499	499	18	226	255	499
Trade and other receivables	25	19	–	19	–	–	19	19
Other debt instruments	36	5	4	9	9	–	–	9
Subsequent measurement at fair value through profit or loss								
Contingent considerations	36	–	260	260	–	–	260	260
Other debt instruments	36	7	34	41	8	–	33	41
Derivatives without a hedging relationship	36, 39	16	18	34	–	26	8	34
Derivatives with a hedging relationship	36, 39	96	–	96	–	96	–	96
Lease receivables (measured in accordance with IFRS 16) <sup>2</sup>	25	3	1	4				
<b>Total</b>		<b>4,701</b>	<b>848</b>	<b>5,548</b>	<b>36</b>	<b>348</b>	<b>575</b>	<b>958</b>
<b>Financial debt</b>								
Subsequent measurement at amortized cost								
Trade payables and other liabilities	30	1,768	–	1,768				
Financial debt	37	2,183	9,419	11,602	9,970	2,180	–	12,150
Other financial liabilities	38	963	34	997				
Subsequent measurement at fair value through profit or loss								
Contingent considerations	38	–	26	26	–	–	26	26
Derivatives without a hedging relationship	37, 38, 39	62	42	104	–	102	2	104
Derivatives with a hedging relationship	38, 39	45	–	45	–	45	–	45
Refund liabilities	9	666	–	666				
Lease liabilities (measured in accordance with IFRS 16) <sup>2</sup>	37	112	327	438				
<b>Total</b>		<b>5,799</b>	<b>9,847</b>	<b>15,646</b>	<b>9,970</b>	<b>2,327</b>	<b>28</b>	<b>12,325</b>

<sup>1</sup> The simplification option under IFRS 7.29(a) was used for disclosures of certain fair values.

<sup>2</sup> Measurements within the scope of IFRS 16 are exempted from the requirements of IFRS 13 (IFRS 13.6(b)).

The changes in financial assets and liabilities for each of the individual classes of financial instruments allocated to Level 3 and measured at fair value were as follows in the previous year:

2020

	Financial assets					Financial liabilities		
	Subsequent measurement at fair value through profit or loss			Subsequent measurement at fair value through other comprehensive income		Subsequent measurement at fair value through profit or loss		
€ million	Other debt instruments	Contingent consideration	Derivatives without a hedging relationship	Equity instruments	Trade and other receivables	Contingent consideration	Derivatives without a hedging relationship	Total
Net carrying amounts, Jan. 1, 2020	26	258	–	190	24	–16	–	483
Additions	19	–	8	51	25	–9	–	94
Transfers into Level 3 from Level 1/Level 2	–	–	–	–	–	–	–	–
Fair value changes								
Gains (+)/losses (–) recognized in the consolidated income statement	–	2	–		–	–1	–2	–1
thereof: other operating result	–1	–18	–		–	1	–2	–20
thereof: attributable to assets/liabilities held as of the balance sheet date	–1	–18	–		–	1	–2	–20
thereof: financial income and expenses	2	20	–		–	–2	–	19
thereof: attributable to assets/liabilities held as of the balance sheet date	2	20	–		–	–2	–	19
Gains (+)/losses (–) recognized in other comprehensive income				22	–			22
Currency translation difference	–2	–	–	–	–	–	–	–1
Disposals	–3	–	–	–	–31	–	–	–33
Transfers out of Level 3 into Level 1/Level 2	–	–	–	–16	–	–	–	–16
Other	–9	–	–	9	–	–	–	–
Net carrying amounts as of Dec. 31, 2020	33	260	8	255	19	–26	–2	547

The changes in financial assets and liabilities for each of the individual classes of financial instruments allocated to Level 3 and measured at fair value were as follows in fiscal 2021:

2021

€ million	Financial assets					Financial liabilities		Total
	Subsequent measurement at fair value through profit or loss			Subsequent measurement at fair value through other comprehensive income		Subsequent measurement at fair value through profit or loss		
	Other debt instruments	Contingent consideration	Derivatives without a hedging relationship	Equity instruments	Trade and other receivables	Contingent consideration	Derivatives without a hedging relationship	
Net carrying amounts, Jan. 1, 2021	33	260	8	255	19	-26	-2	547
Additions	46	5	4	48	38	-	-	141
Transfers into Level 3 from Level 1/Level 2	-	-	-	-	-	-	-	-
Fair value changes								
Gains (+)/losses (-) recognized in the consolidated income statement	7	6	12		-	-12	-7	5
thereof: other operating result	-8	-12	10		-	-10	-7	-27
thereof: attributable to assets/liabilities held as of the balance sheet date	-8	-12	10		-	-10	-7	-27
thereof: financial income and expenses	15	18	1		-	-2	-	32
thereof: attributable to assets/liabilities held as of the balance sheet date	15	18	1		-	-2	-	32
Gains (+)/losses (-) recognized in other comprehensive income				91	-			91
Currency translation difference	2	-	1	-	-	-2	-	1
Disposals	-1	-	-	-13	-37	-	-	-50
Transfers out of Level 3 into Level 1/Level 2	-	-	-	-45	-	-	-	-45
Other	-8	-	-	8	-	-	-	-
Net carrying amounts as of Dec. 31, 2021	78	271	24	345	20	-39	-10	689

In particular, the additions in the reporting period included acquisitions of equity investments, acquisitions of other debt instruments, and trade receivables essentially intended for sale on the basis of a factoring agreement. Disposals during the reporting period related in particular to advance payments received in connection with trade accounts receivable under factoring agreements. The transfers from Level 3 to Level 1 related to Vera Therapeutics, Inc., United States, which has since been listed. The gains and losses from Level 3 assets recognized in other comprehensive income were reported in the consolidated statement of comprehensive income under the item "Fair value adjustments".

The following equity instruments measured at fair value through other comprehensive income were disposed of in 2021 and 2020:

€ million	Reasons for the disposal	Fair value on the date of derecognition	The cumulative gain (+) or loss (-) on disposal recognized in other comprehensive income	Transfer of the cumulative gains (+) or losses (-) within group equity to retained earnings
<b>2021<sup>1</sup></b>				
M Ventures portfolio companies	Portfolio adjustment/restructuring and full acquisition by third parties	16	7	7
Precigen, Inc., USA	Portfolio adjustment/restructuring	36	-	-
<b>2020<sup>1</sup></b>				
M Ventures portfolio companies	Portfolio adjustment/restructuring and full acquisition by third parties	100	91	91

<sup>1</sup> Disposals due to liquidations are not included.

M Ventures portfolio companies mainly include minority interests in listed and unlisted companies. The mandate of M Ventures is to invest in innovative technologies and products that are related to the Group's three business sectors.

The M Ventures portfolio companies disposed of in fiscal 2021 were Forendo Pharma OY, Finland, Progyny, Inc., United States, and shares in F-star Therapeutics, Inc., United States (2020: ObsEva SA, Switzerland and shares in Progyny, Inc., United States).

## (44) Other financial obligations

Other financial obligations comprised the following:

€ million	Dec. 31, 2021	Dec. 31, 2020
Acquisition of intangible assets	1,039	850
Acquisition of property, plant, and equipment	247	135
<b>Other financial obligations</b>	<b>1,286</b>	<b>985</b>

Obligations to acquire intangible assets existed in particular owing to contingent considerations within the scope of in-licensing and research and development collaborations. In these agreements, the Group has entered into an obligation to make milestone payments once specific targets have been reached. In the unlikely event that all of the milestones are achieved, the Group would be obligated to pay up to € 1,039 million (December 31, 2020: € 850 million) for the acquisition of intangible assets. The increase as against the previous year is essentially due to new in-licensing agreements in the Healthcare business sector portfolio (see Note (7) "[Collaboration and licensing agreements](#)"). The table above does not contain any other financial obligations from possible future sales-based license fees and milestone payments.

The expected maturities of the obligations to acquire intangible assets were as follows:

€ million	Dec. 31, 2021	Dec. 31, 2020
Within 1 year	51	33
In 1-5 years	323	152
After more than 5 years	665	665
<b>Obligations to acquire intangible assets</b>	<b>1,039</b>	<b>850</b>

Other financial obligations were recognized at nominal value.



## Other Disclosures

### (45) Related party disclosures

#### Accounting and measurement policies

#### Related party disclosures

Related parties in respect of the Group are E. Merck KG, Darmstadt, Germany, Emanuel-Merck-Vermögens-KG, Darmstadt, Germany, a related party of E. Merck KG, Darmstadt, Germany, and E. Merck Beteiligungen KG, Darmstadt, Germany, a related party of E. Merck KG, Darmstadt, Germany. Furthermore, direct or indirect subsidiaries of Merck KGaA, Darmstadt, Germany, associates of the Group, joint ventures of the Group, as well as pension funds that are classified as defined benefit plans in accordance with IAS 19 are also related parties within the meaning of IAS 24. Members of the Executive Board and the Supervisory Board of Merck KGaA, Darmstadt, Germany, the Executive Board and the Board of Partners of E. Merck KG, Darmstadt, Germany, as well as close members of their families are also related parties, as are companies controlled or jointly controlled by this group of persons.

Transactions were conducted with related parties as follows:

€ million	Income		Expenses		Receivables		Liabilities	
	2021	2020	2021	2020	Dec. 31, 2021	Dec. 31, 2020	Dec. 31, 2021	Dec. 31, 2020
E. Merck KG, Darmstadt, Germany	1.6	1.3	0.5	0.5	0.3	0.1	1,602.3	1,373.7
E. Merck Beteiligungen KG, Darmstadt, Germany, a related party of E. Merck KG, Darmstadt, Germany	0.4	0.1	0.0	0.0	0.5	0.0	0.0	0.0
Emanuel-Merck-Vermögens-KG, Darmstadt, Germany, a related party of E. Merck KG, Darmstadt, Germany	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Engel-Apotheke, Darmstadt <sup>1</sup>	0.1	0.0	1.0	0.7	0.0	0.0	0.0	0.0
Joint ventures	1.5	0.2	0.0	0.0	1.1	0.1	0.6	0.0
Majority interest in non-controlled companies	0.2	0.0	0.0	0.0	0.0	0.1	1.2	1.2
Non-consolidated subsidiaries	6.7	0.1	0.5	0.5	3.2	3.4	5.0	4.1

<sup>1</sup> The owner of Engel-Apotheke, Darmstadt, is a member of the Supervisory Board of Merck KGaA, Darmstadt, Germany.

As in the previous year, the liabilities of Group companies in respect of E. Merck KG, Darmstadt, Germany, primarily resulted from mutual profit transfers between Merck KGaA, Darmstadt, Germany, and E. Merck KG, Darmstadt, Germany, as well as the profit transfer by Merck & Cie, Altdorf, Switzerland, a subsidiary of Merck KGaA, Darmstadt, Germany, to E. Merck KG, Darmstadt, Germany. They included financial liabilities of € 894.1 million (December 31, 2020: € 815.9 million), subject to standard market interest rates. There was no collateral or guarantees; neither in favor of nor at the expense of the Group.

Information on pension funds that are classified as defined benefit plans in accordance with IAS 19 can be found in Note (33) "[Provisions for employee benefits](#)".

Information on Executive Board and Supervisory Board compensation can be found in Note (46) "[Executive Board and Supervisory Board compensation](#)". Activities above and beyond those described therein, such as the provision of services or the granting of loans, between companies of the Group and members of the Executive Board or the Supervisory Board of Merck KGaA, Darmstadt, Germany, the Executive Board or the Board of Partners of E. Merck KG, Darmstadt, Germany, or members of their immediate families did not take place in either fiscal 2021 or the previous year.

## (46) Executive Board and Supervisory Board compensation

As a matter of principle, the compensation of the Executive Board of Merck KGaA, Darmstadt, Germany, is recognized by the general partner, E. Merck KG, Darmstadt, Germany, which is not included in these consolidated financial statements. In fiscal 2021, the companies included in these consolidated financial statements did not recognize any expenses for services rendered by members of the Executive Board of Merck KGaA, Darmstadt, Germany, at these companies (2020: expenses of € 2.6 million).

Compensation of € 32.0 million was recognized for members of the Executive Board of Merck KGaA, Darmstadt, Germany, by E. Merck KG, Darmstadt, Germany, and companies included in these consolidated financial statements in fiscal 2021 (2020: € 27.4 million). This amount included fixed compensation of € 6.4 million (2020: € 5.3 million), variable compensation of € 16.0 million (2020: € 14.0 million), other compensation of € 0.4 million (2020: € 0.0 million), and additional benefits of € 0.4 million (2020: € 0.4 million). In conjunction with the standalone long-term incentive plan for the Executive Board, the structure of which is in essentially as described in Note (33) "[Provisions for employee benefits](#)", 70,846 virtual shares, also referred to as Share Units of Merck KGaA, Darmstadt, Germany (MSUs), will potentially be available subject to the achievement of targets (December 31, 2020: 83,210 MSU). The fair value of these MSU at the grant date was € 8.8 million (December 31, 2020: € 7.7 million). The grant value was € 9.4 million (December 31, 2020: € 8.8 million). For the members of the Executive Board, expenses of € 24.0 million (2020: € 17.5 million) were recognized by the general partner E. Merck KG, Darmstadt, Germany, in fiscal 2021 in the additions to the provisions for the long-term incentive plan and a current service cost of € 2.3 million (2020: € 3.0 million) was recognized in the additions to the provisions for defined benefit pension commitments.

Payments to former members of the Executive Board and their surviving dependents are made as pension payments, as continued payment of fixed remuneration for a limited period in the event of death, as profit sharing, under the long-term incentive plan and waiting allowance for a post-contractual non-competition clause. These payments amounted to € 30.7 million in fiscal 2021 (2020: € 13.8 million). Provisions for defined benefit pension commitments amounted to € 155.1 million as of December 31, 2021 (December 31, 2020: € 177.0 million).

The compensation of the Supervisory Board in fiscal 2021 amounting to € 958.7 thousand (2020: € 870.5 thousand) consisted of a fixed portion of € 822.5 thousand (2020: € 822.5 thousand), meeting attendance fees of € 47.3 thousand (2020: € 48.0 thousand), and committee membership compensation of € 88.9 thousand (2020: € 0.0 thousand).

As in the previous year, no compensation was paid to former members of the Supervisory Board in fiscal 2021.

As in the previous year, the members of the Executive Board and the Supervisory Board did not receive any advances or loans in fiscal 2021. As in the previous year, no contingent liabilities were entered into for the benefit of these persons in fiscal 2021.

Further individualized information and disclosures, as well as a presentation of the compensation system for the members of the Executive Board and the Supervisory Board, can be found in the compensation report in the voluntary section of the combined management report.

**(47) Auditor's fees**

The costs for the auditors (KPMG) of the financial statements of the Group consisted of the following:

€ million	2021		2020	
	Group	thereof: KPMG AG Wirtschaftsprüfungsgesellschaft, Germany	Group	thereof: KPMG AG Wirtschaftsprüfungsgesellschaft, Germany
Audits of financial statements	9.7	2.4	9.3	2.6
Other audit-related services	0.6	0.4	0.5	0.4
Tax consultancy services	0.2	–	0.3	–
Other services	0.4	0.1	0.3	0.1
<b>Total</b>	<b>10.9</b>	<b>2.9</b>	<b>10.4</b>	<b>3.1</b>

Other audit-related services pertained to various statutory or contractually agreed audits. Tax consultancy services encompassed services in connection with the preparation of tax returns for employees delegated abroad. Other services included other consultancy services in regulatory and business matters.

## Scope of Consolidation

### (48) List of shareholdings

The shareholdings of Merck KGaA, Darmstadt, Germany, as of December 31, 2021, are presented below, along with a list of the fair values for equity instruments subsequently measured at fair value through other comprehensive income:

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
<b>I. Fully consolidated companies</b>				
<b>Germany</b>				
Germany	Merck KGaA, Darmstadt, Germany	Darmstadt	Parent company	
Germany	AmpTec GmbH A)	Hamburg	100.00	
Germany	AZ Electronic Materials GmbH A)	Darmstadt	100.00	
Germany	Biochrom GmbH A)	Berlin	100.00	
Germany	Chemitra GmbH A)	Darmstadt	100.00	100.00
Germany	Emedia Export Company mbH	Gernsheim	100.00	
Germany	Merck 12. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck 13. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	
Germany	Merck 15. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	
Germany	Merck 16. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck 20. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck 21. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	
Germany	Merck 24. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck Accounting Solutions & Services Europe GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Weiterstadt	100.00	100.00
Germany	Merck Chemicals GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Consumer Health Holding Germany GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00
Germany	Merck Export GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck Financial Services GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00
Germany	Merck Financial Trading GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Gernsheim	100.00	
Germany	Merck Gernsheim Holding GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Healthcare Holding GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00
Germany	Merck Healthcare KGaA, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Holding GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Gernsheim	100.00	100.00
Germany	Merck International GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
Germany	Merck Internationale Beteiligungen GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	
Germany	Merck Life Science Germany GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Life Science Holding GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00
Germany	Merck LS RTU GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck Patent GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Performance Materials Germany GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	
Germany	Merck Performance Materials GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Wiesbaden	100.00	
Germany	Merck Performance Materials Holding GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00
Germany	Merck Real Estate GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck Schuchardt OHG, a subsidiary of Merck KGaA, Darmstadt, Germany	Hohenbrunn	100.00	100.00
Germany	Merck Serono GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	Merck Site Management GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Gernsheim	100.00	100.00
Germany	Merck Surface Solutions GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Gernsheim	100.00	
Germany	Merck Vierte Allgemeine Beteiligungsgesellschaft mbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Gernsheim	100.00	
Germany	Merck Wohnungs- und Grundstücksverwaltungsgesellschaft mbH, a subsidiary of Merck KGaA, Darmstadt, Germany A)	Darmstadt	100.00	100.00
Germany	OneZeroMed GmbH A)	Darmstadt	100.00	100.00
Germany	Sigma-Aldrich Biochemie GmbH	Steinheim	100.00	
Germany	Sigma-Aldrich Chemie GmbH	Steinheim	100.00	
Germany	Sigma-Aldrich Chemie Holding GmbH	Taufkirchen	100.00	
Germany	Sigma-Aldrich Grundstücks GmbH & Co. KG	Steinheim	100.00	
Germany	Sigma-Aldrich Logistik GmbH	Steinheim	100.00	
Germany	Sigma-Aldrich Verwaltungs GmbH	Steinheim	100.00	100.00
Germany	Versum Materials Germany GmbH	Darmstadt	100.00	
<b>Other European countries</b>				
Austria	Merck Chemicals and Life Science GesmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Vienna	100.00	
Austria	Merck Gesellschaft mbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Vienna	100.00	
Austria	Sigma-Aldrich Handels GmbH	Vienna	100.00	
Belgium	Merck Chemicals NV/SA, a subsidiary of Merck KGaA, Darmstadt, Germany	Overijse	100.00	
Belgium	Merck Life Science BV, a subsidiary of Merck KGaA, Darmstadt, Germany	Overijse	100.00	
Belgium	Merck NV/SA, a subsidiary of Merck KGaA, Darmstadt, Germany	Overijse	100.00	
Bulgaria	Merck Bulgaria EAD, a subsidiary of Merck KGaA, Darmstadt, Germany	Sofia	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
Croatia	Merck d.o.o. , a subsidiary of Merck KGaA, Darmstadt, Germany	Zagreb	100.00	
Czech Republic	Merck Life Science spol s r.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Prague	100.00	
Czech Republic	Merck spol. s r.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Prague	100.00	
Denmark	Merck A/S, a subsidiary of Merck KGaA, Darmstadt, Germany	Soborg	100.00	
Denmark	Merck Life Science A/S, a subsidiary of Merck KGaA, Darmstadt, Germany	Soborg	100.00	
Denmark	Survac ApS	Frederiksberg	100.00	100.00
Estonia	Merck Serono OÜ, a subsidiary of Merck KGaA, Darmstadt, Germany	Tallinn	100.00	
Finland	Merck Life Science OY, a subsidiary of Merck KGaA, Darmstadt, Germany	Espoo	100.00	
Finland	Merck OY, a subsidiary of Merck KGaA, Darmstadt, Germany	Espoo	100.00	
France	Gonnon S.A.S.	Lyon	100.00	
France	Merck Biodevelopment S.A.S., a subsidiary of Merck KGaA, Darmstadt, Germany	Lyon	100.00	
France	Merck Chimie S.A.S., a subsidiary of Merck KGaA, Darmstadt, Germany	Fontenay s/Bois	100.00	
France	Merck Performance Materials S.A.S., a subsidiary of Merck KGaA, Darmstadt, Germany	Trosly Breuil	100.00	
France	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Lyon	99.86	
France	Merck Santé S.A.S., a subsidiary of Merck KGaA, Darmstadt, Germany	Lyon	100.00	
France	Merck Serono S.A.S., a subsidiary of Merck KGaA, Darmstadt, Germany	Lyon	100.00	
France	Millipore S.A.S.	Molsheim	100.00	
France	Sigma-Aldrich Chimie S.a.r.l.	Saint Quentin Fallavier	100.00	
France	Sigma-Aldrich Chimie SNC	Saint Quentin Fallavier	100.00	
France	Sigma-Aldrich Holding S.a.r.l.	Saint Quentin Fallavier	100.00	
Greece	Merck Commercial Industrial Pharmaceutical Chemical Single Member S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Maroussi, Athens	100.00	
Hungary	Merck Kft., a subsidiary of Merck KGaA, Darmstadt, Germany	Budapest	100.00	
Hungary	Merck Life Science Kft., a subsidiary of Merck KGaA, Darmstadt, Germany	Budapest	100.00	
Ireland	Merck Finance Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Carrigtwohill	100.00	
Ireland	Merck Life Science Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Arklow	100.00	
Ireland	Merck Millipore Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Carrigtwohill	100.00	
Ireland	Merck Serono (Ireland) Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Dublin	100.00	
Ireland	Millipore Cork Unlimited Company	Carrigtwohill	100.00	
Ireland	Shrawdine Limited	Arklow	100.00	
Ireland	Sigma-Aldrich Ireland Ltd.	Arklow	100.00	
Ireland	Versum Materials Ireland Limited	Dublin	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
Italy	Allergopharma S.r.l. in Liquidazione	Rome	100.00	
Italy	Istituto di Ricerche Biomediche Antoine Marxer RBM S.p.A.	Colleretto Giacosa	100.00	
Italy	Merck Life Science S.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Milan	100.00	
Italy	Merck S.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Milan	100.00	
Italy	Merck Serono S.p.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Rome	99.74	
Italy	Versum Materials Italia S.r.l.	Milan	100.00	
Latvia	Merck Serono SIA, a subsidiary of Merck KGaA, Darmstadt, Germany	Riga	100.00	
Lithuania	Merck Serono UAB, a subsidiary of Merck KGaA, Darmstadt, Germany	Vilnius	100.00	
Luxembourg	Mats Finance S.a.r.l.	Luxembourg	100.00	
Luxembourg	Merck Chemicals Holding S.a.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	
Luxembourg	Merck Finance S.a.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	
Luxembourg	Merck Finanz S.a.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	
Luxembourg	Merck Holding S.a.r.l., a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	
Luxembourg	Merck Invest SCS, a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	
Luxembourg	Merck Re S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Luxembourg	100.00	100.00
Luxembourg	Millipore International Holdings, S.a.r.l.	Luxembourg	100.00	
Luxembourg	Sigma-Aldrich Global S.a.r.l.	Luxembourg	100.00	
Luxembourg	Sigma-Aldrich S.a.r.l.	Luxembourg	100.00	
Malta	Merck Capital Holding Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Pietà	100.00	50.29
Malta	Merck Capital Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Pietà	100.00	
Netherlands	eyrise B.V.	Veldhoven	100.00	100.00
Netherlands	Merck B.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Schiphol-Rijk	100.00	
Netherlands	Merck Chemicals B.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Amsterdam	100.00	
Netherlands	Merck Europe B.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Amsterdam	100.00	
Netherlands	Merck Holding Netherlands B.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Schiphol-Rijk	100.00	
Netherlands	Merck Life Science N.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Amsterdam	100.00	
Netherlands	Merck Ventures B.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Amsterdam	100.00	
Netherlands	Serono Tri Holdings B.V.	Schiphol-Rijk	100.00	
Netherlands	Sigma-Aldrich B.V.	Zwijndrecht	100.00	
Netherlands	Versum Materials Asia B.V.	Amsterdam	100.00	
Netherlands	Versum Materials Holdings Nederland B.V.	Amsterdam	100.00	
Netherlands	Versum Materials International B.V.	Amsterdam	100.00	
Netherlands	Versum Materials Netherlands B.V.	Amsterdam	100.00	
Netherlands	Versum Materials Netherlands International B.V.	Amsterdam	100.00	
Netherlands	Versum Materials Pacific B.V.	Amsterdam	100.00	
Norway	Merck Life Science AS, a subsidiary of Merck KGaA, Darmstadt, Germany	Oslo	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
Poland	Merck Business Solutions Europe Sp. z o.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Wroclaw	100.00	
Poland	Merck Life Science Sp. z o.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Poznan	100.00	
Poland	Merck Sp. z o.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Warsaw	100.00	
Portugal	Merck, S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Algés	100.00	
Romania	Merck Romania S.R.L., a subsidiary of Merck KGaA, Darmstadt, Germany	Bucharest	100.00	
Russia	Merck Life Science LLC, a subsidiary of Merck KGaA, Darmstadt, Germany	Moscow	100.00	
Russia	Merck LLC, a subsidiary of Merck KGaA, Darmstadt, Germany	Moscow	100.00	
Serbia	Merck d.o.o. Beograd, a subsidiary of Merck KGaA, Darmstadt, Germany	Belgrade	100.00	
Slovakia	Merck Life Science spol. s r.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Bratislava	100.00	
Slovakia	Merck spol. s r.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Bratislava	100.00	
Slovenia	Merck d.o.o., a subsidiary of Merck KGaA, Darmstadt, Germany	Ljubljana	100.00	
Spain	Merck Chemicals and Life Science S.A.U., a subsidiary of Merck KGaA, Darmstadt, Germany	Madrid	100.00	
Spain	Merck Life Science S.L.U., a subsidiary of Merck KGaA, Darmstadt, Germany	Madrid	100.00	
Spain	Merck, S.L.U., a subsidiary of Merck KGaA, Darmstadt, Germany	Madrid	100.00	
Sweden	Merck AB, a subsidiary of Merck KGaA, Darmstadt, Germany	Solna	100.00	
Sweden	Merck Chemicals and Life Science AB, a subsidiary of Merck KGaA, Darmstadt, Germany	Solna	100.00	
Sweden	Sigma-Aldrich Sweden AB	Stockholm	100.00	
Switzerland	Ares Trading SA	Aubonne	100.00	
Switzerland	Merck & Cie, a subsidiary of Merck KGaA, Darmstadt, Germany	Altdorf	51.63	51.63
Switzerland	Merck (Schweiz) AG, a subsidiary of Merck KGaA, Darmstadt, Germany	Zug	100.00	
Switzerland	Merck Performance Materials (Schweiz) AG, a subsidiary of Merck KGaA, Darmstadt, Germany	Schaffhausen	100.00	
Switzerland	Merck Serono SA, a subsidiary of Merck KGaA, Darmstadt, Germany	Aubonne	100.00	
Switzerland	SeroMer Holding SA	Eysins	100.00	
Switzerland	Sigma-Aldrich (Switzerland) Holding AG	Buchs	100.00	
Switzerland	Sigma-Aldrich Chemie GmbH	Buchs	100.00	
Switzerland	Sigma-Aldrich International GmbH	Buchs	100.00	
Switzerland	Sigma-Aldrich Production GmbH	Buchs	100.00	
Turkey	Merck Ilac Ecza ve Kimya Ticaret AS, a subsidiary of Merck KGaA, Darmstadt, Germany	Istanbul	100.00	
United Kingdom	BioReliance Limited	Aberdeen	100.00	
United Kingdom	BioReliance U.K. Acquisition Limited	Gillingham	100.00	
United Kingdom	Epichem Group Limited	Gillingham	100.00	
United Kingdom	Merck Holding Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00	
United Kingdom	Merck Investments Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00	
United Kingdom	Merck Life Science UK Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Gillingham	100.00	

Footnotes follow at the end of the table



Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
United Kingdom	Merck Performance Materials Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00	
United Kingdom	Merck Serono Europe Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00	
United Kingdom	Merck Serono Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00	
United Kingdom	Millipore (U.K.) Limited	Feltham	100.00	
United Kingdom	Millipore UK Holdings LLP	Feltham	100.00	
United Kingdom	SAFC Biosciences Limited	Gillingham	100.00	
United Kingdom	SAFC Hitech Limited	Gillingham	100.00	
United Kingdom	Sigma-Aldrich Company Limited	Gillingham	100.00	
United Kingdom	Versum Materials UK Limited	London	100.00	
<b>North America</b>				
Canada	EMD Chemicals Canada Inc.	Oakville	100.00	
Canada	EMD Crop BioScience Canada Inc.	Toronto	100.00	
Canada	EMD Inc.	Mississauga	100.00	
Canada	Millipore (Canada) Ltd.	Oakville	100.00	
Canada	Natrix Separations, Inc.	Burlington	100.00	
Canada	Sigma-Aldrich Canada Co.	Oakville	100.00	
United States	Aldrich Chemical Co. LLC	Milwaukee	100.00	
United States	Aldrich Chemical Foreign Holding LLC	St. Louis	100.00	
United States	Aldrich-APL, LLC	Urbana	100.00	
United States	BioControl Systems, Inc.	Wilmington	100.00	
United States	BioReliance Corporation	Rockville	100.00	
United States	Cell Marque Corporation	Rocklin	100.00	
United States	Cerilliant Corporation	Round Rock	100.00	
United States	Electron Transfer Technologies, Inc.	West Trenton	100.00	
United States	EMD Accounting Solutions & Services America, Inc.	Rockland	100.00	
United States	EMD Digital Inc.	Burlington	100.00	
United States	EMD Finance LLC	Wilmington	100.00	
United States	EMD Group Holding, Inc.	Wilmington	100.00	
United States	EMD Holding Corp.	Rockland	100.00	
United States	EMD Millipore Corporation	Burlington	100.00	
United States	EMD Performance Materials Corp.	Philadelphia	100.00	
United States	EMD Serono Holding, Inc.	Rockland	100.00	
United States	EMD Serono Research & Development Institute, Inc.	Billerica	100.00	
United States	EMD Serono, Inc.	Rockland	100.00	
United States	FloDesign Sonics, Inc.	Wilmington	100.00	
United States	Grzybowski Scientific Inventions Ltd.	Evanston	100.00	
United States	Intermolecular, Inc.	Wilmington	100.00	
United States	J.C. Schumacher Company	Los Angeles	100.00	
United States	Millipore Asia Ltd.	Wilmington	100.00	
United States	Millipore UK Holdings I, LLC	Wilmington	100.00	
United States	Millipore UK Holdings II, LLC	Wilmington	100.00	
United States	Ormet Circuits, Inc.	San Diego	100.00	
United States	Research Organics, LLC	Cleveland	100.00	
United States	SAFC Biosciences, Inc.	Lenexa	100.00	
United States	SAFC Carlsbad, Inc.	Carlsbad	100.00	
United States	SAFC, Inc.	Madison	100.00	
United States	Serono Laboratories, Inc.	Rockland	100.00	
United States	Sigma Chemical Foreign Holding LLC	St. Louis	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
United States	Sigma Redevelopment Corporation	St. Louis	100.00	
United States	Sigma-Aldrich Co. LLC	St. Louis	100.00	
United States	Sigma-Aldrich Corporation	St. Louis	100.00	
United States	Sigma-Aldrich Foreign Holding Co.	St. Louis	100.00	
United States	Sigma-Aldrich Manufacturing LLC	St. Louis	100.00	
United States	Sigma-Aldrich Missouri Insurance Company	St. Louis	100.00	
United States	Sigma-Aldrich Research Biochemicals, Inc.	Wilmington	100.00	
United States	Sigma-Aldrich RTC, Inc.	Laramie	100.00	
United States	Sigma-Aldrich, Inc.	Madison	100.00	
United States	Sigma-Genosys of Texas LLC	The Woodlands	100.00	
United States	Supelco, Inc.	Bellefonte	100.00	
United States	Versum Materials Formulations and Technology, LLC	Wilmington	100.00	
United States	Versum Materials Manufacturing Company, LLC	Wilmington	100.00	
United States	Versum Materials Technology LLC	Wilmington	100.00	
United States	Versum Materials US International, Inc.	Wilmington	100.00	
United States	Versum Materials US LLC	Wilmington	100.00	
United States	Versum Materials, Inc.	Wilmington	100.00	
<b>Asia-Pacific (APAC)</b>				
Australia	Merck Healthcare Pty. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Macquarie Park	100.00	
Australia	Merck Pty. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Bayswater	100.00	
Australia	Sigma-Aldrich Oceania Pty. Ltd.	Macquarie Park	100.00	
Australia	Sigma-Aldrich Pty. Ltd.	Macquarie Park	100.00	
China	Beijing Skywing Technology Co., Ltd.	Beijing	100.00	
China	Merck Chemicals (Shanghai) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Shanghai	100.00	
China	Merck Display Materials (Shanghai) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Shanghai	100.00	
China	Merck Electronic Materials (Suzhou) Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Suzhou	100.00	
China	Merck Holding (China) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Shanghai	100.00	
China	Merck Innovation Hub (Guangdong) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Guangzhou	100.00	
China	Merck Life Science Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Hong Kong	100.00	
China	Merck Life Science Technologies (Nantong) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Nantong	100.00	
China	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Hong Kong	100.00	
China	Merck Management Consulting (Shanghai) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Shanghai	100.00	
China	Merck Performance Materials Hong Kong Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Hong Kong	100.00	
China	Merck Pharmaceutical (HK) Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Hong Kong	100.00	
China	Merck Pharmaceutical Distribution (Jiangsu) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Nantong	100.00	
China	Merck Pharmaceutical Manufacturing (Jiangsu) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Nantong	100.00	
China	Merck Serono (Beijing) Pharmaceutical Distribution Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Beijing	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
China	Merck Serono (Beijing) Pharmaceutical R&D Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Beijing	100.00	
China	Merck Serono Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Beijing	100.00	
China	SAFC Hitech (Shanghai) Co., Ltd.	Shanghai	100.00	
China	Sigma-Aldrich (Shanghai) Trading Co., Ltd.	Shanghai	100.00	
China	Sigma-Aldrich (Wuxi) Life Science & Technology Co., Ltd.	Wuxi	100.00	
China	Versum Materials (Dalian) Co., Ltd.	Dalian	100.00	
China	Versum Materials (Shanghai) Co., Ltd.	Shanghai	100.00	
India	Merck Life Science Pvt. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Mumbai	100.00	
India	Merck Performance Materials Pvt. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Mumbai	100.00	
India	Merck Specialities Pvt. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Mumbai	100.00	
India	Sigma-Aldrich Chemicals Private Limited	Bangalore	100.00	
Indonesia	P.T. Merck Chemicals and Life Sciences, a subsidiary of Merck KGaA, Darmstadt, Germany	Jakarta	100.00	
Indonesia	P.T. Merck Tbk., a subsidiary of Merck KGaA, Darmstadt, Germany	Jakarta	86.65	
Japan	BioReliance K.K.	Tokyo	100.00	
Japan	Merck Biopharma Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Tokyo	100.00	
Japan	Merck Electronics Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Tokyo	100.00	
Japan	Merck Holdings G.K., a subsidiary of Merck KGaA, Darmstadt, Germany	Tokyo	100.00	
Japan	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Tokyo	100.00	
Japan	Merck Performance Materials G.K., a subsidiary of Merck KGaA, Darmstadt, Germany	Tokyo	100.00	
Japan	Sigma-Aldrich Japan G.K.	Tokyo	100.00	
Japan	Versum Materials Japan Inc.	Tokyo	100.00	
Malaysia	Merck Sdn Bhd, a subsidiary of Merck KGaA, Darmstadt, Germany	Petaling Jaya	100.00	
Malaysia	Sigma-Aldrich (M) Sdn Bhd	Petaling Jaya	100.00	
Malaysia	Versum Materials Malaysia Sdn Bhd	Kuala Lumpur	100.00	
New Zealand	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Auckland	100.00	
New Zealand	Sigma-Aldrich New Zealand Co.	Auckland	100.00	
Philippines	Merck Business Solutions Asia Inc., a subsidiary of Merck KGaA, Darmstadt, Germany	Bonifacio Global City	99.99	
Philippines	Merck Inc., a subsidiary of Merck KGaA, Darmstadt, Germany	Bonifacio Global City	100.00	
Singapore	Merck Performance Materials Pte. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Singapore	100.00	
Singapore	Merck Pte. Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Singapore	100.00	
Singapore	Sigma-Aldrich Pte. Ltd.	Singapore	100.00	
Singapore	Versum Materials Singapore International Pte. Ltd.	Singapore	100.00	
Singapore	Versum Materials Singapore Pte. Ltd.	Singapore	100.00	
South Korea	Merck Electronic Materials Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Seoul	100.00	
South Korea	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Seoul	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
South Korea	Merck Performance Materials Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Pyeongtaek-shi	100.00	
South Korea	Sigma-Aldrich Korea Ltd.	Seoul	100.00	
South Korea	Versum Materials ADM Korea Inc.	Ansan-si	100.00	
South Korea	Versum Materials HYT Inc.	Ansan-si	100.00	
South Korea	Versum Materials Korea Inc.	Siheung-si	100.00	
South Korea	Versum Materials PM Korea Inc.	Ulsan	100.00	
South Korea	Versum Materials SPC Korea Ltd.	Pyeongtaek-shi	100.00	
Taiwan	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Taipei	100.00	
Taiwan	Merck Performance Materials Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Taipei	100.00	
Taiwan	SAFC Hitech Taiwan Co., Ltd.	Kaohsiung	100.00	
Taiwan	Versum Materials Taiwan Co., Ltd.	Taipei	74.00	
Thailand	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Bangkok	45.11	
Vietnam	Merck Healthcare Vietnam Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Ho Chi Minh City	100.00	
Vietnam	Merck Vietnam Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Ho Chi Minh City	100.00	
<b>Latin America</b>				
Argentina	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Buenos Aires	100.00	
Argentina	Sigma-Aldrich de Argentina S.R.L.	Buenos Aires	100.00	
Brazil	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Rio de Janeiro	100.00	
Brazil	Sigma-Aldrich Brasil Ltda.	Barueri	100.00	
Chile	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Santiago de Chile	100.00	
Chile	Sigma-Aldrich Quimica Ltda.	Santiago de Chile	100.00	
Colombia	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Bogota	100.00	
Ecuador	Merck C.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Quito	100.00	
Guatemala	Merck, S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Guatemala City	100.00	
Mexico	Merck Biopharma Distribution S.A. de C.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Mexico City	100.00	
Mexico	Merck, S.A. de C.V., a subsidiary of Merck KGaA, Darmstadt, Germany	Mexico City	100.00	
Mexico	Sigma-Aldrich Quimica, S. de R.L. de C.V.	Toluca	100.00	
Panama	Merck, S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Panama City	100.00	
Panama	Mesofarma Corporation	Panama City	100.00	
Peru	Merck Peruana S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Lima	100.00	
Uruguay	Ares Trading Uruguay S.A.	Montevideo	100.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)
<b>Middle East and Africa (MEA)</b>				
Egypt	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Cairo	100.00	
Israel	Inter-Lab Ltd.	Yavne	100.00	
Israel	InterPharm Laboratories Ltd.	Yavne	100.00	
Israel	Merck Serono Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Herzliya Pituach	100.00	
Israel	PMatX Ltd.	Yavne	90.00	
Israel	QLight Nanotech Ltd.	Jerusalem	100.00	
Israel	Sigma-Aldrich Israel Ltd.	Rehovot	100.00	
Israel	Versum Materials Israel Ltd.	Tel Aviv	100.00	
Kenya	Merck Healthcare and Life Science Limited, a subsidiary of Merck KGaA, Darmstadt, Germany	Nairobi	100.00	
South Africa	Merck (Pty) Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Halfway House	100.00	
South Africa	Merck Life Science (Pty) Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Halfway House	100.00	
Tunisia	Merck Promotion SARL, a subsidiary of Merck KGaA, Darmstadt, Germany	Tunis	100.00	
Tunisia	Merck SARL, a subsidiary of Merck KGaA, Darmstadt, Germany	Tunis	100.00	
United Arab Emirates	Merck Serono Middle East FZ-Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Dubai	100.00	
II. Companies accounted for using the equity method				
<b>Other European countries</b>				
United Kingdom	MM Domain Holdco Limited	London	50.00	50.00
<b>North America</b>				
United States	Syntropy Technologies LLC	Wilmington	50.00	

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)	Fair value as of Dec. 31, 2021 (€ million)	Fair value as of Dec. 31, 2020 (€ million)
III. Subsidiaries not consolidated for reasons of materiality						
<b>Germany</b>						
Germany	Merck 25. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 26. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 27. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 28. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 36. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 37. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 38. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 39. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 40. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 41. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
Germany	Merck 42. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 43. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 44. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 45. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 46. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 47. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 48. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck 49. Allgemeine Beteiligungs-GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	-
Germany	Merck Display Trading GmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00		<0.5	-

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)	Fair value as of Dec. 31, 2021 (€ million)	Fair value as of Dec. 31, 2020 (€ million)
<b>Other European countries</b>						
Greece	Sigma-Aldrich (OM) Ltd.	Maroussi (Athens)	100.00		<0.5	<0.5
Ireland	SAFC Arklow Ltd.	Arklow	100.00		<0.5	<0.5
Russia	Chemical Trade Limited LLC	Moscow	100.00		<0.5	<0.5
United Kingdom	BioControl Systems Limited	London	100.00		<0.5	<0.5
United Kingdom	Merck Cross Border Trustees Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00		<0.5	<0.5
United Kingdom	Merck Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00		<0.5	<0.5
United Kingdom	Merck Pension Trustees Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Feltham	100.00		<0.5	<0.5
United Kingdom	Sigma Chemical Co. Ltd.	Gillingham	100.00		<0.5	<0.5
<b>North America</b>						
United States	EMD Digital Holdings LLC	Wilmington	100.00		<0.5	<0.5
United States	Fluka Chemical Corp.	St. Louis	100.00		<0.5	<0.5
<b>Asia-Pacific (APAC)</b>						
Australia	SAFC Biosciences Pty. Ltd.	Macquarie Park	100.00		<0.5	-
China	Merck Electronics (Zhangjiagang) Co., Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Suzhou	100.00		<0.5	-
<b>Latin America</b>						
Dominican Republic	Merck Dominicana, S.R.L., a subsidiary of Merck KGaA, Darmstadt, Germany	Santo Domingo	100.00		<0.5	<0.5
<b>Middle East and Africa (MEA)</b>						
Nigeria	Merck Pharmaceutical and Life Sciences Ltd., a subsidiary of Merck KGaA, Darmstadt, Germany	Lagos	100.00		<0.5	<0.5
IV. Majority interest in non-controlled companies						
<b>Germany</b>						
Germany	Merck Foundation gGmbH, a subsidiary of Merck KGaA, Darmstadt, Germany	Darmstadt	100.00	100.00	<0.5	<0.5
<b>Latin America</b>						
Venezuela	Merck S.A., a subsidiary of Merck KGaA, Darmstadt, Germany	Caracas	100.00		<0.5	<0.5
Venezuela	Representaciones MEPRO S.A.	Caracas	100.00		<0.5	<0.5

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)	Fair value as of Dec. 31, 2021 (€ million)	Fair value as of Dec. 31, 2020 (€ million)
V. Associated companies not accounted for using the equity method for reasons of materiality						
<b>Other European countries</b>						
Netherlands	Calypso Biotech B.V.	Amsterdam	38.81		B)	B)
Netherlands	iOnctura B.V.	Amsterdam	29.44		B)	B)
Switzerland	Asceneuron SA	Lausanne	25.35		B)	B)
Switzerland	CAMAG Chemie-Erzeugnisse und Adsorptionstechnik AG	Muttenz	39.11		1	2
Switzerland	Vaximm AG	Basel	22.06		B)	B)
<b>North America</b>						
United States	Actithera Inc.	Wilmington	36.00		B)	-
United States	Prolog Healthy Living Fund II, L.P.	St. Louis	50.58		C)	C)
United States	Prolog Healthy Living Fund, L.P.	St. Louis	38.32		C)	C)
<b>Middle East and Africa (MEA)</b>						
Algeria	MDCA Pharma Promotion SARL	Hydra	49.00		<0.5	<0.5
VI. Other equity positions						
<b>Germany</b>						
Germany	Alcan Systems GmbH	Darmstadt	<20.00		B)	B)
Germany	Azelis Deutschland Kosmetik GmbH	Sankt Augustin	<20.00		<0.5	<0.5
Germany	BEEoled GmbH	Dresden	<20.00		<0.5	-
Germany	Ferroelectric Memory GmbH	Dresden	<20.00		B)	B)
Germany	Formo Bio GmbH	Berlin	<20.00		B)	B)
Germany	InfraServ GmbH & Co. Wiesbaden KG	Wiesbaden	<20.00		16	12
Germany	Inuru GmbH	Berlin	<20.00		<0.5	<0.5
Germany	IOmx Therapeutics AG	Martinsried	<20.00		B)	B)
Germany	micropsi industries GmbH	Berlin	<20.00		B)	B)
Germany	pharma mall Gesellschaft für Electronic Commerce mbH	Sankt Augustin	<20.00		1	1
Germany	PharmLog Pharma Logistik GmbH	Boenen	<20.00		2	2
Germany	PrintCity GmbH & Co. KG	Neuried	<20.00	<20.00	<0.5	<0.5
<b>Other European countries</b>						
Belgium	ReWind Therapeutics N.V.	Leuven-Heverlee	<20.00		B)	B)
Finland	Abacus Diagnostica OY	Turku	<20.00		<0.5	<0.5
France	Aveni SACS	Massy	<20.00		B)	B)
France	DNA Script S.A.S.	Paris	<20.00		B)	B)
France	Scipio Bioscience S.A.S.	Montrouge	<20.00		B)	B)
Netherlands	Anavo Therapeutics B.V.	Leiden	<20.00		B)	B)
Netherlands	Mosa Meat B.V.	Maastricht	<20.00		B)	B)
Netherlands	SynAffix B.V.	Nijmegen	<20.00		B)	-
Switzerland	FoRx Therapeutics AG	Basel	<20.00		B)	-
Switzerland	Inthera Bioscience AG	Schlieren	23.28		B)	B)
Switzerland	MoonLake Immunotherapeutics AG	Zug	<20.00		B)	B)
United Kingdom	Artios Pharma Limited	Cambridge	<20.00		B)	-
United Kingdom	Macrophage Pharma Limited	Cambridge	22.21		B)	B)
United Kingdom	NanoSyrinx Ltd.	Coventry	<20.00		B)	B)



Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)	Fair value as of Dec. 31, 2021 (€ million)	Fair value as of Dec. 31, 2020 (€ million)
United Kingdom	Outrun Therapeutics Limited	Dundee	22.00		B)	B)
United Kingdom	Peratech HoldCo Limited	Catterick Garrison	<20.00		B)	B)
United Kingdom	Storm Therapeutics Limited	London	<20.00		B)	B)
United Kingdom	Theolytics Ltd.	Headington, Oxford	<20.00		4	-
<b>North America</b>						
Canada	Future Fertility Inc.	Toronto	<20.00		B)	-
United States	Akili Interactive Labs, Inc.	Boston	<20.00		B)	B)
United States	Allozyne, Inc.	Seattle	<20.00		<0.5	<0.5
United States	Altoida, Inc.	Suwanee	<20.00		B)	B)
United States	ApoGen Biotechnologies, Inc.	Seattle	<20.00		B)	B)
United States	Biolinq Inc.	San Diego	<20.00		B)	B)
United States	Celestial AI Inc.	Wilmington	<20.00		B)	B)
United States	ElectronInks Inc.	Austin	<20.00		B)	B)
United States	F-star Therapeutics, Inc.	Wilmington	<20.00		B)	B)
United States	Galecto, Inc.	Wilmington	<20.00		B)	B)
United States	Hydrochlor, LLC	Wilmington	50.00		D)	D)
United States	Immunitas Therapeutics, Inc.	Wilmington	<20.00		B)	B)
United States	Indi Molecular, Inc.	Culver City	<20.00		B)	B)
United States	Kraig Biocraft Laboratories, Inc.	Ann Arbor	<20.00		<0.5	<0.5
United States	Lumioda, Inc.	New York	<20.00		B)	B)
United States	MemryX Inc.	Ann Arbor	<20.00		B)	B)
United States	Metalenz, Inc.	Boston	<20.00		B)	B)
United States	Neurable Inc.	Boston	<20.00		B)	B)
United States	Pacific Light & Hologram, Inc.	Wilmington	<20.00		B)	B)
United States	Pictor Labs, Inc.	Los Angeles	<20.00		B)	B)
United States	Plexium Inc.	Wilmington	<20.00		B)	B)
United States	Precigen, Inc.	Germantown	<20.00		68	226
United States	Raze Therapeutics, Inc.	Cambridge	<20.00		B)	B)
United States	Ribometrix Inc.	Durham	<20.00		B)	B)
United States	Riffyn, Inc.	Oakland	<20.00		B)	B)
United States	Robert W. Baird & Co.	Chicago	<20.00		C)	C)
United States	SeeQC, Inc.	Elmsford	<20.00		B)	B)
United States	Sonde Health, Inc.	Boston	<20.00		B)	B)
United States	Soteria Biotherapeutics Inc.	San Francisco	<20.00		B)	-
United States	Telios Pharma, Inc.	Wilmington	<20.00		9	9
United States	Tioga Pharmaceuticals, Inc.	San Diego	<20.00	<20.00	<0.5	<0.5
United States	Vera Therapeutics, Inc.	Wilmington	<20.00		45	11
United States	Xilio Therapeutics, Inc.	Waltham	<20.00		B)	B)
<b>Asia-Pacific (APAC)</b>						
China	IKAS Industry Co., Ltd.	Shenzhen	<20.00		B)	-
China	Multitude Therapeutics Inc.	Shanghai	<20.00		B)	B)
China	Nanjing Xinchun Neuromorphic Technology Co., Ltd.	Nanjing	<20.00		B)	B)
Japan	Showa Denko Versum Materials 2 Co., Ltd.	Tokyo	35.00		D)	D)
South Korea	Construction Guarantee Cooperative	Seoul	<20.00		<0.5	<0.5
<b>Latin America</b>						
Cayman Islands	CLEARInk Displays, Ltd.	Grand Cayman	<20.00		B)	B)

Footnotes follow at the end of the table

Country	Company	Registered office	Equity interest (%)	thereof: Merck KGaA, Darmstadt, Germany (%)	Fair value as of Dec. 31, 2021 (€ million)	Fair value as of Dec. 31, 2020 (€ million)
<b>Middle East and Africa (MEA)</b>						
Algeria	Novapharm Production SARL	Wilaya de Tipiza	20.00		2	<0.5
Israel	ARTSaVIT Ltd.	Yavne	<20.00		B)	B)
Israel	I-Heal Israel Health Entrepreneurs AI Lab Ltd.	Rehovot	<20.00		<0.5	-
Israel	Immunorizon Ltd.	Yavne	20.00		B)	B)
Israel	MediSafe Project Ltd.	Haifa	<20.00		B)	B)
Israel	Metabomed Ltd.	Yavne	<20.00		B)	B)
Israel	Neologic Ltd.	Tel Mond	<20.00		B)	-
Israel	Pantheon Biosciences Ltd.	Yavne	<20.00		B)	B)
Israel	Pilltracker 2015 Ltd.	Tel Aviv	<20.00		B)	B)
Israel	PxE Computational Imaging Ltd.	Lachish Darom	<20.00		B)	B)
Israel	Sentaur Bio Ltd.	Yavne	22.5		B)	B)
Israel	Wiliot Ltd.	Caesarea	<20.00		B)	B)

A) Companies opting for exemption as provided for by section 264 (3) and section 264b of the German Commercial Code.

B) Companies which are affiliates from the portfolio of Merck Ventures B.V., a subsidiary of Merck KGaA, Darmstadt, Germany. As of December 31, 2021, the fair value of the M Ventures portfolio amounted to € 308 million (December 31, 2020: € 234 million).

C) Closed-end funds classified as debt instruments in accordance with IFRS 9.

D) This is an affiliate within the meaning of IFRS 11 (joint activity).

Darmstadt, February 15, 2022



Belén Garijo



Kai Beckmann



Peter Guenter



Matthias Heinzel



Marcus Kuhnert