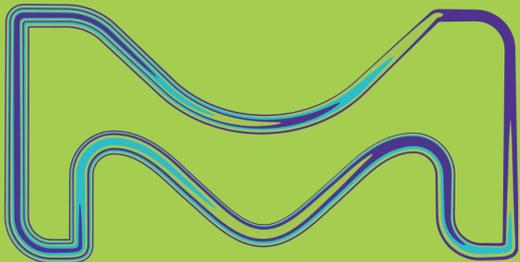


**COMMERZBANK
GERMAN INVESTMENT
SEMINAR 2021**

Merck KGaA, Darmstadt, Germany

Marcus Kuhnert, CFO

January 11th, 2021





Disclaimer

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Agenda

- 01 Business overview**
- 02 Transforming the company**
- 03 Healthcare – Global specialty innovator poised for above-industry growth**
- 04 Life Science – Diversified industry leader poised for above-market growth**
- 05 Performance Materials – Leading electronics player poised for accelerating growth**
- 06 Sustainability**
- 07 Executive summary and guidance**



BUSINESS OVERVIEW

01

Group

Three high-tech businesses competing in attractive markets



Healthcare

Leading in specialty pharma markets

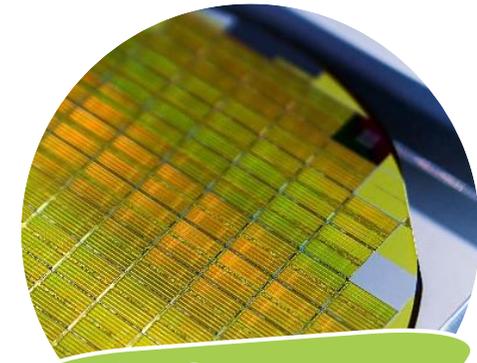
- Biologics and small-molecule **prescription medicines** against cancer, multiple sclerosis, infertility, and strong General Medicine portfolio
- **Research** focus: Oncology, Immunology & Immuno-Oncology
- **Successful portfolio management:** e.g. divestment of Consumer Health and Allergopharma



Life Science

Leading life science company

- Tools and services for **biotech research & production**
- **Tools and laboratory supply** for academic research and industrial testing



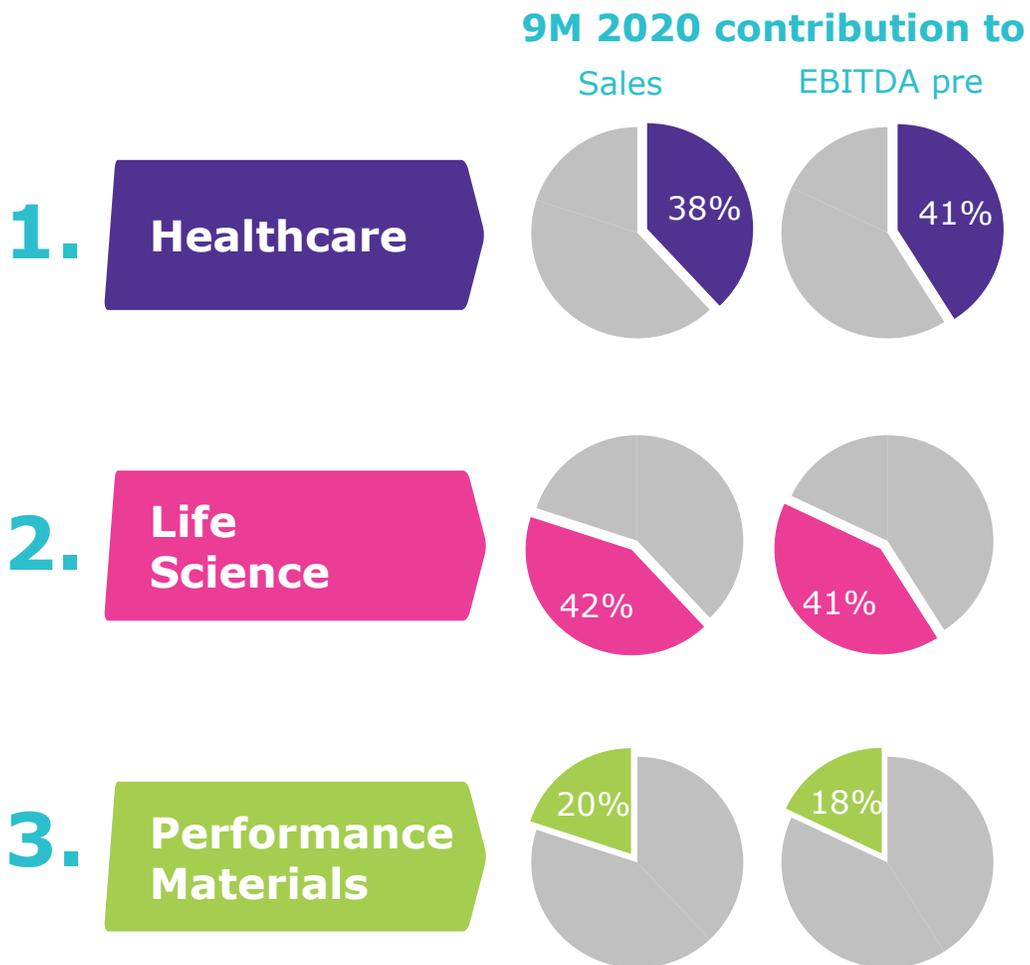
Performance Materials

Leading company in high-tech solutions

- High-tech solutions and materials for **electronics**
- Broad portfolio of **decorative and functional solutions**

Group

Today – three strong pillars as basis for profitable growth



Global specialty innovator poised for above-industry growth

- **Resilient core business** backed by excellent life cycle management
- **Strong growth** from new products, late-stage pipeline assets with blockbuster potential
- **Rigorous cost discipline** and value-maximizing pipeline prioritization

Diversified industry leader poised for above-market growth

- **Portfolio advantage** and outperformance drive above-market growth
- **Strengthen core:** products (PS), chemistry (RS), lab water (AS)
- **Establish new pillars:** PS services, gene editing and novel modalities

Leading electronics player poised for accelerating growth

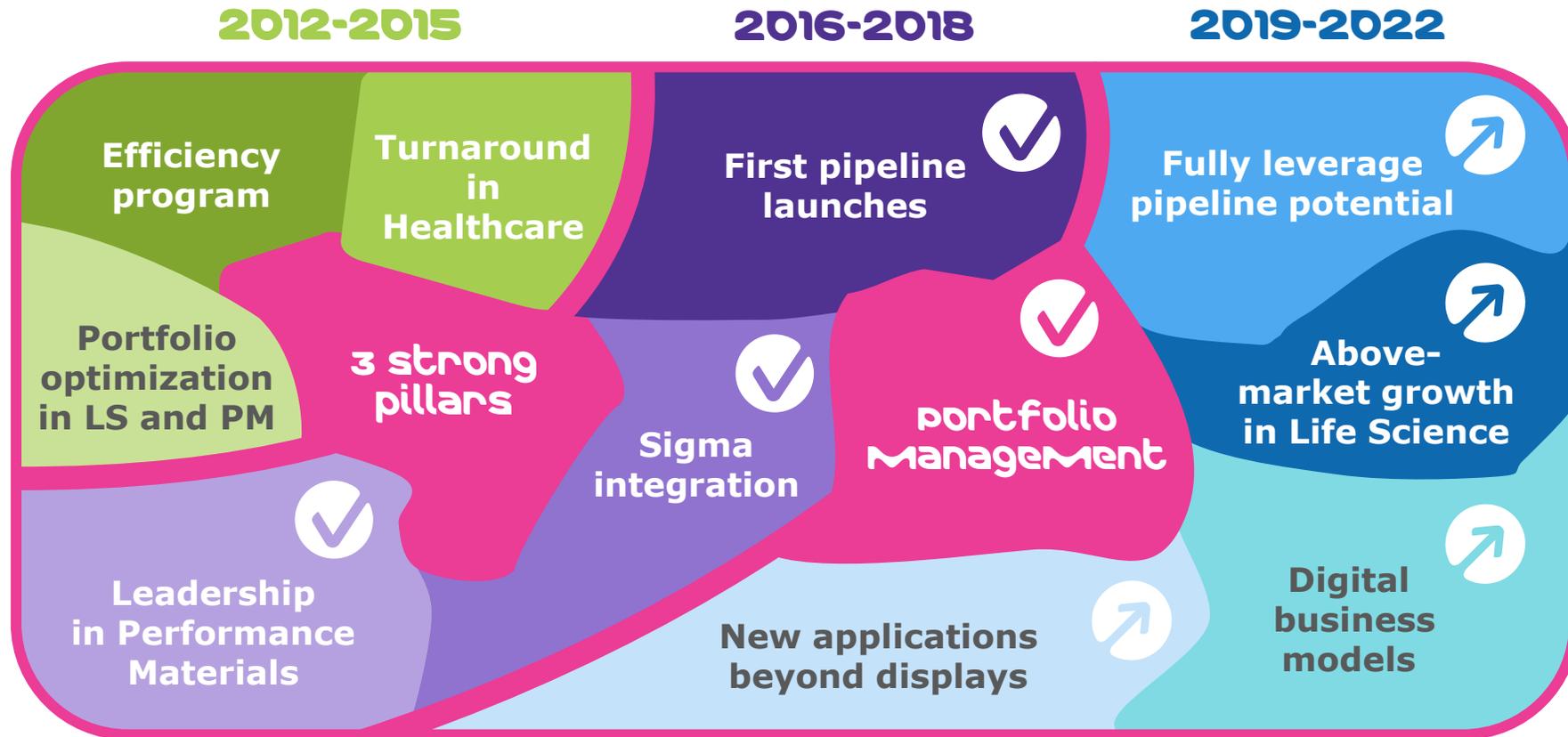
- **Growing semiconductor share** as key driver for acceleration
- **More resilient growth** through rising diversification
- **Strict cost discipline** in maturing parts of the portfolio

Acronyms: PS = Process Solutions, RS = Research Solutions, AS = Applied Solutions



Group

The 2016 vision – a strategic agenda until 2022



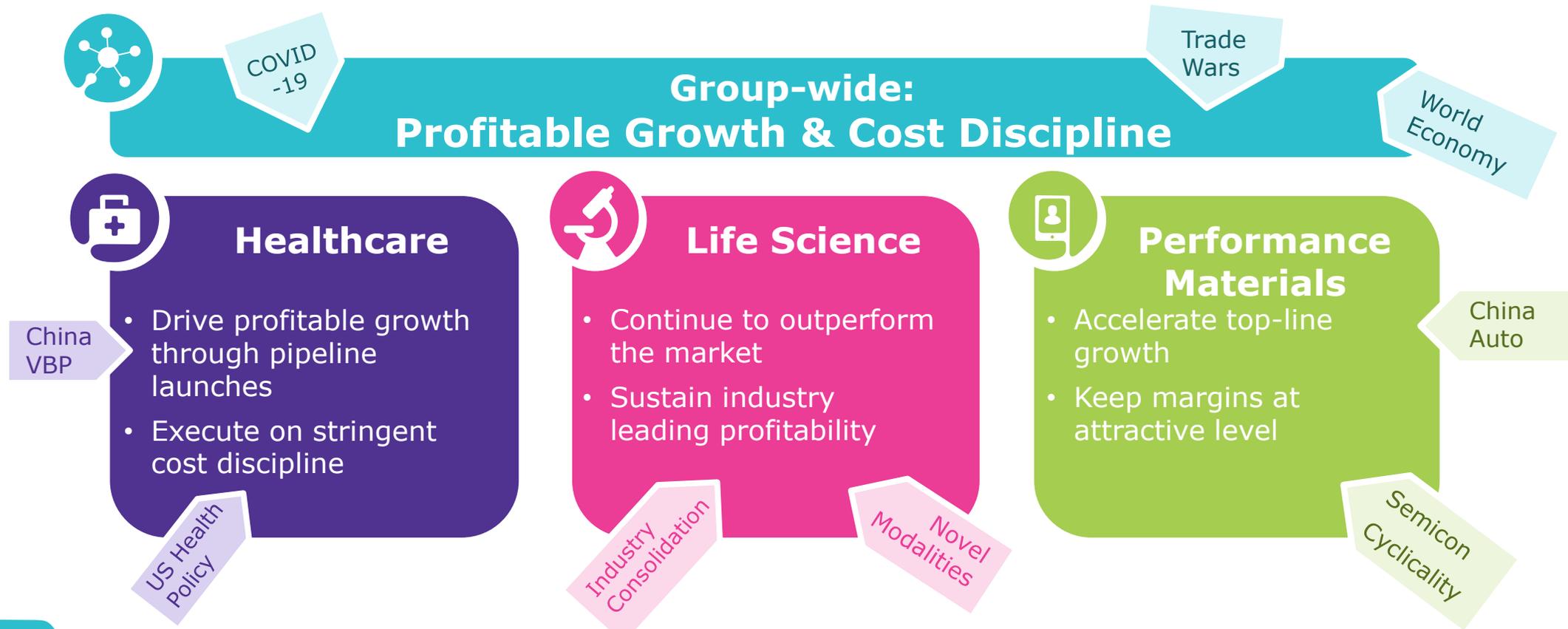
Executing on the growth and expansion phase of the 2016-22 strategic agenda

✓ = delivered; ↗ = well on track



Group

2021 and beyond – poised for growth in a challenging environment



Staying on course in a potentially volatile environment

Acronym: VBP = volume based procurement

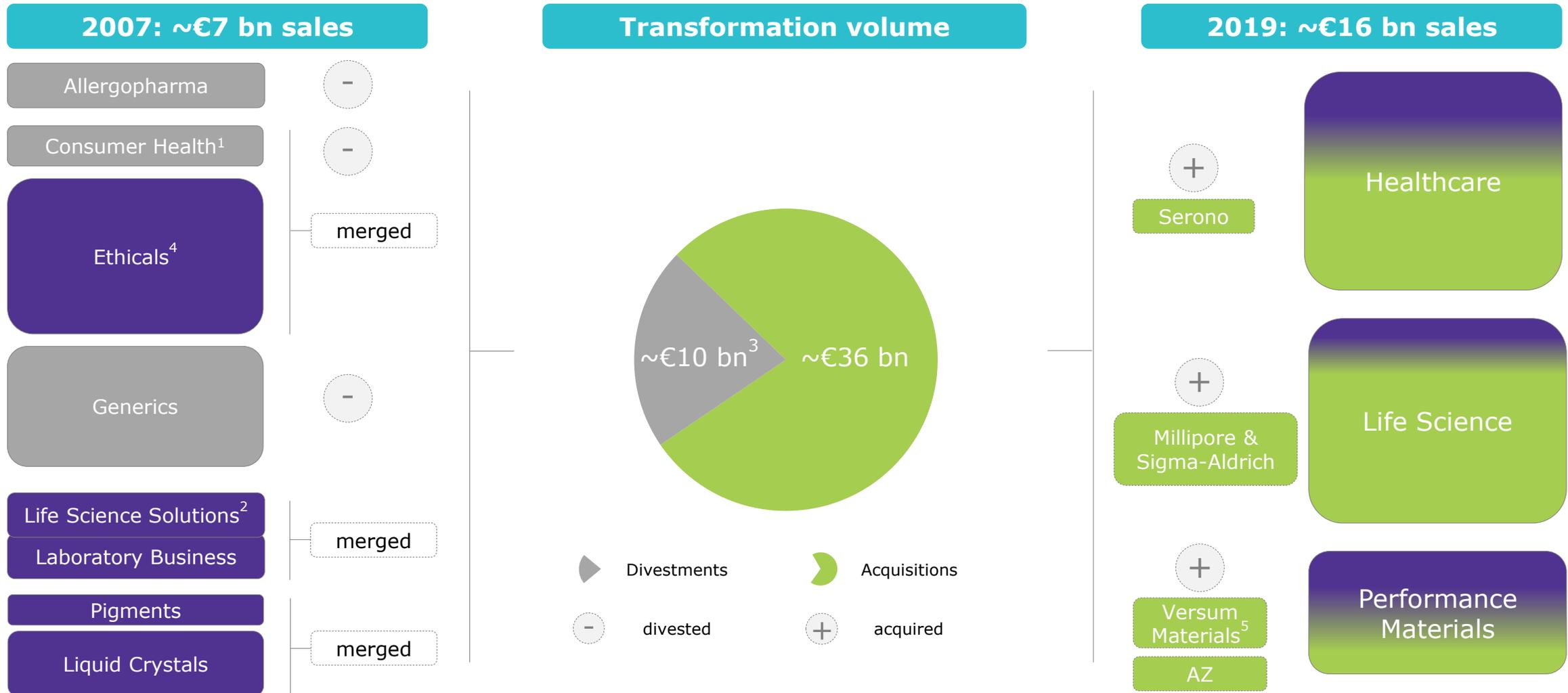


transforming
the company

02

Group

We have added scale and strengthened the attractiveness of our portfolio

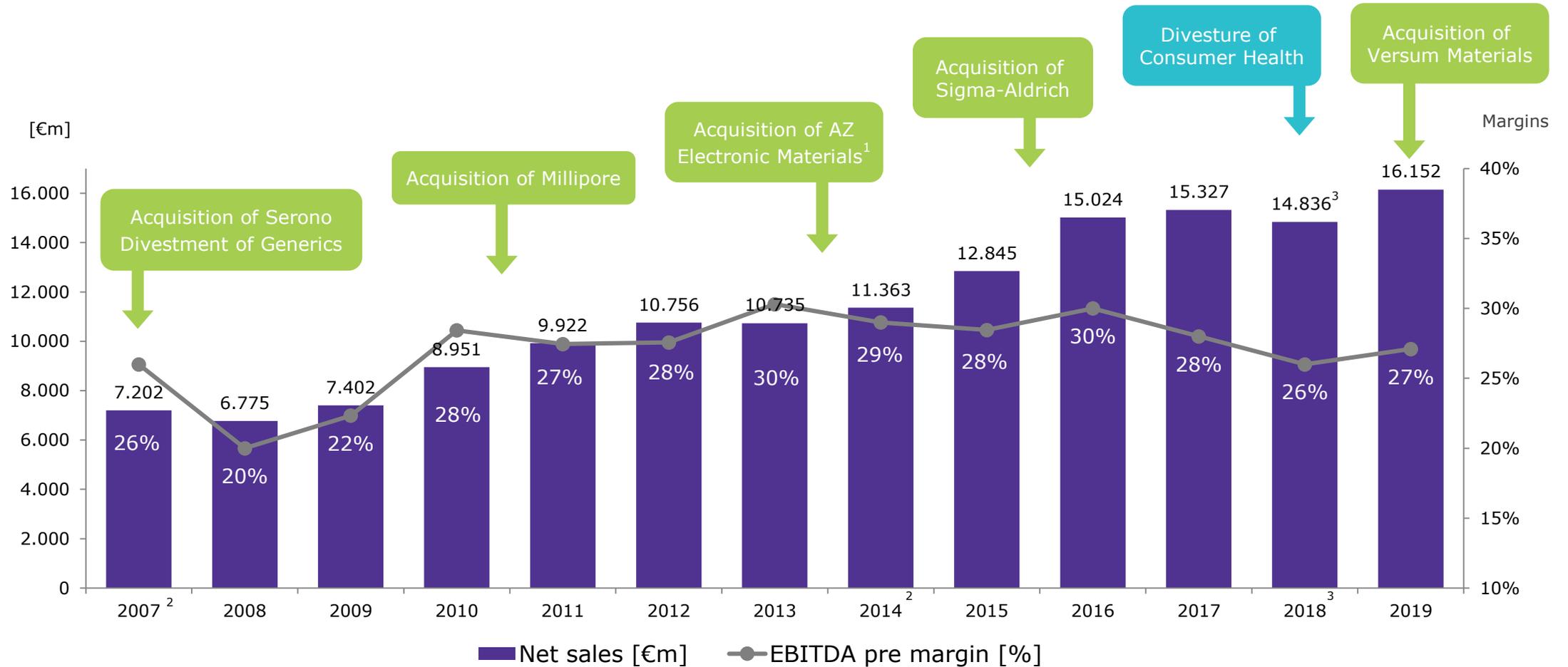


¹Closing of sale of Consumer Health at a cash purchase price of €3.4 bn completed as of December 1, 2018; ²Excluding "Crop Bioscience", which was divested; ³Profroma divestment volume includes cash proceeds for Consumer Health; ⁴Excluding "Theramex", which was divested; ⁵Closing of acquisition of Versum Materials at a purchase price of €5.8 bn completed as of October 7, 2019



Group

Continue to transform to a science and technology focused company

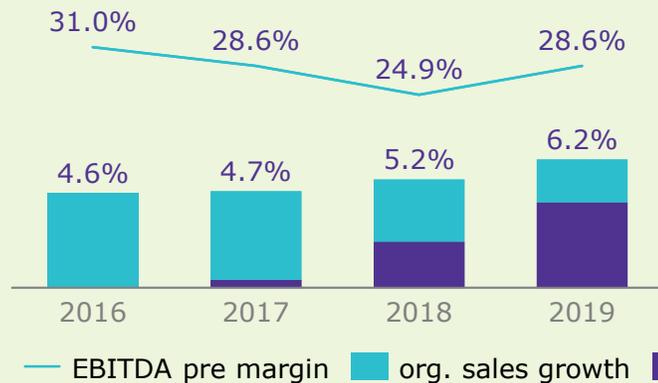


Group

All three business sectors delivering on their strategic priorities

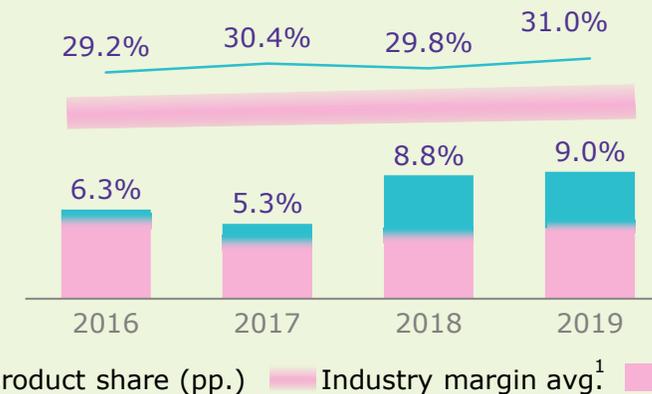
Healthcare

- **Accelerating organic growth** with rising contribution from launches (Mavenclad[®], Bavencio[®])
- **Margin trough behind, pipeline progressing well**



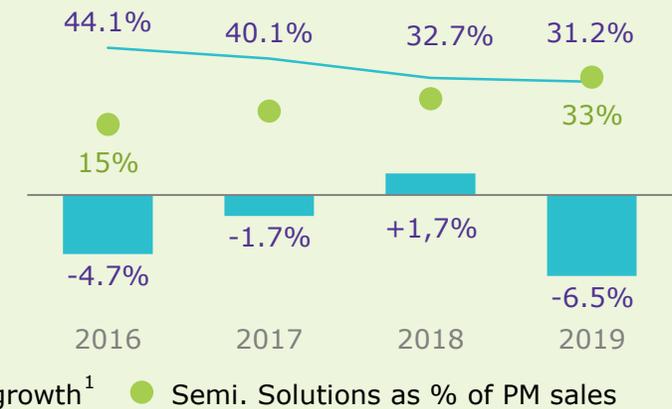
Life Science

- **Above-market organic growth** paired with **industry-leading margin**
- Significant **growth investments** (organic, inorganic & partnerships)



Performance Materials

- Significant portfolio change **towards higher growth business** (Semi, OLED)
- **Margin stabilizing** at ~30% amid sound execution of Bright Future



¹ Company estimate based on industry data and reporting by peers

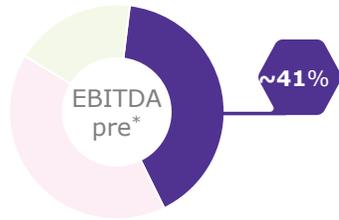


Group

Clear set of priority goals



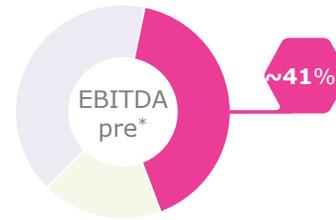
Healthcare



- Deliver on ambition to keep core business at least stable until 2022
- Transition from investment to earnings phase by 2019
- Foster successful Bavencio[®] and Mavenclad[®] ramp up
- Stringent pipeline execution



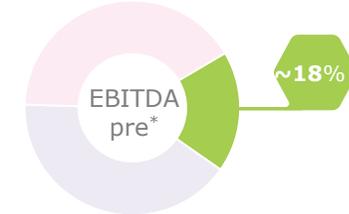
Life science



- Strengthen position as differentiated player in a highly attractive market
- Maintain consistent above-market growth trajectory and superior profitability



Performance Materials



- Deliver ambition of 3-4% CAGR
- Implement 5-year transformation program and focus on seamless integration of Versum and Intermolecular; to deliver financial ambition of around 30% margin
- Maintain strong cash generation and cash conversion

*based on 9M 2020



Three-pillar structure – positioned to win in high-growth markets

Global economy¹



Global
GDP

~3% to 4%



End markets¹



Global pharma industry
~4% to 5%



Global life science industry
~5% to 6%



Global electronics industry
~4%



~4% to 5%

Focus market areas¹



Oncology: ~10%
Immunology: ~5% to 9%



Biologics: ~10% to 12%
Services: ~7% to 8%



Semi materials: ~4% to 6%



6%-plus



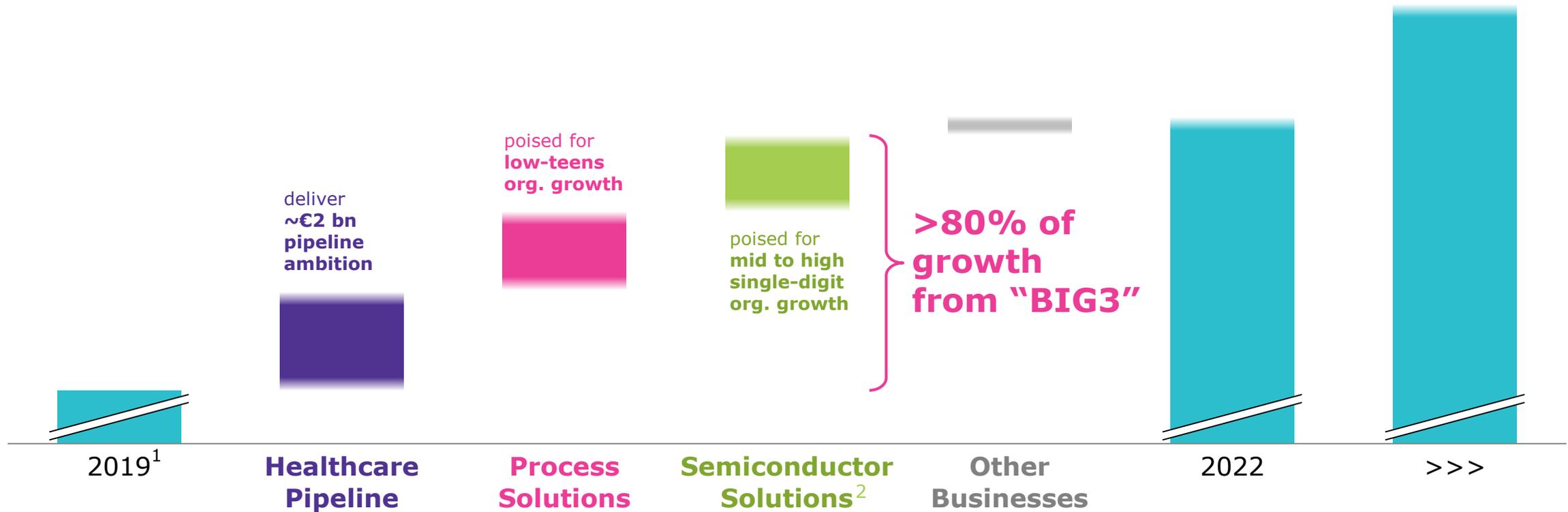
**Purposefully positioned in attractive markets with secular growth above global GDP
...further focusing investments on attractive sub-segments**

¹ Company estimates of mid-term growth outlook based on industry forecasts and reports from public research institutes (e.g. IMF, IQVIA, EvaluatePharma, Prismark, etc.)



Group

Three main drivers of growth to 2022 and beyond



Beyond 2022: further significant growth potential from "BIG3" and increasing contributions from other businesses

¹ 2019 Group sales of €16.2 bn; ² Including Versum portfolio effect

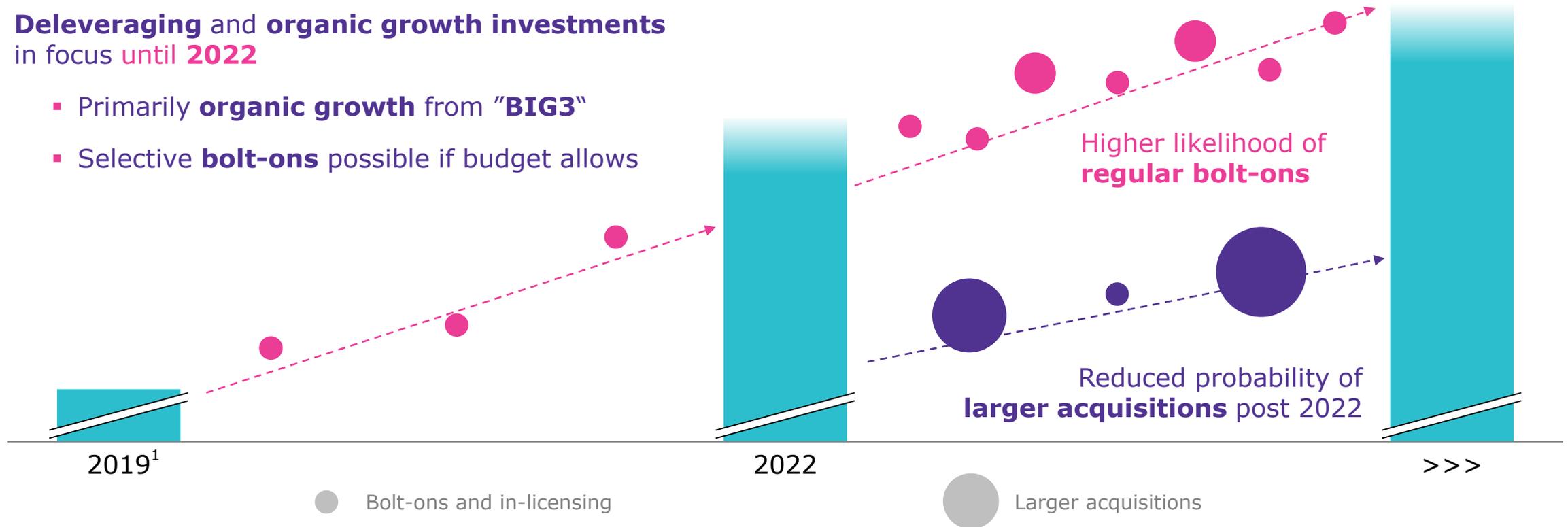


Group

Portfolio strategy – from transformation to evolution

Deleveraging and **organic growth investments**
in focus until **2022**

- Primarily **organic growth** from “**BIG3**”
- Selective **bolt-ons** possible if budget allows



**Strong portfolio: significant organic growth potential to 2022 and beyond
...and higher likelihood of regular bolt-ons post 2022**

¹ 2019 Group sales of €16.2 bn



Healthcare

Global specialty innovator poised for above-industry growth

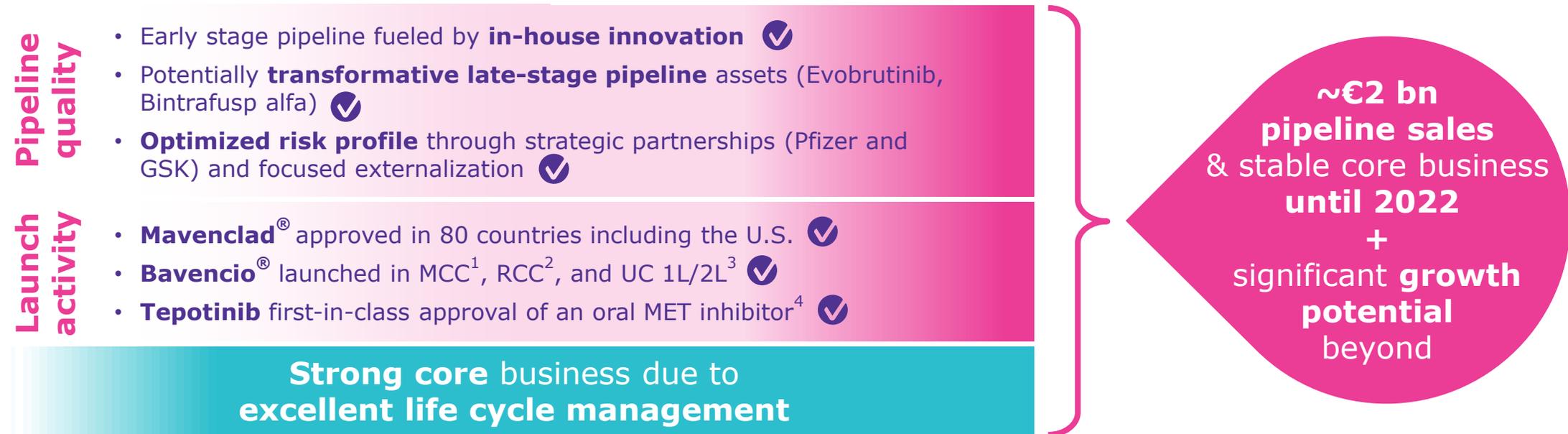
03

Healthcare

Creating optionality through **focused pipeline approach**

Pipeline and launch progress supported by strong core

Mid-term outlook Healthcare



Confirming financial ambition of a stable core business and ~€2 bn pipeline sales until 2022 with further significant growth potential beyond

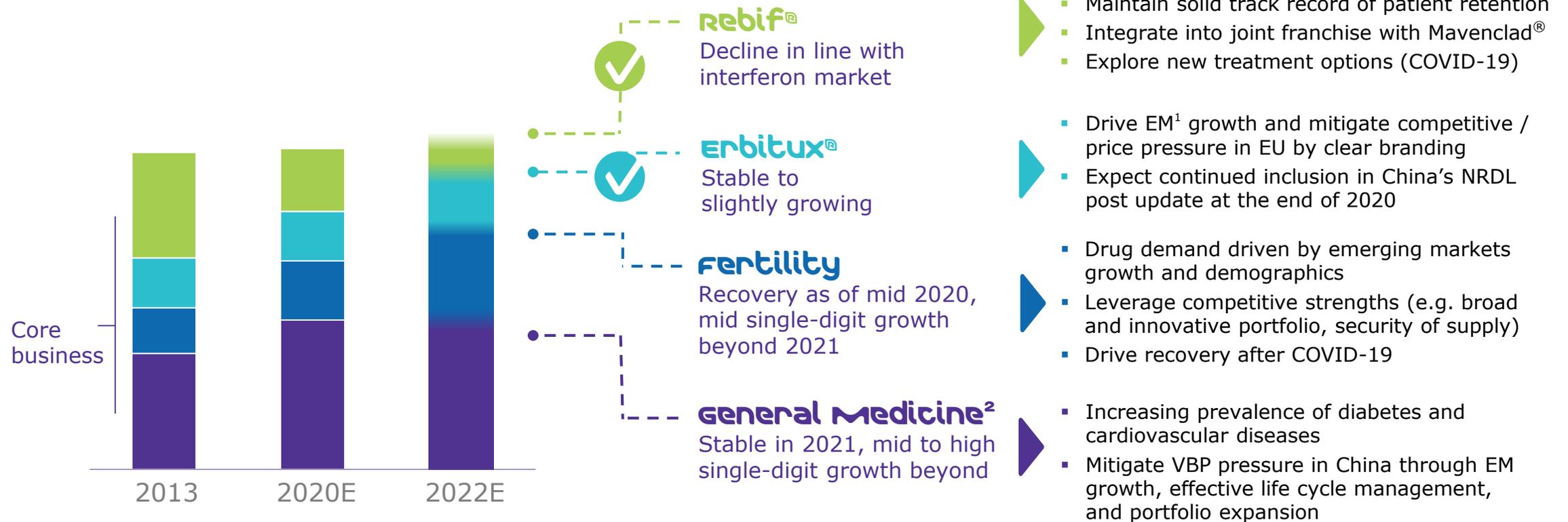
¹ MCC = Merkel Cell Carcinoma, launched in all major jurisdictions; ² RCC = Renal Cell Carcinoma, launched in all major jurisdictions; ³ UC = Urothelial Carcinoma, 1L = first line, 2L = second line, launched in the U.S., filed for approval in Europe and Japan; ⁴ approved in Japan for advanced NSCLC (non-small cell lung cancer), filed for approval in the U.S. under RTOR (Real-Time Oncology Review)



Healthcare

Confirming ambition to keep core business at least stable to 2022

Healthcare core business net sales until 2022



Core business with **36 consecutive quarters of growth** (Q2 2011 – Q1 2020)

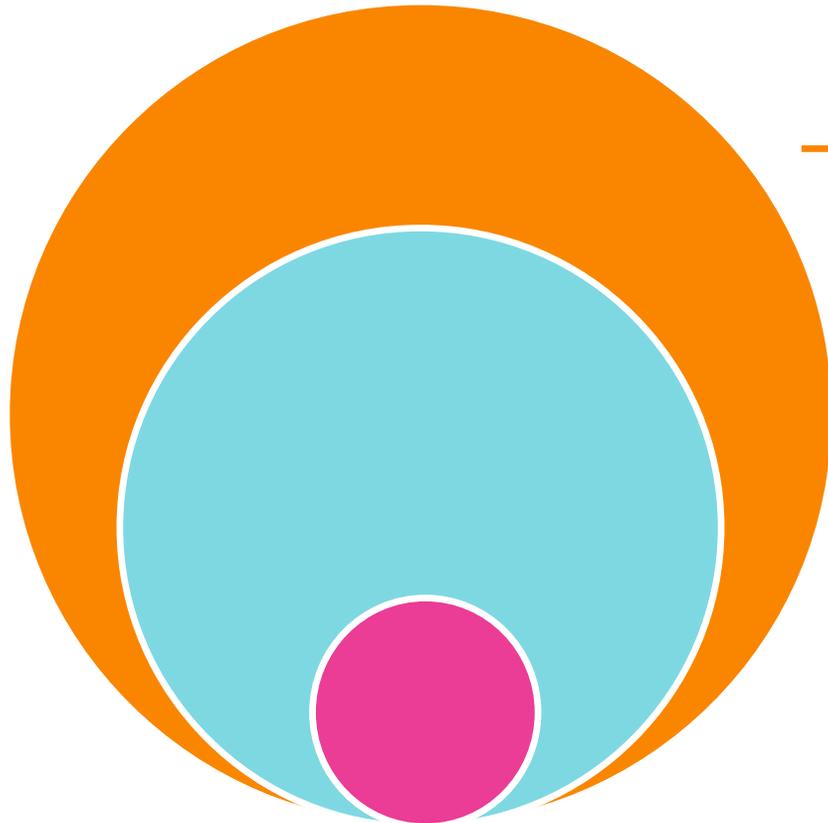
Growth to **pick up after COVID-19 impact** in Q2 2020, further **growth potential after 2022**

¹ EM: emerging markets; ² includes General Medicine, CardioMetabolic Care (CMC) and Endocrinology



Healthcare

Mavenclad and Bavencio launches on track for ~€2 bn pipeline ambition in 2022



- Global peak sales: €1.0–1.4 bn
- Approved in 81 countries, including USA, EU, Canada and Australia
- Global launch continuing to make progress
- Recovery from peak COVID impact visible as of June



- Approved for aRCC (USA, EU, Japan), mMCC (50 countries incl. USA and EU), and UC 2L (USA, Canada, Israel)
- UC 1L: Approved by FDA on June 30, 2020; Approval by EMA and Japanese MHLW expected in H1 2021
- Phase III read-out remaining: NSCLC 1L (est. primary completion date: April 2021)



- Approved in Japan on March 25, 2020 (Sakigake and ODD granted in 2018 & 2019)
- Filing accepted by US FDA on August 25, 2020 (granted priority review under RTOR), US approval expected in Q1 2021

Bintrafusp alfa

- Multiple potentially registrational studies across various tumor types ongoing
- First data read-outs expected in early 2021

ILLUSTRATIVE - Not to scale;
Acronyms: BTB = Breakthrough Designation; ODD = Orphan Drug Designation; IA = Interim Analysis; RTOR = Real-Time Oncology Review; sBLA = Supplemental Biologics License Application



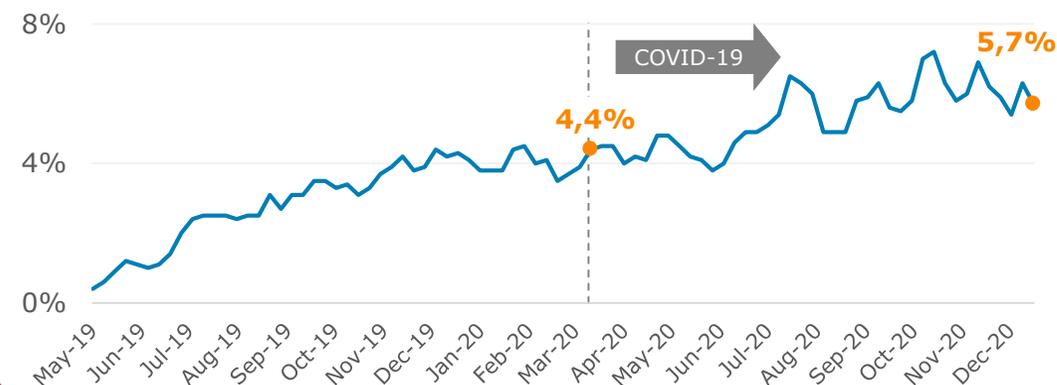
Healthcare

Mavenclad launch update: Showing renewed momentum globally

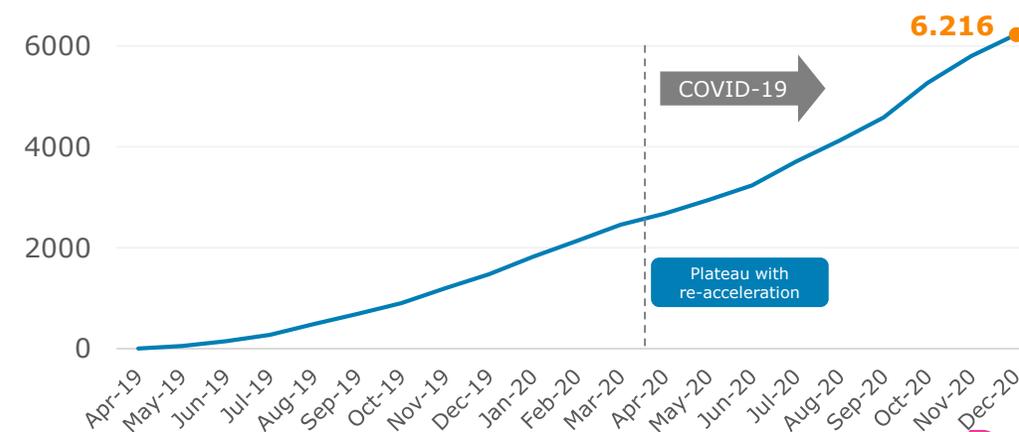
- **New data at 2020 ACTRIMS-ECTRIMS** highlight rapid onset of action and reassuring post-approval safety on malignancy, viral infections, and COVID-19 outcomes
- **Q3 2020 highest selling quarter** since launch
- **US:**
 - **Share gains since pandemic** in both the High Efficacy (HE) and Oral dynamic segments, though dynamic market remains depressed
 - **Positive Rx momentum** with goal to continue HE share gains
- **Ex-US:**
 - **New initiations rebounding** after April low point across all major Ex-US markets
 - **Strong performance for year 2 return patients**



Gains in High Efficacy Dynamic share (R3W)¹



New patient acquisition momentum continues post Q2²



¹ IQVIA Projected National Claims weekly data through 12/18/2020;

² IQVIA NPA, Paid, weekly NRx data, cumulative, through 12/18/2020



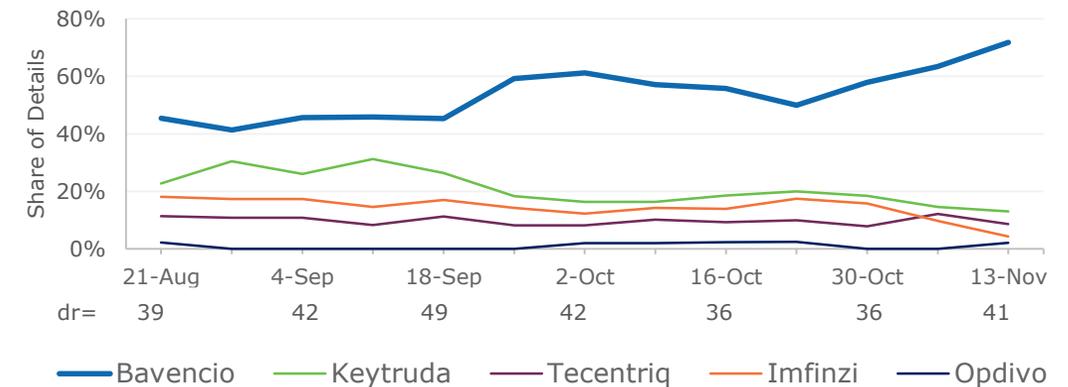
Healthcare

Bavencio launch update: 1L UC US launch driving strong inflection

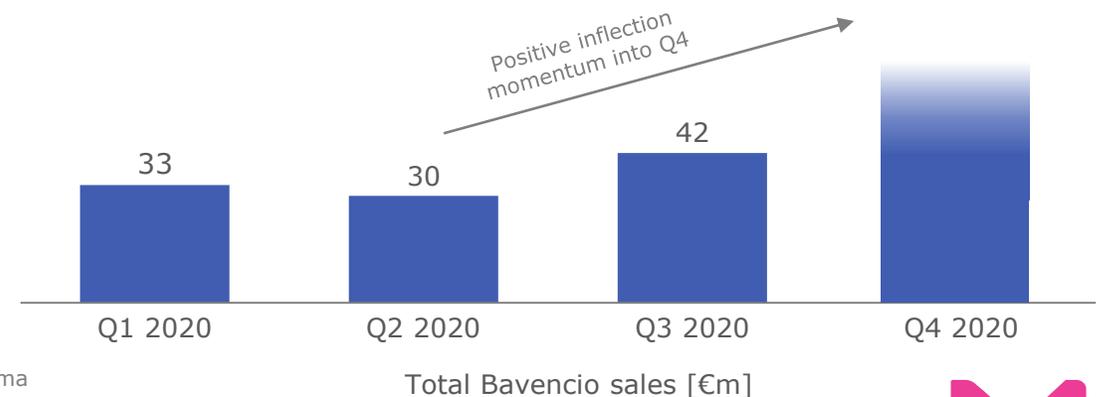
- **Strong launch performance**, and reception in community validates significance of OS advantage
- **Encouraging data points** discussed in September R&D update continue to trend positively:
 - Sustained increase in accounts ordering Bavencio
 - Continued leading share of voice amongst all IOs indicated across bladder cancer despite the pandemic
 - Clear message recall on OS message
 - Steep unit growth vs pre-approval period
 - Continued increase in penetration in indicated segment
- **On track to change SOC** within indicated segment
- Opportunity to **benefit from growing the pie** (% increase of patients treated Platinum chemo)
- **EMA and Japan approvals expected H1 2021**, strong base of Platinum chemo providing opportunity for Bavencio regimen



Leading Share of Voice within the IO class – Relevance of approach and data¹



US UC approval and inflection point for Bavencio, with momentum into Q4

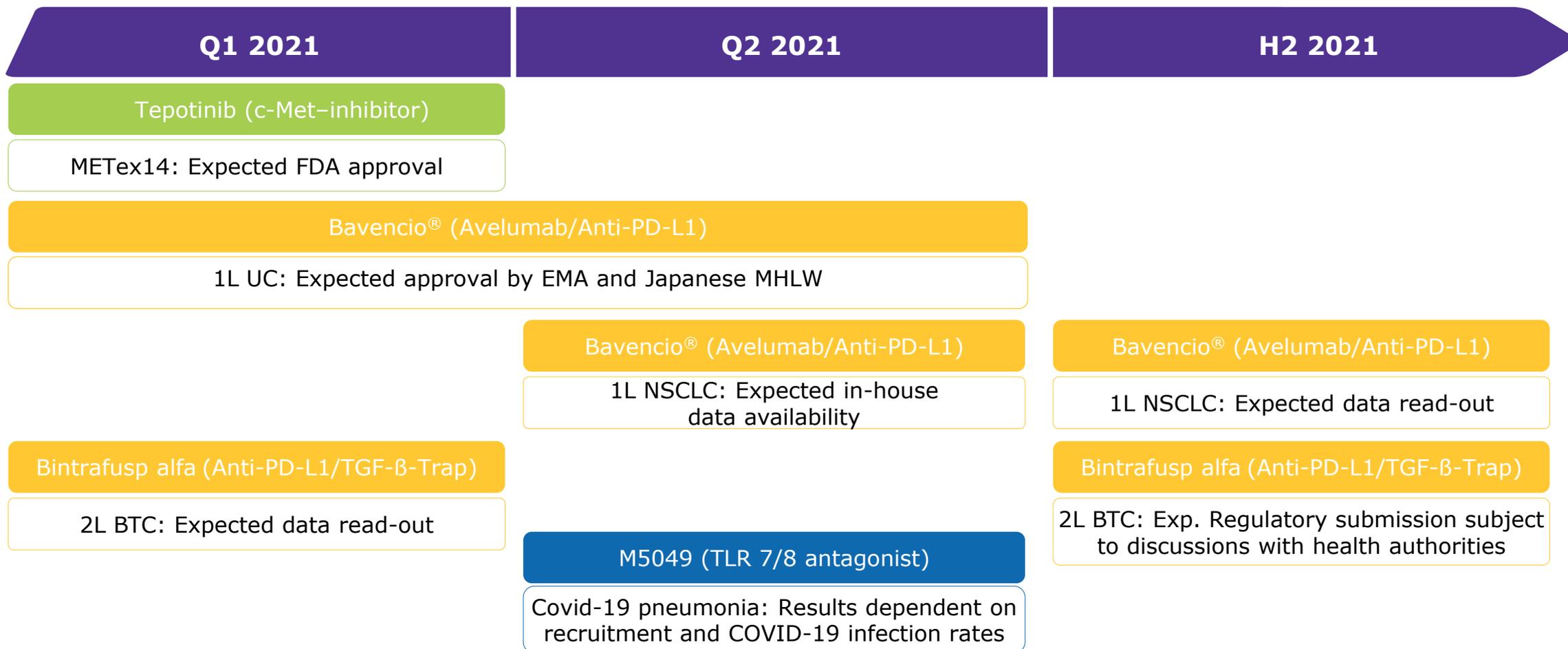


¹ BrandImpact Bladder Cancer SOV and Message Recall Study, data through 11/13, 2020; Acronyms: dr = unique number of physicians reporting detail, IO = immuno-oncology, UC = urothelial carcinoma



Healthcare catalysts – Significant developmental progress across Oncology and Immuno-Oncology portfolio expected in 2021

■ Oncology
■ Immuno-Oncology ■ Immunology



Acronyms: BTC = Biliary Tract Cancer, EMA = European Medicines Agency, FDA = U.S. Food and Drug Administration, MHLW = Ministry of Health, Labour and Welfare, NSCLC = Non-Small Cell Lung Cancer, TLR = Toll-like receptor, UC = Urothelial Cancer



Life science

Diversified industry leader poised for above-market growth

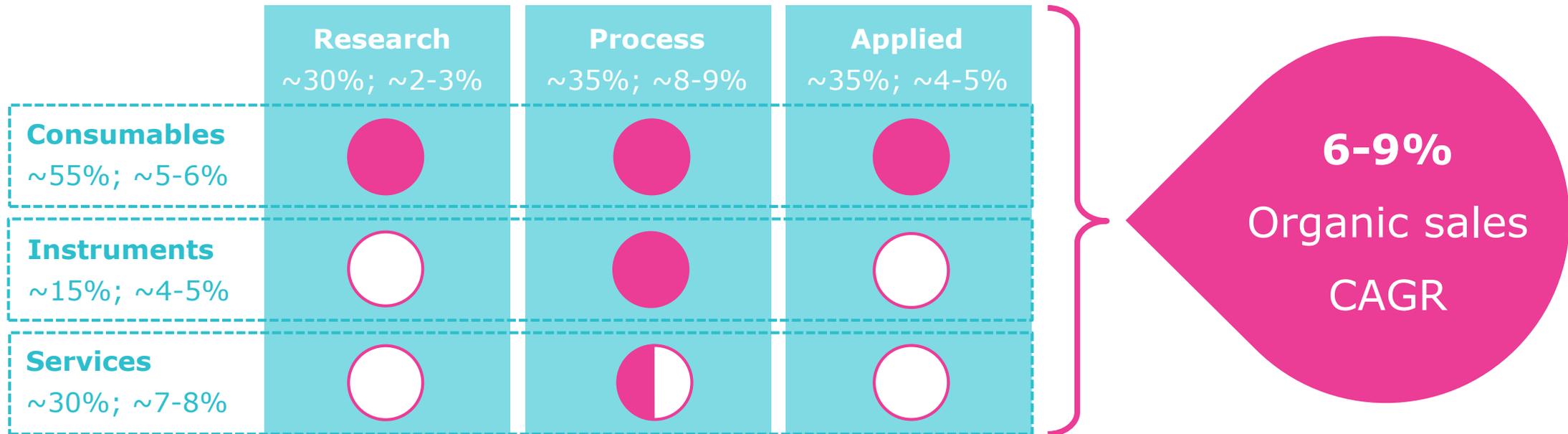
04

Life Science

Building growth momentum with focus on attractive market segments

Total Life Science Market¹

~€170-180 bn; ~5-6% CAGR



Merck KGaA, Darmstadt, Germany's market presence: ● strong ◐ moderate ○ limited

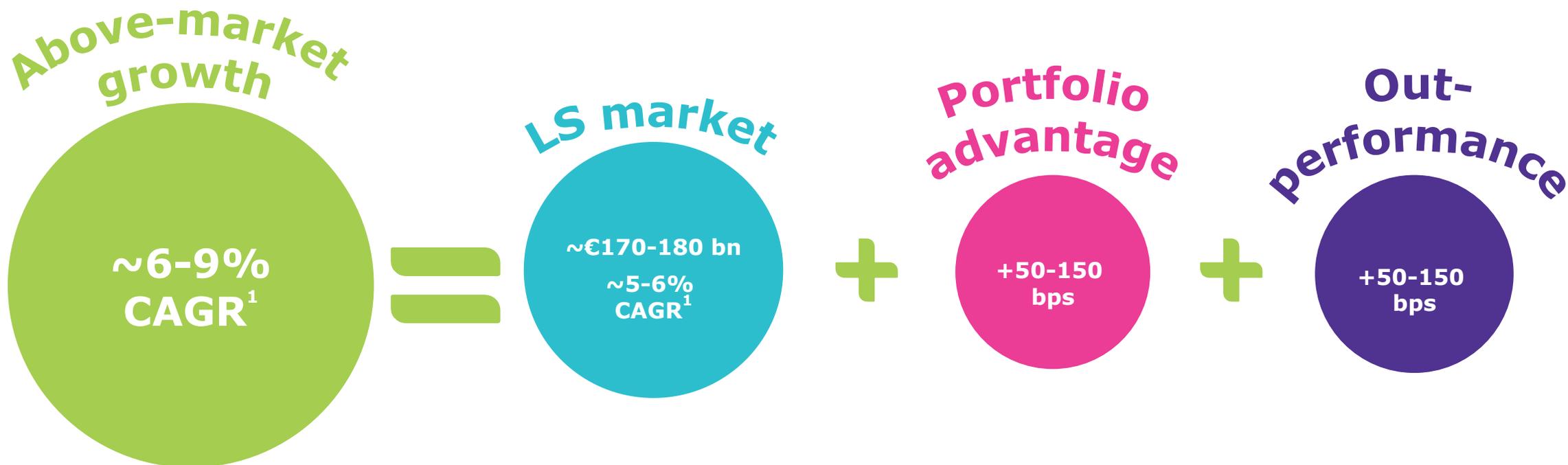


Upgrading mid-term financial ambition to **6-9% organic sales CAGR**

¹ Company estimate based on industry forecast over 5-year horizon



Improved mid-term outlook driven by market and portfolio focus



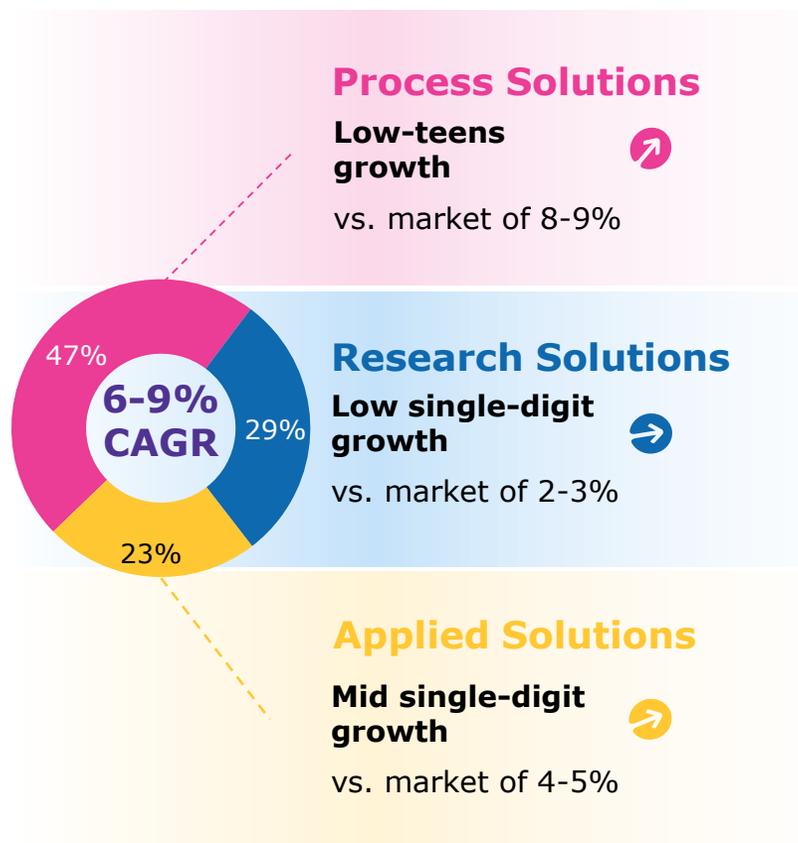
- **Market outlook improving** further, mainly due to **Process** segment
- **Above-market growth set to continue** due to **portfolio advantage** and **outperformance**

¹ Company estimate based on industry forecast over 5-year horizon



All business units contributing to above-market growth

Sales split¹



Mid-term outlook²

Process Solutions

Low-teens growth

vs. market of 8-9%



Research Solutions

Low single-digit growth

vs. market of 2-3%



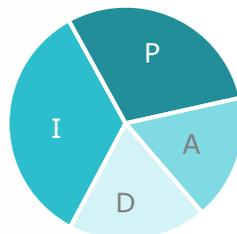
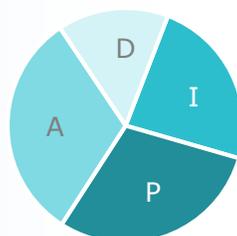
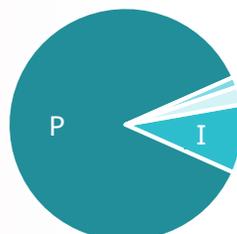
Applied Solutions

Mid single-digit growth

vs. market of 4-5%



Customer Split³



Fundamental growth drivers

- **Biologics:** global mAbs⁴ production growing by ~11-15% p.a. for 2020-2024⁵ driven by new molecules and biosimilars
- **Diversification:** contribution by top 10 molecules will decline to ~30% until 2024 from ~50% in 2020⁶
- **Novel modalities:** cell & gene therapy market with >30% CAGR 2020-2024⁵, complex delivery drives demand for services and viral vectors
- **Research activity:** >9,000 pre-clinical projects in research pipelines⁷; rising number of experiments backs healthy growth in biotechs/CROs⁸
- **Public and private funding:** availability, access and predictability drive demand from academia and emerging biotechs
- **Emerging technologies:** high growth technologies for drug discovery and development, e.g. advanced cell culture and AI drug discovery
- **Regulation:** rise in quality standards and increasing demand for testing across customer segments
- **Population and economic growth:** demand for access to more sophisticated products and services rises, e.g. in emerging markets
- **Speed:** need for fast testing results raises requirements for Applied customers, esp. in clinical testing and food & beverage testing

Customer Segments: **P** Pharma and Biotech **I** Industrial and Testing **A** Academia **D** Diagnostics

¹ Based on H1 2020, CAGR is organic mid-term ambition; ² growth rates are organic CAGRs; ³ indicative only; ⁴ mAbs = monoclonal antibodies; ⁵ Source: company estimate based on industry forecasts;

⁶ Source: EvaluatePharma; ⁷ Source: statista; ⁸ CRO = Contract Research Organization



Critical offering in the fight against COVID-19



PRODUCTS feed into...

www.sigmaaldrich.com/covid-19

VIRUS DETECTION

- Leading critical component provider for Molecular and Serological diagnostic kits
- PCR reagents, kits and tools for all stages of assay development

VIRUS CHARACTERIZATION

- Offering is among largest biologic reagents and hardware portfolios
- Effective vaccines and therapies start with reliable virus characterization
- Highest quality reagents needed for understanding of viral attachment, genomics, or proteomics

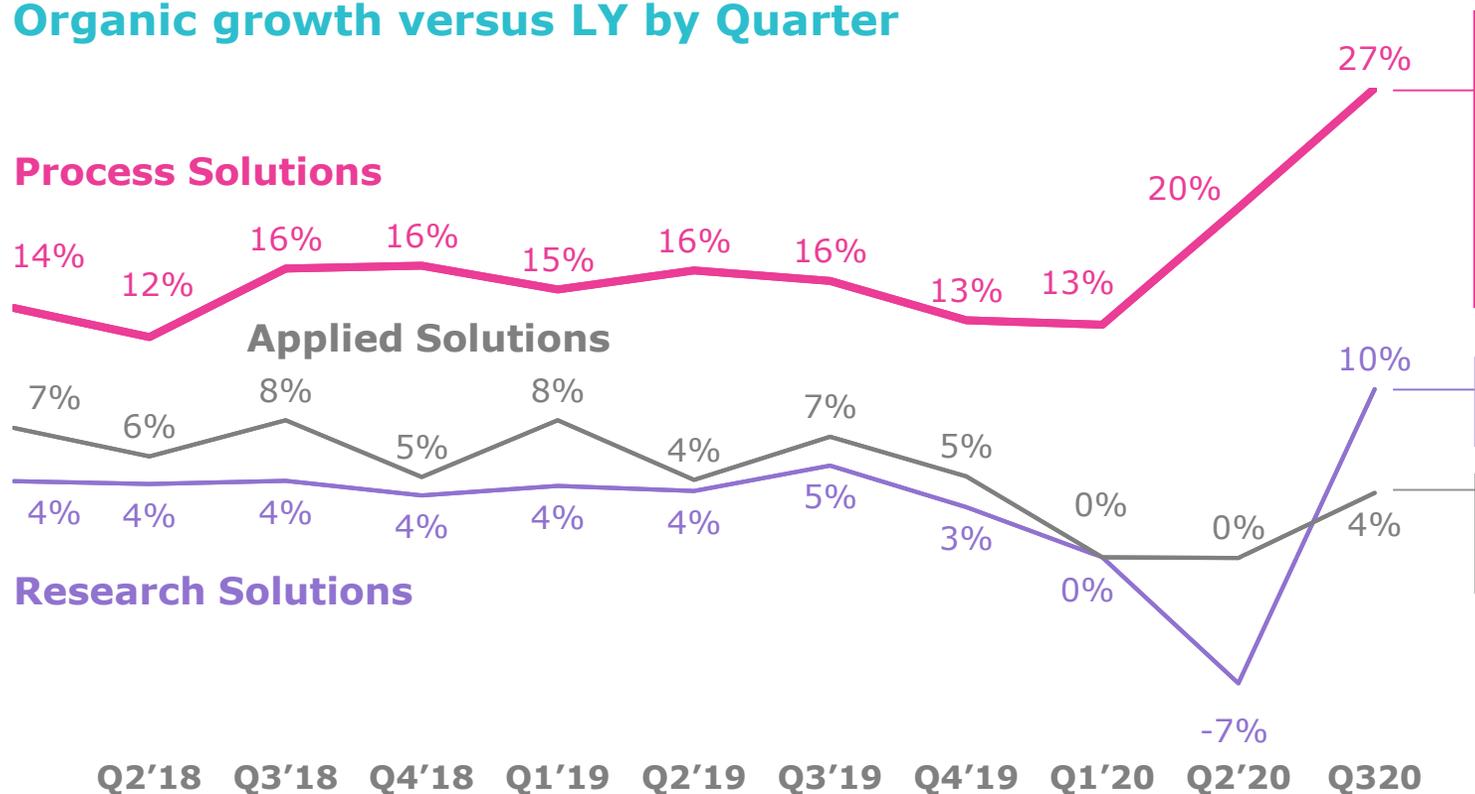
VACCINE & THERAPY PRODUCTION

- Supporting global COVID-19 vaccine and therapy response effort:
 - **Upstream and downstream research and scaling**
 - **End-to-End solutions**
 - **Biosafety Testing Services**



Life Science: Significant upside potential for Process Solutions; Research and Applied started recovering

Organic growth versus LY by Quarter



- **Strong tailwinds** in Process Solutions
- **Order intake** accelerating to **>50%**
- **Sustainable increase** in underlying demand
- **Capacity investments** ongoing
- **Catch-up** effects in Q3
- **Some pull-in** effects from Q4
- Visible **recovery in Q3**
- **Returning** to underlying growth rate



Confirm mid-term outlook: **Life Science downsides to fade**, some **upsides to remain**
 Q4 scenario assumes **Research normalization** but no additional impact from imminent lockdowns



performance Materials

Leading electronics player poised for
accelerating growth

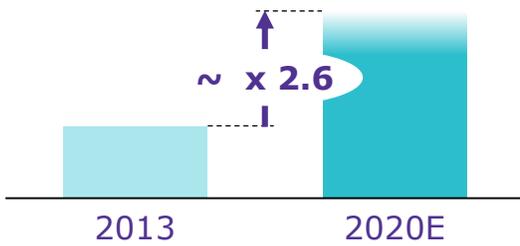
05

Performance Materials

Electronics focus leads to **greater resilience** and **accelerated growth**

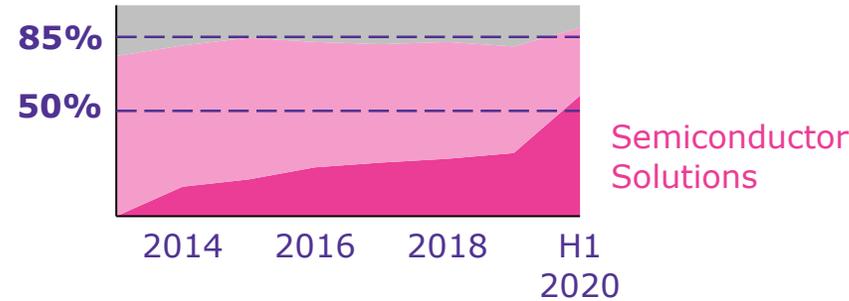
of customers

[that make up 80% of Sales]



Performance Materials sales split

[% of total]

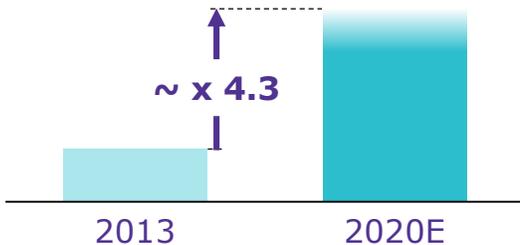


Mid-term outlook

Performance Materials

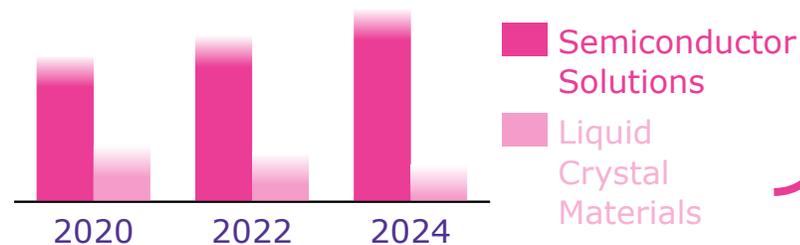
of product groups

[that make up 80% of Sales]



Semi vs. Liquid Crystals

[illustrative anticipated sales development]



3-4%
organic sales
CAGR

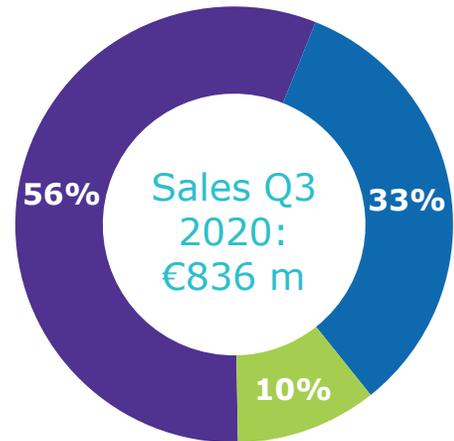


Updating mid-term financial ambition **to 3-4% organic sales CAGR**



Performance Materials refocus on electronics drives mid-term guidance upgrade: 3 to 4% CAGR overall

Mid term outlook



semiconductor solutions



Mid- to high single-digit growth

display solutions



Low single-digit decline

surface solutions



Low single-digit growth

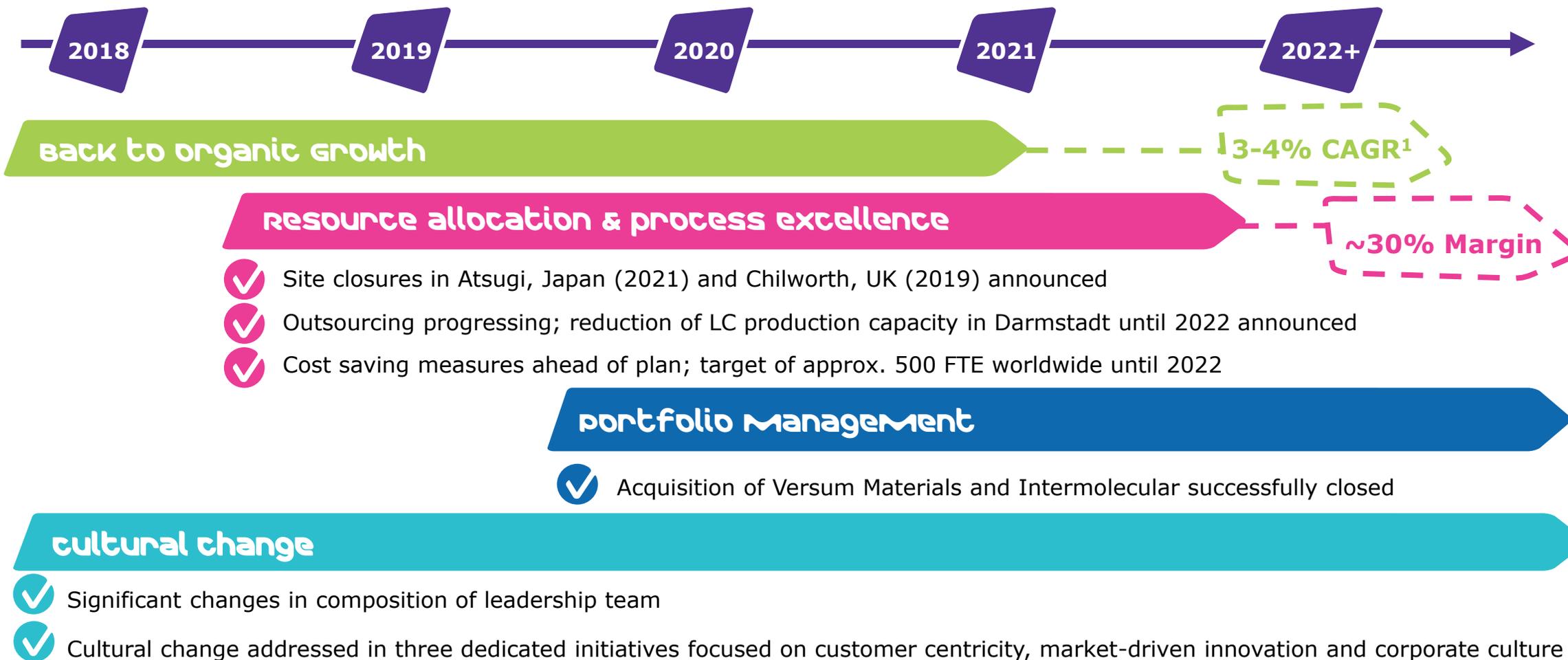
- Continued market growth due to technological advances (Artificial intelligence, 5G, Big Data and cloud, Internet of Things) serving customers in **Logic, Memory, Packaging and others**
 - 4 to 6% market growth¹
 - 200 to 300bps above-market growth from share gains & better portfolio (incl. 100 to 150bps additional growth from integration top-line synergies)
-
- Driven by trend to **bigger TV size, higher resolutions, more mobile devices**
 - 3 to 4% growth of total LCD m² area², while price pressure continues
 - 18 to 22% growth of total OLED m² area² with slight to moderate market share gains
 - OLED material market to exceed LC material market by 2022³
-
- Well balanced exposure to **automotive** and **cosmetics** end market
 - Drivers: rising living standards, higher disposable income in growing markets and increasing demand for high value products at reasonable prices
 - Light vehicle production and relevant cosmetics end markets returning to growth in 2021 and reaching 2019 levels by 2022 and beyond⁴

¹Source: Jan 2020 IC Insights 2018-2024 CAGR for wafer starts in million units; ²Source: Omdia Display Market Outlook, Q1 2020; ³Internal Business Intelligence; ⁴ Sources: LMC Automotive Light Vehicles Forecast, Aug 2020 & Euromonitor BPC (Beauty & Personal Care) Aug 2020



Performance Materials

5-year transformation program Bright Future is well on track



¹New mid-term CAGR guidance starting 2020



Performance Materials

Strategic roadmap materializing

Measures for a bright future



Darmstadt

- In Darmstadt focus on R&D and production
- Immediate bottom-line contribution from 2019 onwards
- Reduce the number of FTEs by ~15% = ~400 FTEs



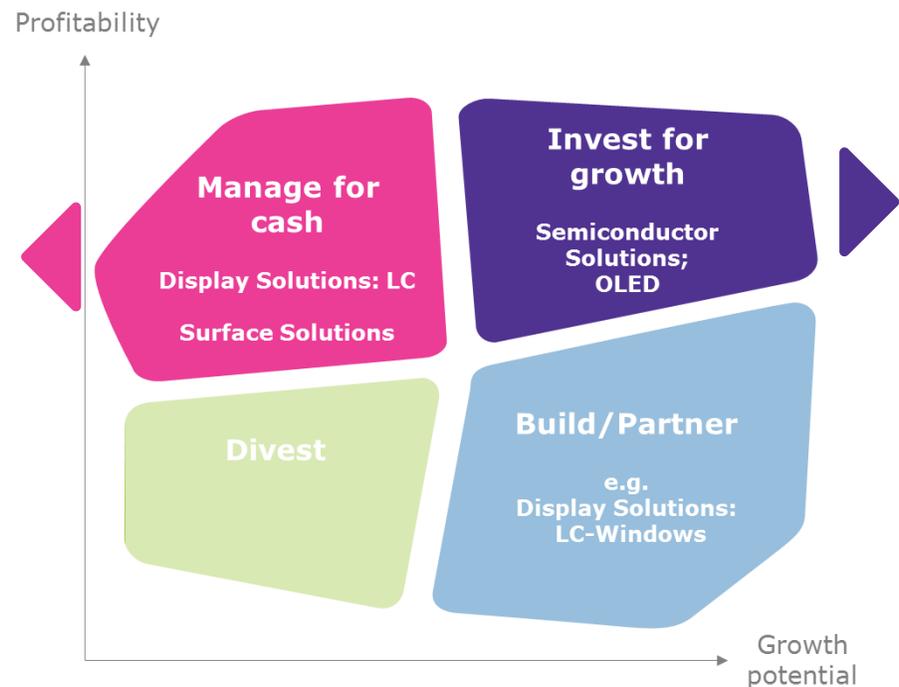
Chilworth

- Chilworth site during September 2019 successfully closed



Atsugi

- Shut down of Performance Materials activities at Atsugi site started (to be completed during 2021)
- R&D and production activities in Atsugi transferred and consolidated in other PM locations in Asia
- Consolidation of site structure in Japan



- Leading supplier of high-purity process chemicals, gases and equipment serving semiconductor manufacturers
- Track record of accelerated growth and industry leading profitability
- Creating a **leading electronic materials player** with **attractive long-term prospect**



- Leading in advanced materials innovation
- Acquisition to strengthen semiconductor technology offering
- Application specific **materials expertise** with that **perfectly complement** Group's business and technology portfolio



Bottom-line management to support margin ambition of 30% in the long-term



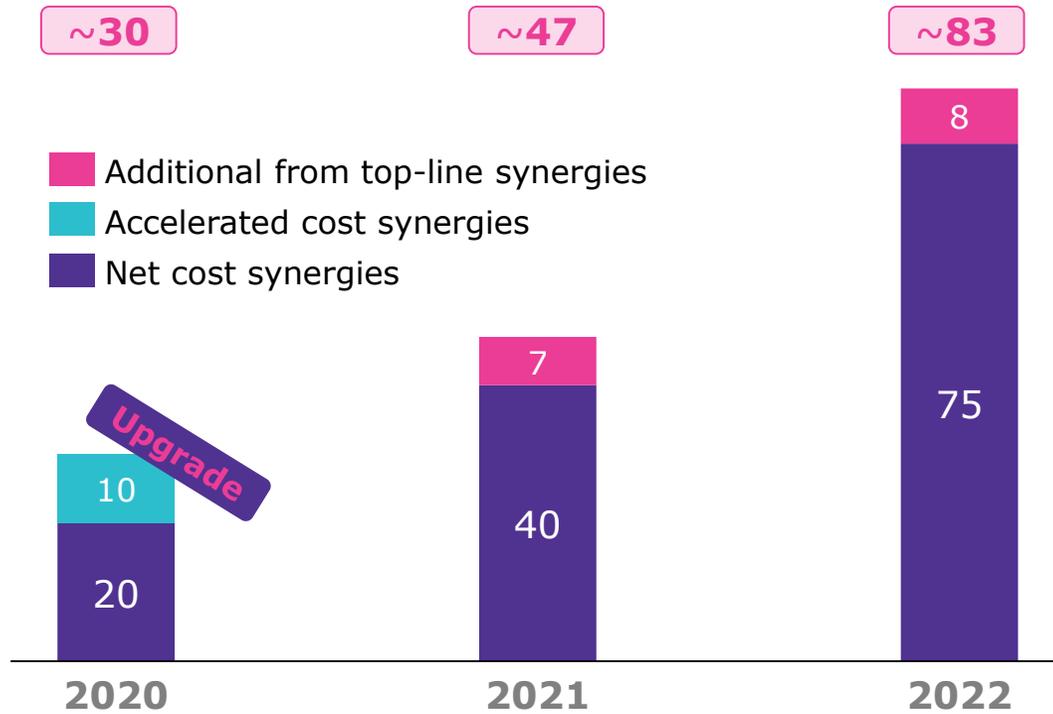
Both transactions successfully closed



Performance Materials

Synergy upgrade driven by fast 2020 execution and top-line synergies

EBITDA pre impact of synergy ramp-up [€ m]



Synergy upgrade of ~10% confirms strong integration capabilities

Sources of synergies

- business optimization**
 - Transform country setup
 - Streamline duplicate structures
- procurement and supply chain**
 - Optimize production and supply chain network
 - Achieve savings through joint procurement
- corporate and administrative functions**
 - Integrate corporate & administrative functions
 - Cost savings due to U.S. company delistings

*Top-line synergies from cross-selling, new products introductions and overarching initiatives



sustainability

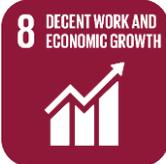
07

Enhanced sustainability strategy leverages our strengths and manifests the company's commitment



Potential to increase sustainable value for business and society

High-impact SDGs > where we can contribute > and benefit

High-impact SDGs		where we can contribute	and benefit
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<p>Good Health and Well-being</p>	<ul style="list-style-type: none"> ➤ We are able to contribute with dedicated products, know-how, partnerships and initiatives in pharma, science and technology. 	<p>Target</p> <p>1</p> <p>3</p> <p>Business opportunities</p> <ul style="list-style-type: none"> ▪ Develop a new range of sustainable products & services, benefiting from our innovation power ▪ Open up additional customer groups and expand regional reach
 <p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>Decent Work and Economic Growth</p>	<ul style="list-style-type: none"> ➤ Our ambition of future growth considers health and safety of employees also in the supply chain. 	<p>1</p> <p>2</p> <p>Risk management</p> <ul style="list-style-type: none"> ▪ Reduce risks through higher awareness and longer-term view ▪ Secure supply chain resilience
 <p>9 INDUSTRY INNOVATION AND INFRASTRUCTURE</p>	<p>Industry, Innovation and Infrastructure</p>	<ul style="list-style-type: none"> ➤ Our innovation power will lead to more sustainable products and processes in various industries. 	<p>1</p> <p>2</p> <p>Partnerships</p> <ul style="list-style-type: none"> ▪ Contribute as supplier of choice to customers' ESG strategy ▪ Improve ESG impact of our suppliers
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<p>Responsible Consumption and Production</p>	<ul style="list-style-type: none"> ➤ Being a responsible supplier, we will also challenge suppliers to support in reaching company targets. 	<p>2</p> <p>3</p> <p>Operations</p> <ul style="list-style-type: none"> ▪ Increase attractiveness as employer
 <p>17 PARTNERSHIPS FOR THE GOALS</p>	<p>Partnerships for the Goals</p>	<ul style="list-style-type: none"> ➤ To unleash even more power, we foster collaborations with capable partners to sum up know-how for more sustainable impact. 	<p>1</p> <p>3</p> <ul style="list-style-type: none"> ▪ Reduce costs of capital ▪ Benefit from grants and reliefs (politics, insurance, etc.) ▪ Incentivize through integrated compensation schemes



Next steps towards the ESG targets

-  Analysis of requirements: Strategy, business, regulation, stakeholders (done and institutionalized)
-  ➤ Build an effective data platform for internal steering
-  ➤ Develop ESG-KPIs for reporting and integrate in compensation schemes
-  ➤ Further incorporate ESG in R&D, controlling, M&A, supply chain
-  ➤ Decide on dedicated investments and initiatives to achieve targets

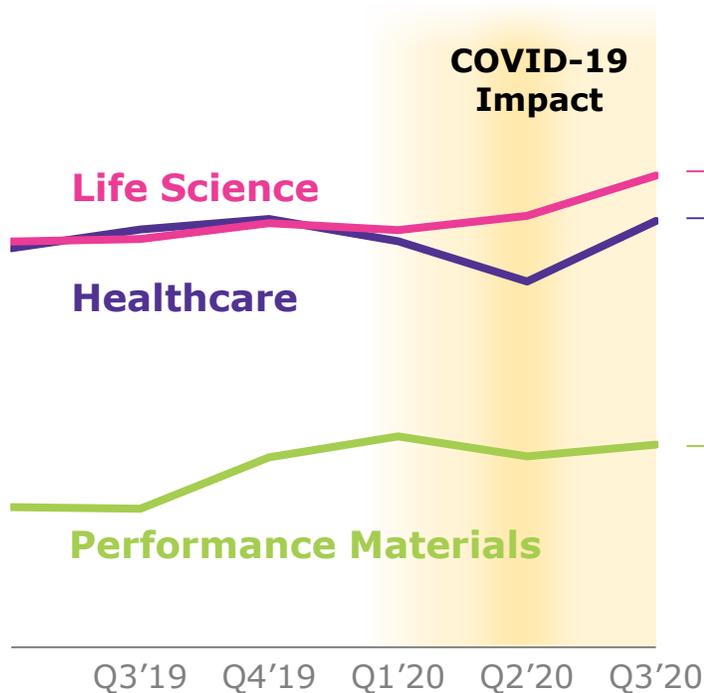


EXECUTIVE
SUMMARY and
guidance

06

Successful crisis management increasingly mitigates pandemic impact

Quarterly Net Sales in €m*



Underlying developments

- **Life Science well positioned** for new COVID-19 driven demand trends
- **Process business** rapidly addressing new market needs, **fueling net upside**
- Research and Applied **driving recovery in Q3**
- **Fertility: well managed return** to pre COVID-19 levels - not yet all regions
- **Strong Mavenclad[®] recovery** being driven since June
- **Bavencio[®] UC launch** progressing very well on a largely virtual launch
- **General Medicine** on track with good volume development
- Managing visible **recovery in Q3**, but not yet growing organically
- **Semiconductors Solutions' strength** within strong market
- Net downside from COVID-19 **in Display and Surface**

* At fixed 2019 FX rates

Guidance upgrade proof point of **excellent crisis management** and **strong business performance**

Group

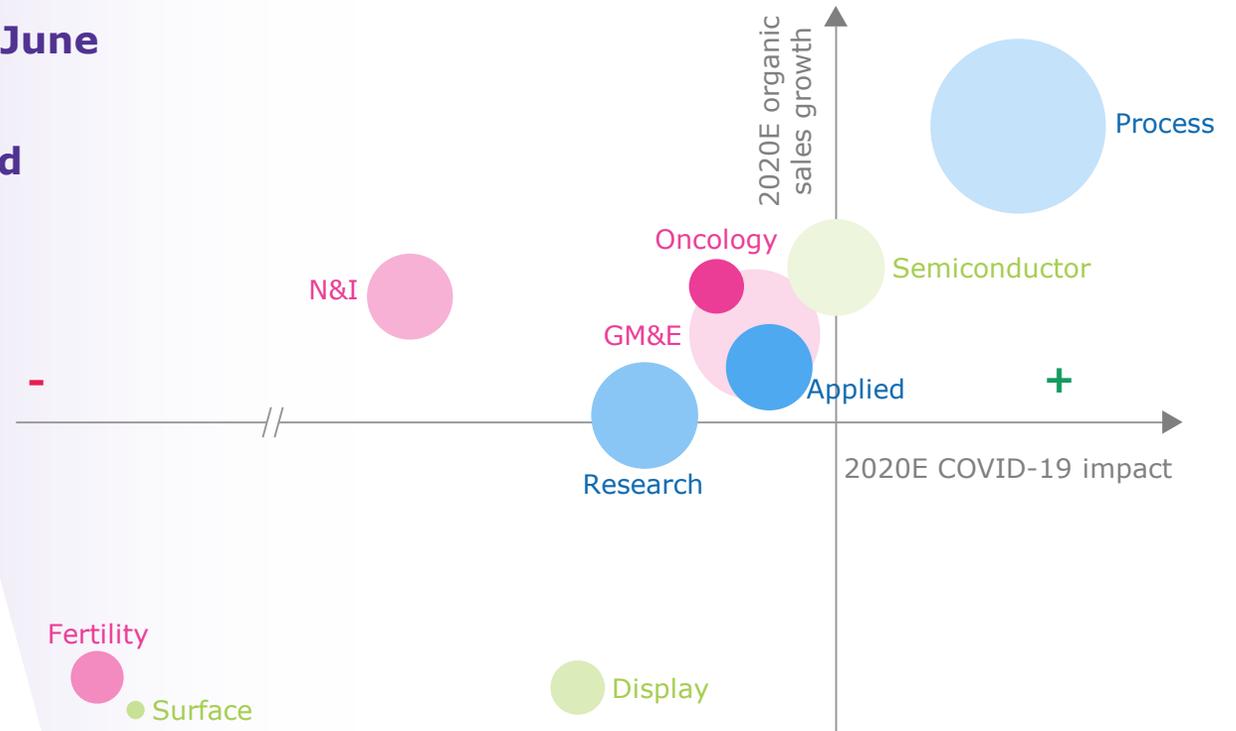
2020 – strong resilience in times of global crisis

- **2020 guidance confirmed; recovery started in June**
- **Most businesses growing** despite COVID-19
- **Largest business** growing and **positively affected**
- Smallest businesses with biggest impact

Delivery on priorities during crisis

- ✓ **Health & safety of employees**
- ✓ **Business continuity**
- ✓ **Contributions to public health and society**
- ✓ **Sustainability aspects further enforced**

Growth and COVID-19 impact by business¹



Merck KGaA, Darmstadt, Germany - steady earnings growth with high margins and a low risk profile

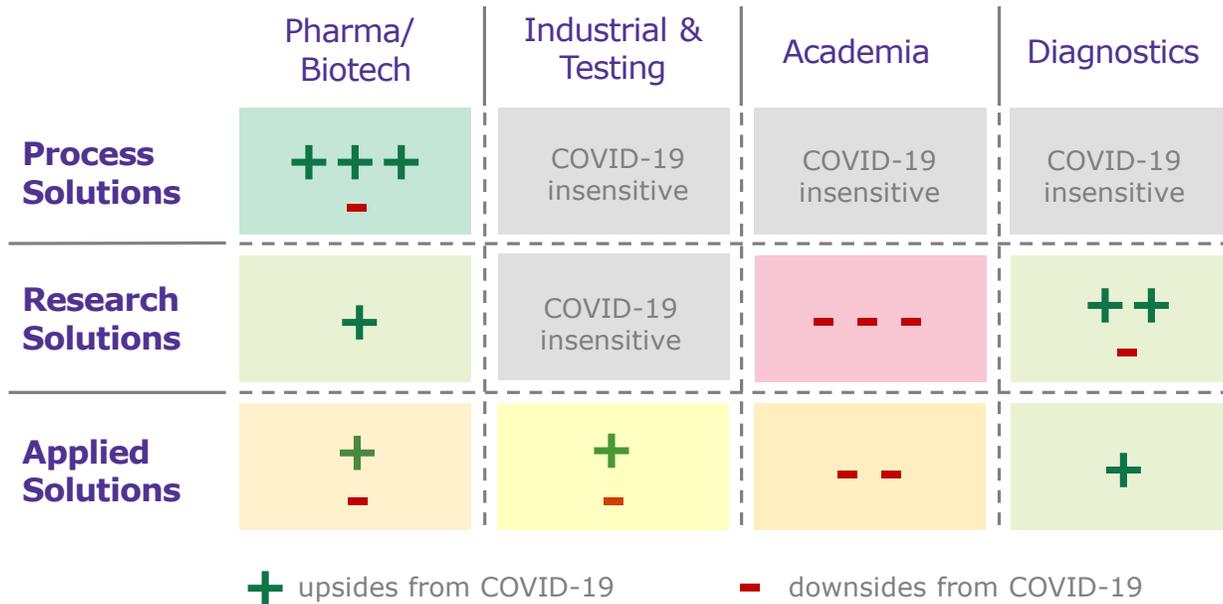


¹ Indicative only and based on guidance from August 6: slight to moderate organic sales and EBITDA pre growth, COVID-19 with up to a mid single-digit impact on sales of which 50-60% hitting EBITDA pre

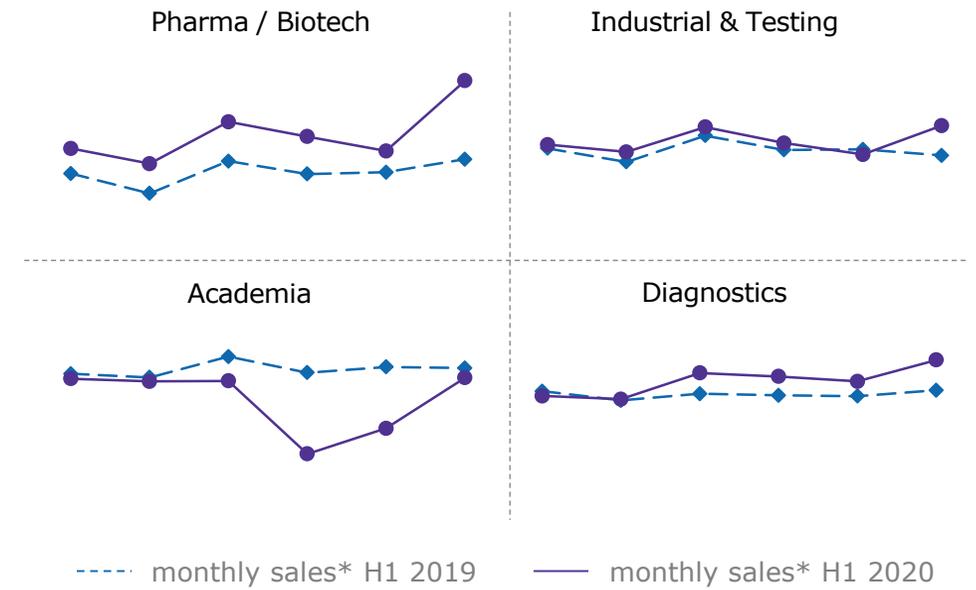


Life Science highly resilient and well positioned to participate in potential mid-term upside from COVID-19

2020 heatmap of COVID-19 impact by customer segment



H1 2020 monthly sales* by customer segment



* Illustrative; to scale only within each customer segment



- Mid-term: **downsides to fade**, some **upsides to stay**, recovery started in June
- Order book for Process Solutions **up by >40%**, capacity expansion underway



Group

Full-year 2020 guidance

Net sales:

Organic: +4% to +5% YoY
Versum growth contribution in the mid-single digits %
FX: -2% to -3% YoY
~€17.1 – 17.5 bn

EBITDA pre:

Organic: +14% to +16% YoY (*ex Biogen¹: +6% to +8%*)
Mid-single digit % growth from Versum
FX: -3% to -5% YoY
~€5.05 – 5.25 bn (*thereof Biogen¹ €365 m*)

EPS pre:

~ €6.50 – 6.80
(*thereof Biogen¹ €0.63 m*)

Executive Summary



Group

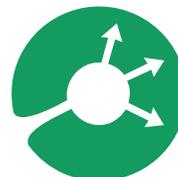
Successfully driving transformation into a leading science and technology company

steady earnings growth with high margins and a low risk profile



setup

Three-pillar structure strengthened further as a resilient basis; COVID-19 crisis as another proof point



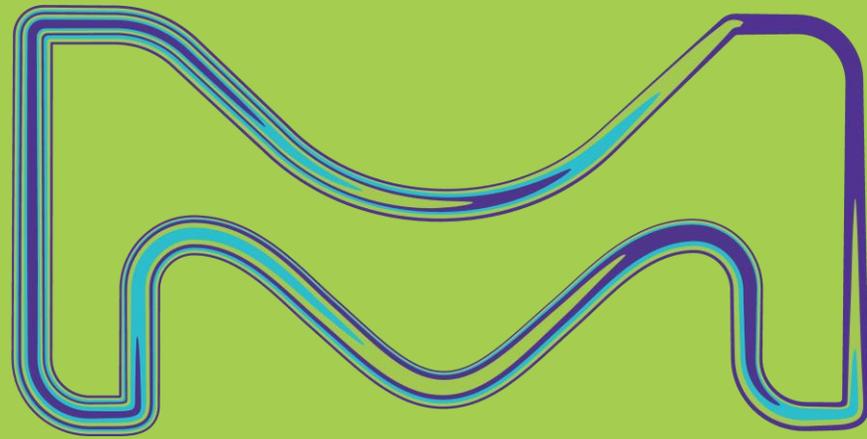
Growth Engines

Healthcare pipeline, Process Solutions and Semiconductor Solutions will be key drivers of growth to 2022 and beyond



Execution

Delivery on strategic priorities ensures profitable growth; regaining financial flexibility with higher likelihood of regular bolt-ons post 2022



Group

2020 business sector guidance¹

Healthcare



Net sales

- Organic: +2% to +3%
- COVID-19 impacting fertility performance
- Continued Mavenclad[®] recovery after June and solid uptake of Bavencio[®] UC 1L launch

EBITDA pre

- Organic: +25% to +27% YoY
(*ex Biogen²: +6% to +8%*)
- FX: -7% to -9% YoY
- ~€2,220 – 2,290 m
(*thereof Biogen² €365 m*)

Life Science



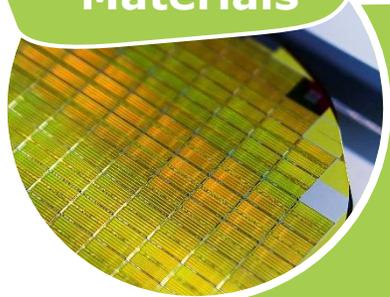
Net sales

- Organic: +9% to +10%
- Strong growth dynamic in Process Solutions

EBITDA pre

- Organic: +13% to +15% YoY
- FX: -3% to -4% YoY
- ~€2,300 – 2,370 m

Performance Materials



Net sales

- Organic: -4% to -5%
- Semiconductor Solutions growing strongly, while COVID-19 weighing on Display and Surface
- Mid-thirties % contribution from Versum

EBITDA pre

- Organic: -6% to -9% YoY
- FX: -1% to -3% YoY
- Mid-thirties % contribution from Versum
- ~€980 – 1,030 m

¹Business Sector guidances are only support to the Group guidance and do not have to add up

¹ Reversal of the provisions for the patent dispute proceedings for Rebif in the amount of €365 m

Additional financial guidance 2020

Further financial details

Corporate & Other EBITDA pre	~ -440 to -460 m
Interest result	~ -280 to -310 m
Effective tax rate	~24% to 26%
Capex on PPE	~1.2 bn to 1.3 bn
Hedging/USD assumption	FY 2020 hedge ratio ~70% at EUR/USD ~1.16
2020 Ø EUR/USD assumption	~1.13 to 1.15

Group

Key earnings drivers to remember for 2020



EBITDA pre - supporting factors

- €365 m Biogen litigation provision release
- Increasing sales contribution from Mavenclad[®] and Bavencio[®]
- Stringent M&S and R&D cost management in HC (decrease YoY absolute and as % of sales)
- Good momentum in Semiconductor Solutions and cost savings from Bright Future program related initiatives
- High level of cost consciousness and prioritization
- Four quarters of Versum



EBITDA pre - reducing factors

- No more benefit from Pfizer deferred income (€191 m in 2019)
- Lower income from pipeline management
- COVID-19-related sales and earnings impact
- Ongoing decline in Liquid Crystals

Group

Key earnings drivers to remember for 2021



EBITDA pre - supporting factors

- Increasing Mavenclad[®] & Bavencio[®] contribution
- Ongoing strength in Life Science with above-market organic sales growth
- Continued strong outlook in Semiconductor Solutions with above-market organic sales growth
- High level of cost consciousness (e.g. M&S and R&D in Healthcare to further decrease as % of sales)
- Potential milestone payments (e.g. Bavencio[®])



EBITDA pre - reducing factors

- Glucophage impacted by VBP in China
- Continued decline of liquid crystals and Rebif[®]



Discipline and prioritization will be key ingredients to deliver

Group

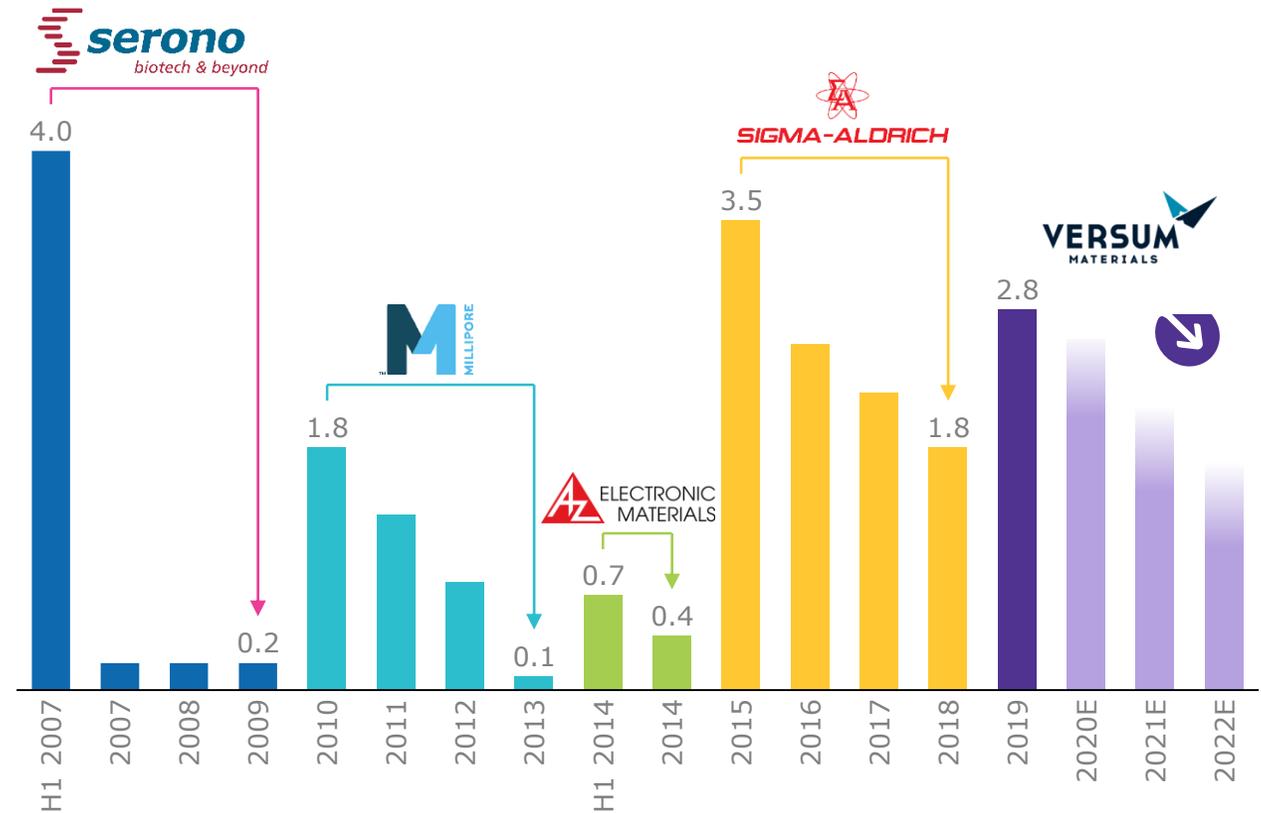
Focus on organic growth and deleveraging to 2022

Proven swift deleveraging after major acquisitions

- **Deleverage to <2x** net debt/EBITDA pre in 2022
- **M&A on hold until 2022**; only smaller deals to be realized if budget available
- New mid-term capex ceiling of ~€1.3 bn reflects **increased focus on organic investment** and Versum consolidation
- Dividend policy mirrors **sustainable earnings trend**

UPDATE

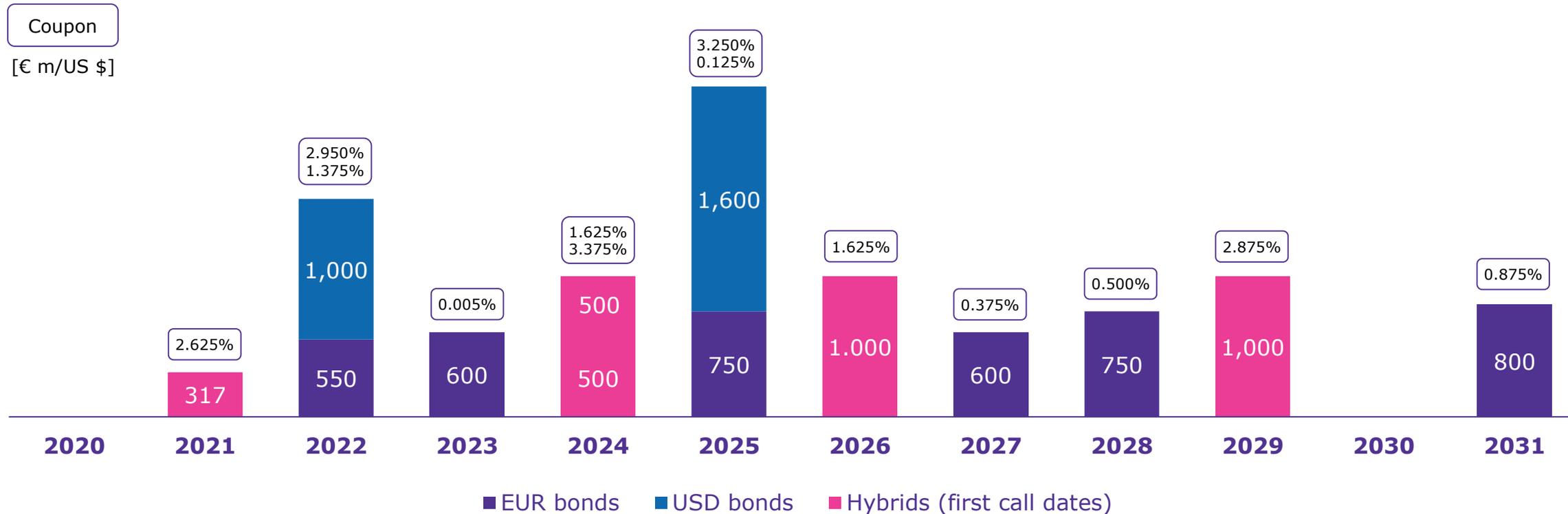
Net debt / EBITDA pre track record & outlook



Financial Update

Balanced maturity profile: lower refinancing risks & higher flexibility

Maturity profile as of September 30, 2020



Early refinancing of 2021 hybrid first call date successfully executed.



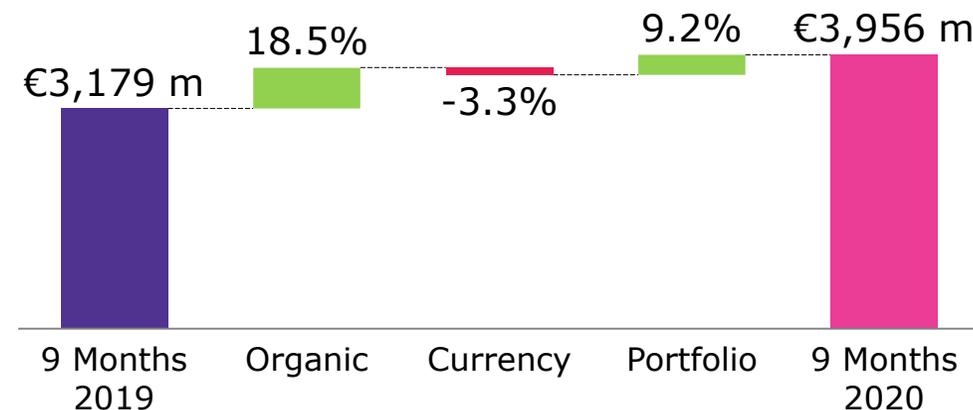
Very strong performance in Life Science and quick Q3 recovery in Healthcare drive 4% organic growth in the first 9 months of 2020

9M YoY Net Sales

	Organic	Currency	Portfolio	Total
Healthcare	3.2%	-2.7%	-0.7%	-0.2%
Life Science	9.2%	-1.3%	0.0%	7.9%
Performance Materials	-8.2%	0.5%	51.3%	43.6%
Group	4.1%	-1.6%	7.4%	9.9%

- Healthcare growing 3% organically YTD September on the basis of a very strong Q1 and a generally swift recovery in Q3
- Further accelerating Process Solutions growth overcompensates YTD net negative impact from COVID-19-related lockdowns in Applied and Research Solutions
- Semiconductor Solutions growing 9.6% organically YTD September; however, COVID-19 impact on Display and Surface Solutions results in overall organic decline

9M YoY EBITDA pre



- EBITDA pre growing faster than sales organically (5.6% excluding Biogen provision release)
- Margin accretive Versum portfolio effect contributing 9% EBITDA pre growth
- Increasing FX headwinds result in a YTD September drag of 3.3%



9M 2020: Overview

Key figures

[€m]	9M 2019	9M 2020	Δ	(Excl. Biogen provision release)	
				Q3 2020	Δ
Net sales	11,771	12,936	9.9%		
EBITDA pre	3,179	3,956	24.4%	3,591	13.0%
Margin (in % of net sales)	27.0%	30.6%	3.6pp	27.8%	0.8 pp
EPS pre	4.02	5.14	27.9%	4.51	12.1%
Operating cash flow	2,166	2,189	1.1%		

[€m]	Dec. 31, 2019	Sept. 30, 2020	Δ
Net financial debt	12,363	12,082	-2.3%
Working capital	3,944	4,364	10.6%
Employees	57,071	58,077	1.8%

Comments

- A strong Q1, Versum portfolio effect and accelerating growth in Process and Semiconductor Solutions drive sales above last year, despite strong COVID-19 impact in Q2
- EBITDA pre growing despite lower non-recurring income components and fixed cost under-absorption from COVID-19 impact
- EPS pre growing slower than EBITDA pre driven by a stable financial result
- Stable operating cash flow driven mainly by GSK upfront payment in 2019 and higher working capital in 2020



Reported figures

Reported results

[€m]	9M 2019	9M 2020	Δ
EBIT	1,605	2,374	47.9%
Financial result	-309	-302	-2.0%
Profit before tax	1,297	2,071	59.7%
Income tax	-337	-518	53.6%
<i>Effective tax rate (%)</i>	26.0%	25.0%	-1.0pp
Net income	1,002	1,551	54.8%
EPS (€)	2.31	3.57	54.5%

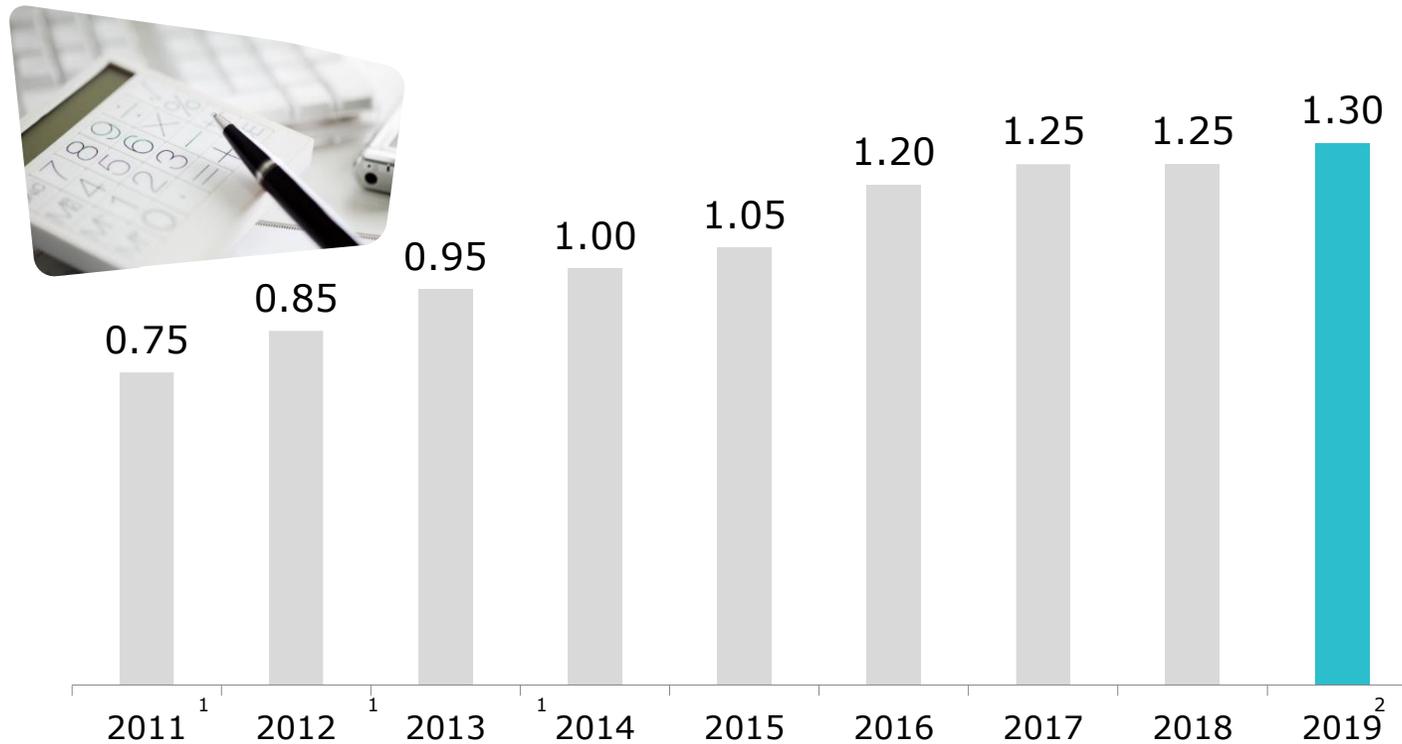
Comments

- EBIT increase driven by Versum portfolio effect and Life Science growth, partially offset by lower non-recurring income, higher depreciation & amortization from Versum PPA and impairments in Performance Materials
- Stable financial result: favorable refinancing compensates higher debt level post Versum
- Effective tax rate within guidance range of ~24-26%
- Higher net income and EPS reflect higher EBIT



Sustainable dividend growth

Dividend¹ development 2011-2019

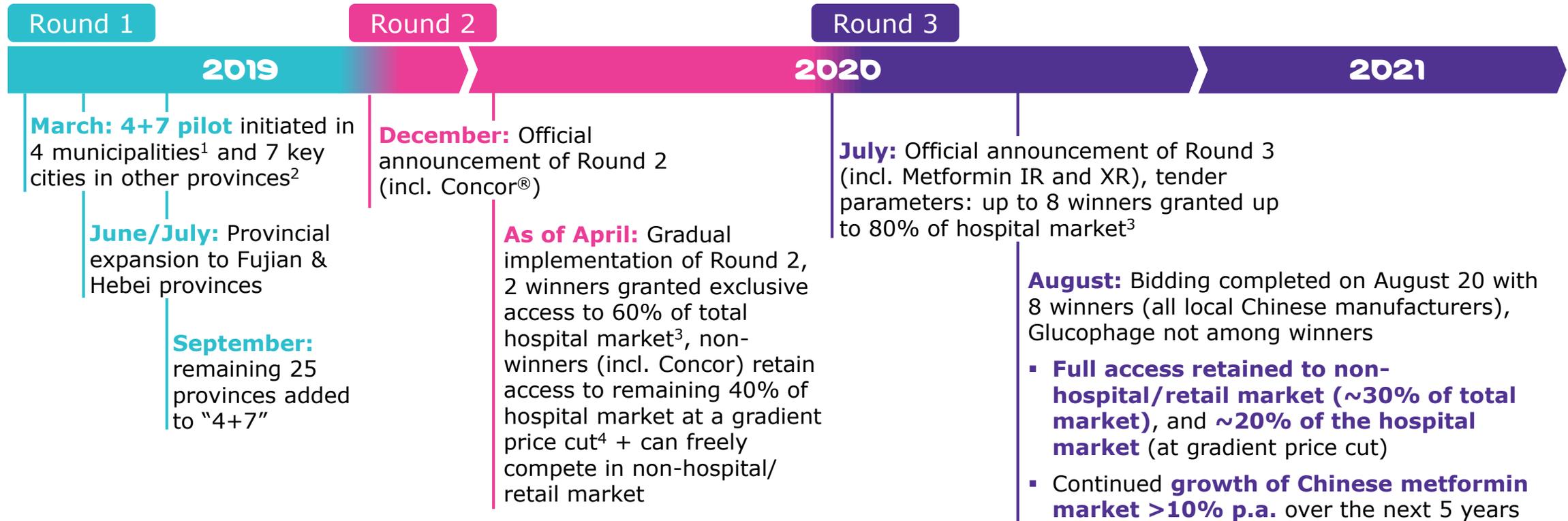


2019 dividend

- Dividend of €1.30 (+4% YoY) per share proposed² for 2019
- Payout ratio of 23.4% of EPS pre in 2019; we aim at 20–25% of EPS pre
- Dividend yield³ of 1.2%



China's VBP: Round 3 completed, sustained confidence in keeping base business at least stable until 2022



▶ China Glucophage sales represent **only ~6% of the total base business** (2019 net sales)
 Sustained confidence in **approx. stable base business through 2021 and 2022**

1: Beijing, Shanghai, Chongqing, Tianjin; 2: together encompasses ~1/3 of Chinese drug market; 3: hospital market for bisoprolol and metformin makes up ~70% of total market, this includes urban hospitals, rural hospitals, and community health centers; 4: Concor[®] price cut in the high single digit %; Acronyms: VBP = Volume-Based Procurement



Phase I

berzosertib (M6620)
ATR inhibitor
Solid tumors¹

peposertib (M3814)
DNA-PK inhibitor
Solid tumors²

M1774
ATR inhibitor
Solid tumors

M3258
LMP7 inhibitor
Multiple myeloma

M4344
ATR inhibitor
Solid tumors

M8891
MetAP2 inhibitor
Solid tumors

- Oncology
- Immuno-Oncology
- Immunology
- Neurology
- Global Health

■ Program under out-licensing agreement

bintrafusp alfa
TGFbeta trap/anti-PD-L1

Solid tumors

bintrafusp alfa
TGFbeta trap/anti-PD-L1

Cervical cancer 1L

M6223
TIGIT inhibitor
Solid tumors³

M5049
TLR7/8 antagonist
Immunology

M6495
anti-ADAMTS-5
nanobody
Osteoarthritis⁴

M5717
PeEF2 inhibitor
Malaria

Phase II

peposertib (M3814)
DNA-PK inhibitor
Rectal cancer

tepotinib
MET kinase inhibitor
Non-small cell lung cancer,
METex14 skipping

tepotinib
MET kinase inhibitor
Non-small cell lung cancer,
MET amplified⁵

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Non-small cell lung cancer 1L/2L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Locally advanced non-small cell
lung cancer

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Biliary tract cancer 1L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Biliary tract cancer 2L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Cervical cancer 2L

avelumab
anti-PD-L1 mAb
Solid tumors⁶

avelumab
anti-PD-L1 mAb
Non-small cell lung cancer⁶

avelumab
anti-PD-L1 mAb
Urothelial cancer⁶

atacept
anti-BlyS/APRIL fusion
protein
Systemic lupus erythematosus

atacept
anti-BlyS/APRIL fusion
protein
IgA nephropathy

sonelokinab (M1095)
anti-IL-17 A/F nanobody
Psoriasis

sprifermin
fibroblast growth factor
18
Osteoarthritis

M5049
TLR7/8 antagonist
Covid-19 pneumonia

Phase III

avelumab
anti-PD-L1 mAb
Non-small cell lung cancer 1L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Non-small cell lung cancer 1L

evobrutinib
BTK inhibitor
Multiple sclerosis

Registration

tepotinib
MET kinase inhibitor
Non-small cell lung cancer,
METex14 skipping⁸

avelumab
anti-PD-L1 mAb
Urothelial cancer 1L-M⁹

1L, first-line treatment; 1L-M, first-line maintenance treatment; 2L, second-line treatment;

¹ Includes studies (phase I/II) in collaboration with NCI. ² Includes studies in combination with avelumab. ³ Includes study in combination with bintrafusp alfa. ⁴ As announced on October 06 2020, Merck KGaA, Darmstadt, Germany has entered into an out-licensing agreement with Novartis. ⁵ In combination with osimertinib in MET amplified, advanced or metastatic NSCLC harboring activating EGFR mutations. ⁶ Avelumab combination studies with talazoparib, axitinib, ALK inhibitors, cetuximab, or chemotherapy. ⁷ Pending Phase III initiation in 2021. ⁸ As announced on August 25 2020, the US Food and Drug Administration (FDA) has accepted and granted Priority Review to the new drug application (NDA) in non-small cell lung cancer (NSCLC). ⁹ As announced on June 22 2020, the European Medicines Agency (EMA) has validated for review the Type II variation application for avelumab for first-line maintenance treatment of patients with locally advanced or metastatic urothelial carcinoma (UC). Unless noted otherwise, clinical programs conducted in collaboration with external partners are not shown unless Merck KGaA, Darmstadt, Germany is the sponsor of that respective trial. Pipeline products are under clinical investigation and have not been proven to be safe and effective. There is no guarantee any product will be approved in the sought-after indication.



Mavenclad

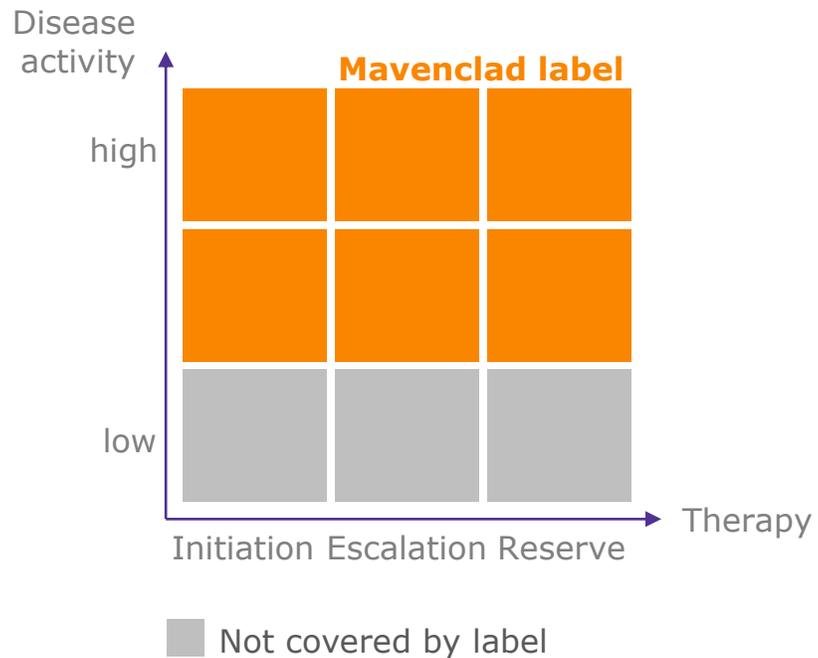
Mavenclad's attractive label in Europe supports integrated franchise strategy

Mavenclad label covers 60-70% of patients with RRMS¹ within the MS¹ patient population in Europe

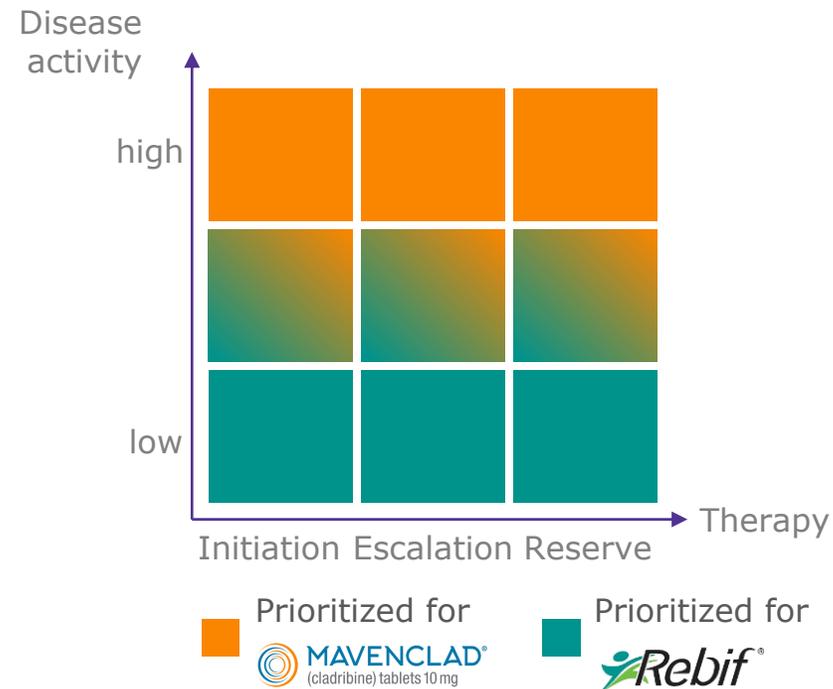
Merck KGaA, Darmstadt, Germany's overall NDD franchise will cover a broad MS patient pool

Integrated franchise strategy

MS patient population²



RRMS patients, EU-5³



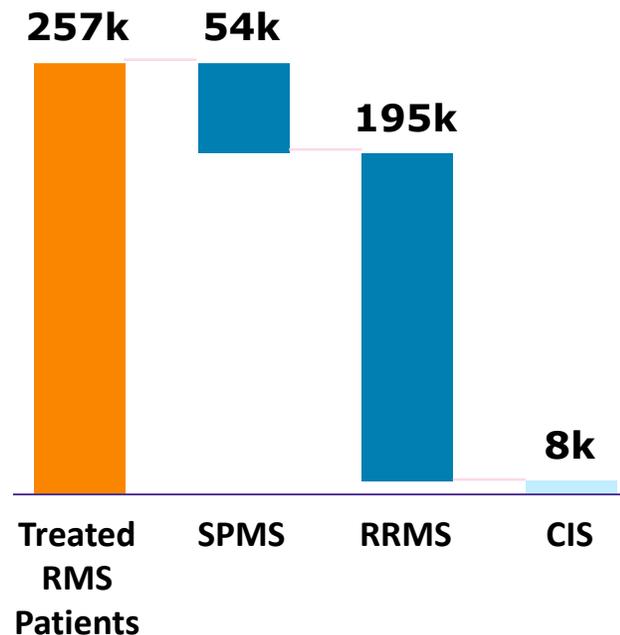
- ✓ At patient level: Rebif and Mavenclad are **highly complementary**
- ✓ At physician level: High overlap
- ✓ Franchise infrastructure investment benefits both brands



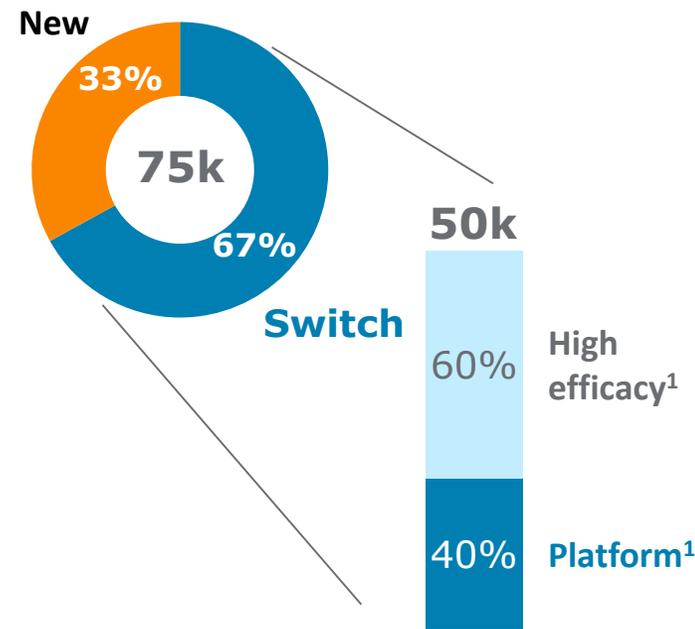
Mavenclad

In March 2019, the FDA approved Mavenclad for the treatment of adults with relapsing-remitting (RRMS) and active secondary progressive disease (SPMS)

Treated RMS patients in US



Dynamic RMS treated patients



Mavenclad addresses clear medical needs

- **Previously treated** patients represent the vast majority of the dynamic patient pool
 - **Lack of efficacy** is the predominant driver of switching, hence observed “high-efficacy” share of switches
 - **Intolerance** also drives switching, though to a lesser degree, and results in switches between classes
- Novel mechanism and unique oral short-course regimen of **Mavenclad addresses these needs**





Tepotinib (MET kinase inhibitor) First-in-class launch in MET Exon14 sets foundation for EGFRm/ METamp opportunity and exploration in other tumor types



Lay the foundation in NSCLC – MET Exon14
(VISION study, NCT02864992)

- **Highly competitive data** set presented at ASCO 2020 and published in New England Journal of Medicine in May 2020 (99 patients with a follow up ≥9 mths)
- **First-in-class launch** in Japan¹ in March 2020, Sakigake designation² granted in 2018
- **US approval expected in Q1 2021** following acceptance of filing on August 25, 2020; granted Priority Review, being evaluated under FDA Real-Time Oncology Review (RTOR) pilot program; previously granted Breakthrough Therapy Designation in 2019



Tap into a growing opportunity in NSCLC – EGFRmut/ METamp
(INSIGHT 2 study, NCT03940703)

- **Increased EGFRm detection** with testing and treatment moving into earlier lines of therapy (ADAURA trial demonstrates a 79% reduction in the risk of death with Osimertinib in the adjuvant setting (ASCO 2020), suggesting an even greater uptake of Osimertinib)
- **METamp as the primary driver of resistance** - Some publications suggest that METamp resistance post-Osimertinib could be ~25%³



Explore EGFR resistance in CRC – Tepotinib + Erbitux® combo
(NCT04515394)

- Opportunity for **Tepotinib to address an unmet need in metastatic colorectal cancer (mCRC) together with Erbitux®**



1: second largest Oncology market globally; 2: SAKIGAKE designation promotes research and development in Japan, aiming at early practical application for innovative pharmaceutical products; 3: Piotrowska et al., "Landscape of Acquired Resistance to Osimertinib in EGFR -Mutant NSCLC and Clinical Validation of Combined EGFR and RET Inhibition with Osimertinib and BLU-667 for Acquired RET Fusion", AACR Cancer Discovery 2018; Acronyms: CRC = Colorectal cancer; EGFR = Epidermal Growth Factor Receptor; NSCLC = Non-small cell lung cancer



Tepotinib (MET kinase inhibitor) Tapping into the rapidly evolving EGFRmut/METamp market - Encouraging INSIGHT 1 data

INSIGHT 2 – Tepotinib + Osimertinib in Osimertinib Relapsed METamp NSCLC Recruiting

- **Study design recently amended to reflect evolved and future standard of care:**
 - **Target population** – Inclusion criteria adjusted to focus solely on 1L Osimertinib failures
 - **Testing** - Streamline patient enrollment based on current gold standard method (TBx FISH)
 - **Increasing METamp prevalence** - Some publications suggest that METamp resistance post-Osimertinib could be ~25%¹
- Estimated primary completion date: **November 2022**

A solid foundation - Encouraging INSIGHT 1 data (18-months follow-up presented at WCLC 2019)²

Endpoint	Tepotinib + gefitinib	Chemotherapy
Primary - PFS (HR 0.13 [90% CI 0.04, 0.43])	16.6 m	4.2 m
Secondary - ORR (OR 2.67 [90% CI 0.37, 19.56])	66.7%	42.9%
Secondary - OS (HR 0.09 [CI 0.01, 0.54])	37.3 m	13.1 m

Tepotinib + Erbitux® (Cetuximab) - Addressing a significant medical need in 2L metastatic colorectal cancer (mCRC) NEW – Not yet recruiting

- Opportunity for **Tepotinib to address an unmet need in CRC** together with Erbitux®
- Estimated primary completion date: **March 2023**

- ✓ **Proof of Concept: MET amplification can be considered a suitable biomarker** for treatment with Tepotinib
- ✓ **Safety:** generally **well-tolerated**, most adverse events mild to moderate

1: Piotrowska et al., "Landscape of Acquired Resistance to Osimertinib in EGFR -Mutant NSCLC and Clinical Validation of Combined EGFR and RET Inhibition with Osimertinib and BLU-667 for Acquired RET Fusion", AACR Cancer Discovery 2018; 2: Wu et al., "Long term outcomes to tepotinib plus gefitinib in patients with EGFR mutant NSCLC and MET dysregulation: 18 month follow up", presented at WCLC 2019; Acronyms: FISH = Fluorescence in situ hybridization; TBx = Tissue Biopsy

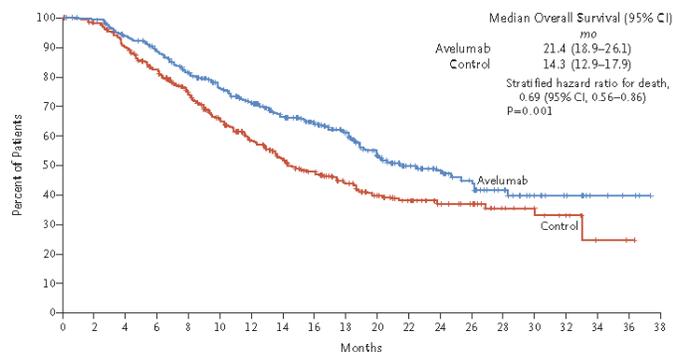


Bavencio® (Avelumab) Approved by FDA as UC 1L maintenance treatment on June 30 2020, transformative OS data recently published in NEJM

The NEW ENGLAND
JOURNAL of MEDICINE

„Avelumab Maintenance Therapy for Advanced or Metastatic Urothelial Carcinoma”, Powles et al., NEJM, published September 18, 2020¹

- **31% reduction in risk of death and an increase of 7 months in the median overall survival** (21.4 months for Bavencio® + best supportive care (BSC) versus 14.3 months for BSC alone)



- **OS improvements consistent across pre-specified subgroups**, regardless of the type of platinum-based chemotherapy received and patients' PD-L1 status
- **No new safety signals** were identified, and the safety profile was consistent with previous studies of Bavencio® monotherapy
- **Median duration of Bavencio® treatment** in the study: **24.9 wks**

ESMO 2020 – Additional analyses support the use of Bavencio® as a new addition and advance to the standard of care²

New data

Broad indication³:

VIRTUAL 2020 ESMO Congress

- Data demonstrate OS benefits across prespecified subgroups, including patients with CR on chemotherapy, supporting avelumab 1L maintenance as a new treatment option for all platinum-eligible patients, both cisplatin-eligible and ineligible

Important insights for unique MOA of Bavencio® in maintenance⁴:

- Multiple exploratory biomarkers were identified as being potentially predictive of OS in this analysis, including a number of alleles encoding high-affinity FcγRIIA and FcγRIIIA variants, which may indicate FcR-mediated antitumor mechanisms

Quality of Life data / Patient-reported outcomes (PROs)⁵:

- Bavencio® 1L maintenance therapy improves OS with no negative effect on clinically relevant PROs, supporting the use of avelumab as a new addition and advance to the standard of care

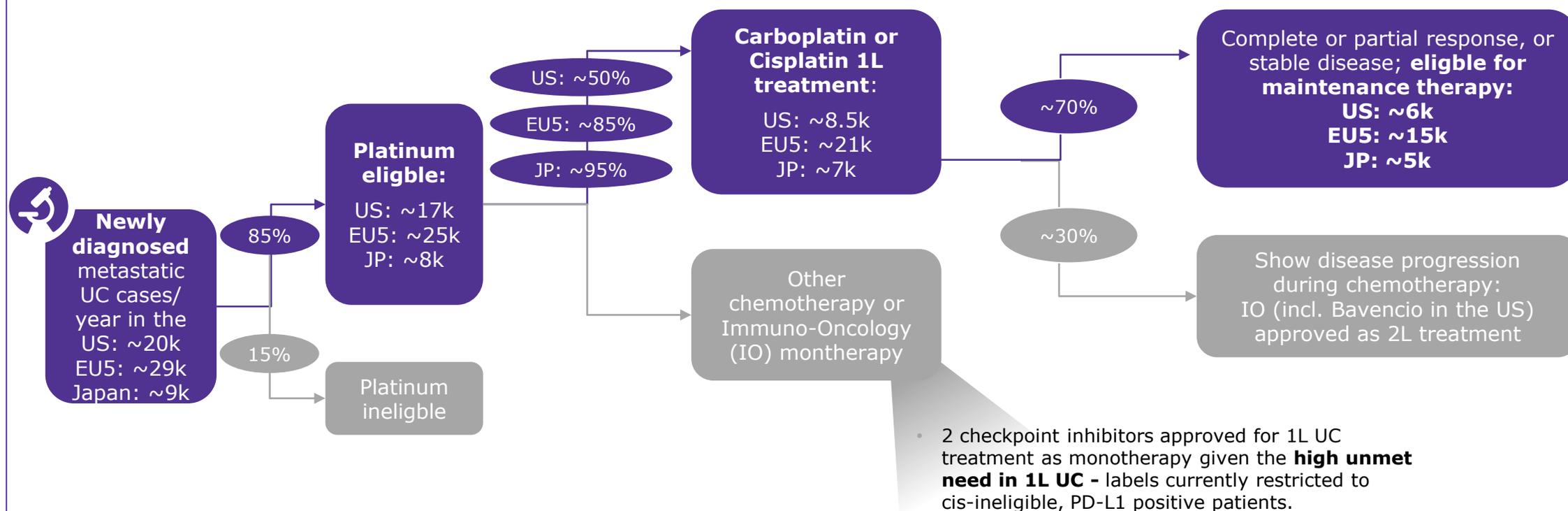
1: Powles et al., "Avelumab Maintenance Therapy for Advanced or Metastatic Urothelial Carcinoma", published on September 18, 2020 in The New England Journal of Medicine; 2: NCCN July 2020, ESMO Guidelines July 2020; 3: Grivas et al., "Avelumab first-line (1L) maintenance + best supportive care (BSC) vs BSC alone with 1L chemotherapy (CTx) for advanced urothelial carcinoma (UC): Subgroup analyses from JAVELIN Bladder 100", presented at ESMO 2020; 4: Powles et al., "Avelumab first-line (1L) maintenance + best supportive care (BSC) vs BSC alone for advanced urothelial carcinoma (UC): association between clinical outcomes and exploratory biomarkers"; 5: Powles et al., "Patient-reported outcomes (PROs) from JAVELIN Bladder 100: avelumab first-line (1L) maintenance + best supportive care (BSC) vs BSC alone for advanced urothelial carcinoma (UC)", presented at ESMO 2020; Acronyms: NEJM = New England Journal of Medicine; OS = Overall survival; UC = Urothelial cancer



Bavencio® (Avelumab) – Urothelial Carcinoma (UC 1L)

There is an urgent need for a 1L treatment strategy that maintains and reinforces the initial benefit of induction chemotherapy

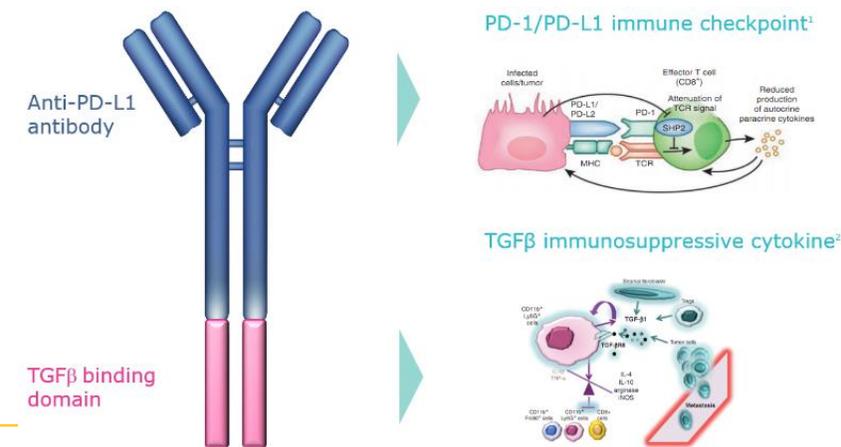
Durable responses to standard of care (1L chemotherapy) are rare with most patients experiencing progression within 9 months of treatment¹



Bintrafusp alfa¹An innovative first-in-class bifunctional fusion protein discovered in-house leading the TGF- β immuno-oncology field

Mode of action

- Innovative **first-in-class bifunctional fusion protein** designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF- β signaling)
- Demonstrated **superior anti-tumor activity in pre-clinical study** compared to anti-PD-L1 alone, and anti-PD-L1 and TGF- β given in combination as separate agents
- **Great excitement in IO community** about M7824 uniquely addressing TGF- β biology widely accepted as key resistance factor for anti-PDx therapies



Clinical development achievements

- Tested in **14 Phase Ib expansion cohorts** across >700 patients in more than 10 tumor types
- Shown clinical anti-tumor activity across multiple hard-to-treat cancers including **advanced NSCLC, biliary tract cancer, HPV-associated cancers, and gastric cancer**
- PhII study **M7824 monotherapy versus pembrolizumab 1L**, advanced NSCLC high PD-L1-tumor expressers started in October 2018



Clinical development plans

- **Multiple high priority immuno-oncology clinical development studies** ongoing or expected to commence shortly, including **studies in non-small cell lung and biliary tract cancers with registrational intent** and most recently **advanced, unresectable cervical cancer**

Bintrafusp alfa: Development Strategy

Program overview: Multiple shots-on-goal (10 ongoing studies) to evaluate co-localized inhibition of TGF-β / PD-L1 hypotheses

Indication	Tumor biology / TGF-β, PD-L1 hypothesis		Target aberrant TGF-β signaling and fibrosis	Impact on dysregulation driven by HPV infection	CT combo to initiate immune reactivation, target fibrosis, to increase drug exposure	RT combo to counteract PD-L1 & TGF-β mediated immune-suppression, reduce fibrosis & EMT, elicit abscopal effect	Target TGF-β-mediated fibrotic phenotype in immunogenic setting	Est. primary completion
BTC 047: BTC 2L			✗					Q4 2020
BTC 055: BTC 1L					✗			Q4 2022
Lung 024: NSCLC 1L					✗			Q1 2022
Lung 005: Unresectable Stage III NSCLC (vs Durvalumab)						✗		Q1 2024
Lung 037: NSCLC 1L (vs Pembrolizumab)							✗	Q2 2023
New Cervical 046: Cervical Cancer 1L				✗	✗			Q2 2022
New Cervical 017: Cervical Cancer 2L				✗				Q2 2022
New TNBC 020: TNBC 2L							✗	Q1 2023
New Urothelial Cancer 2L							✗	Q3 2022
New Solid tumors (M6223/anti-TIGIT combo)							✗	Q3 2022
			mono		CT combo	CR/T combo	mono	

Acronyms: BTC = Biliary Tract Cancer; CT = Chemotherapy; EMT = Epithelial-mesenchymal transition; HPV = Human papillomavirus; NSCLC = Non-small Cell Lung Cancer; RT = Radiation therapy; TNBC = Triple-Negative Breast Cancer

New Study start date imminent OR within the last 6 months

Registrational potential

Signal finding



Bintrafusp alfa: INTR@PID LUNG 037¹

Having passed futility during a planned interim analysis, the Phase III study continues and will read out on clinically relevant endpoints PFS/OS

Interim
Analysis
passed²

- The IDMC reviewed **preliminary safety and efficacy data** from both treatment arms; **data remains blinded to GSK and Merck KGaA, Darmstadt, Germany**
- Per IDMC, the **trial passed futility (ORR/safety analysis)** against an active comparator (pembrolizumab)
- Criteria underlying the IDMC's decisions will not be made public

Study
continues
as planned

- **Analyses from the study will only be shared upon study completion, once the full dataset for the dual primary endpoints (PFS/OS) has been obtained**
- Depending on data, an appropriate path forward will be determined together with the health authorities and GSK
- Development milestones may be payable in future³

	Initial Trial Design (Study start: October 2018)	Evolved / Adaptive Trial Design (March 2020)	Adaptive Trial Design (as of October 2020)
Estimated Enrollment	300 participants	Potential for expansion to 584	Update – Recruitment closed at approx. 300 („Active, not recruiting“)
Primary Endpoints	ORR/PFS (dual endpoints)	PFS/OS (dual endpoints, updated based on guidance from health authorities)	→ Unchanged since March 2020
Phase	Phase II	Adaptive Phase III	→ Unchanged since March 2020
Registrational Intent	✓	✓	→ Unchanged since October 2018
Est. Primary Completion Date	October 2021 (event-driven)	April 2023 (event-driven)	→ Unchanged since March 2020

1: NCT03631706, „M7824 Versus Pembrolizumab as a First-line (1L) Treatment in Participants With Programmed Death-ligand 1 (PD-L1) Expressing Advanced Non-small Cell Lung Cancer (NSCLC)“, 2: Results of this interim analysis will not be made public nor will data be published until trial completion, 3: As stated at the time of deal signature, the agreement foresees there is the potential for up to € 500m development-related milestone payments tied to data from the lung program and there are multiple milestone opportunities;
Acronyms: IA = Interim analysis, IDMC = Independent data monitoring committee, OS = Overall Survival, PFS = Progression-Free Survival



Bintrafusp alfa: Developmental Progress

2L Biliary Tract Cancer (BTC) monotherapy data read-out exp. in Q1 2021

M7824 BTC data presented at ESMO 2018

- **Need:** Few available treatment options (no 2L standard of care)¹
- **Results: Encouraging activity²** in 30 Asian patients with pretreated biliary tract cancer
- **ORR²:** 20% (IRC assessment). Median DoR was NR (range, 8.3–13.9 months) with confirmed responses ongoing in all patients
- **Overall Survival by IRC: MOS:** 12.7 months (6.7 – NR), comparing favorably with historical data in pretreated patients receiving second- or later line treatment (<7 months MOS in 2L¹)
- Responses observed **irrespective of PD-L1 expression levels²**
- **Orphan Drug Designation** granted by FDA in December 2018

Leading PDx data presented at ASCO 2019³

- **ORR:** 5.8% (PhII, 2L); 13.0% (PhI)
- **OS:** 7.4 months (PhII, 2L); 6.2 months (PhI)

INTR@PID BTC 047

INTR@PID CLINICAL TRIALS

BTC
047

Locally
advanced or
metastatic
BTC 2L
N = 141

M7824 1200 mg IV,
Q2W, up to 24
months

Endpoints

Primary endpoint: ORR

Secondary endpoints: DOR, DRR, PFS, OS, Safety

Biomarker endpoints: PDL1 expression MSI status, comprehensive genomic profiles

Bintrafusp alfa: Developmental Progress NSCLC Stage III cCRT Combo trial



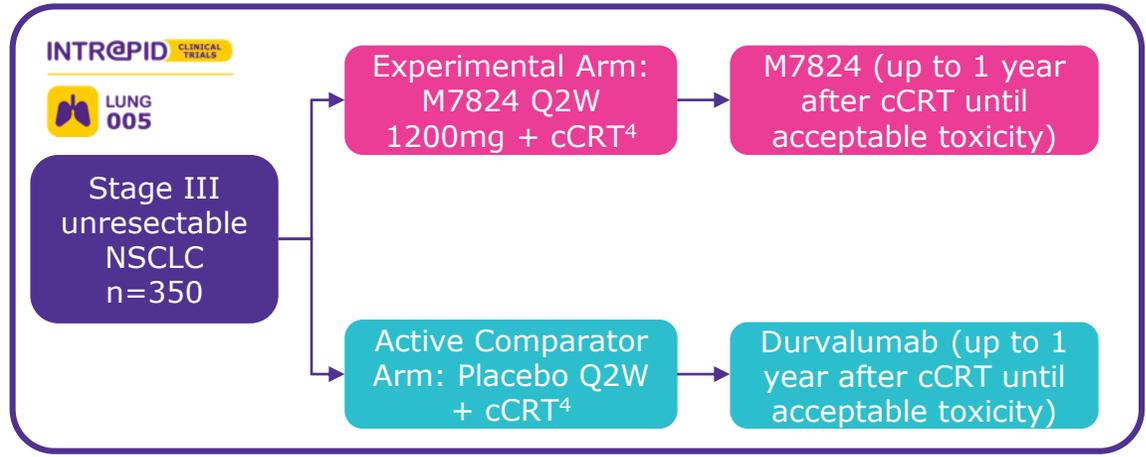
NSCLC 2L data presented at ESMO 2018

- **Need:** NSCLC accounts for 80-85% of all cases of lung cancer¹
- **Results: Encouraging efficacy comparing favorably to established PDx-inhibitor monotherapy (IRC)^{2,3}:**
 - **ORR (all-comers):** 25.0%
 - **ORR (PD-L1-positive):** 37.0%
 - **ORR (PD-L1-high):** 85.7%
- **Progression free survival by IRC (PD-L1 ≥ 1%):**
 - M7824: **mPFS = 9.5 months**, competitor: 4.0 months^{2,3}
- **Overall Survival by IRC (PD-L1 ≥ 1%):**
 - M7824: **mOS not reached**, competitor: 12.7 months^{2,3}

Pre-clinical data on M7824 + RT combo⁵

- M7824 and RT combination therapy **enhances antitumor activity relative to mono-therapies** in mouse models
- EMT, VEGF, and RT-induced fibrosis gene signatures are decreased with M7824 and combination therapy, and **M7824 reduces RT-induced fibrosis**
- Results **support evaluation of M7824 + RT in the clinic**

INTR@PID LUNG 005



Endpoints

Primary endpoint: PFS
 Main secondary endpoints: OS, Safety, Pulmonary function, Association of PD-L1 expression at base line and efficacy

¹Jemal A et al., Cancer statistics, 2007, CA Cancer J Clin 2007;57:43-66; ²Paz-Ares et al., Poster presented at the 43rd European Society for Medical Oncology Annual Meeting, Munich, October 19–23, 2018, data shown for 1200mg Q2W dose; ³Herbst et al.; Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): a randomised controlled trial (www.thelancet.com Published online December 19, 2015 [http://dx.doi.org/10.1016/S0140-6736\(15\)01281-7](http://dx.doi.org/10.1016/S0140-6736(15)01281-7)); ⁴Cisplatin/Etoposide or Carboplatin/Paclitaxel or Cisplatin/Pemetrexed concomitant with Intensity Modulated Radiation Therapy (IMRT); ⁵Lan et al., Combination of M7824 and radiation therapy enhances antitumor activity, increases immune response, and modulates radiation-induced fibrosis in cancer models, 2018



Bintrafusp alfa: Developmental Progress

Data shown at AACR 2019 highlights opportunity in HPV-related cancers

Efficacy variable	HPV-associated cancer (n=43)	HPV+* (n=36)
Confirmed BOR, n (%)		
CR	2 (4.7%)	2 (5.6%)
PR	10 (23.3%)	9 (25%)
SD	6 (14.0%)	5 (13.9%)
PD	20 (46.5%)	17 (47.2%)
Not evaluable	5 (11.6%)	3 (8.3%)
Delayed PR [†]	3 (7.0%)	3 (8.3%)
ORR per RECIST v1.1, n (%) [95% CI]	12 (27.9%) [15.3–43.7]	11 (30.6%) [16.3–48.1]
Total clinical response rate[†], n (%)	15 (34.9%)	14 (38.9%)
DCR, n (%)	18 (41.9%)	44.4%

Prevalence: >630,000 new cases of HPV-related cancer are reported worldwide annually¹

Response Rates:

- Bintrafusp alfa response rates **compared favorably to those with anti-PD-1 inhibitors** (ORRs of 13%–24%)¹⁻⁷
- **ORR was 27.9% and 30.6% in HPV-associated and HPV+ cancers, respectively**
- Including three additional patients with delayed PRs after initial PD: **Total response rate was 34.9% and 38.9% in HPV-associated and HPV+ cancers, respectively**

Long-term Benefit:

- **Most responses durable** with 4 responses having DoR >18 months and 11/15 responses ongoing at the data cutoff
- Responses to bintrafusp alfa occurred **irrespective of tumor type** or PD-L1 expression
- **Safety profile was similar to anti-PD-(L)1 therapy^{1,5}** except for SCC/KAs and low grade mucosal bleeding which are anticipated AEs with TGF- β inhibition^{8,9}

Cervical Cancer 2L study recently posted on ct.gov

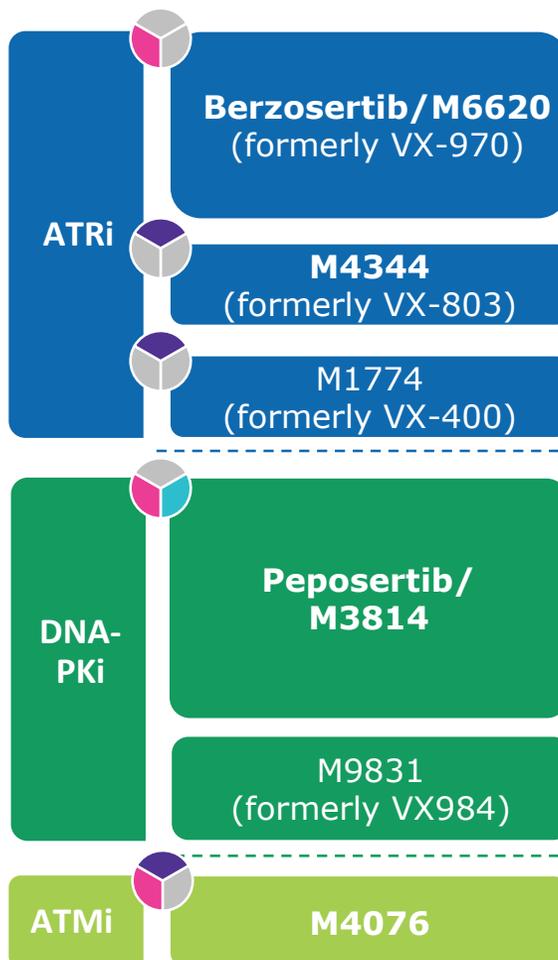
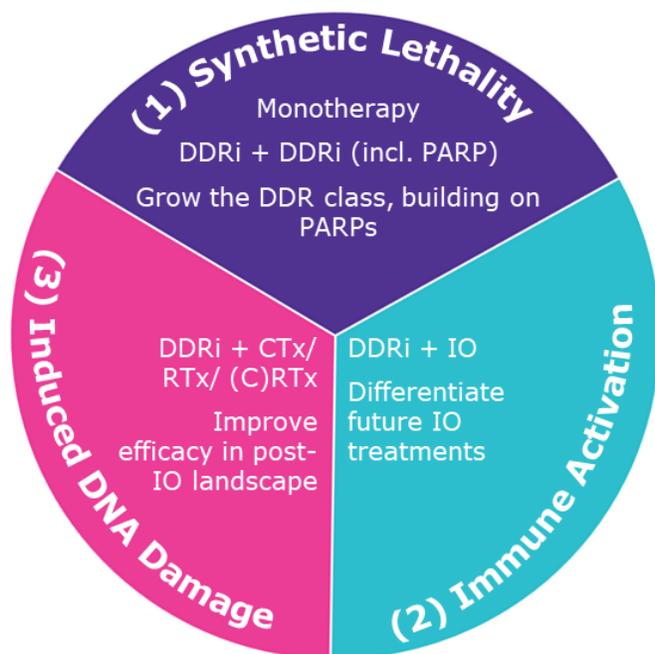
[†]Due to confirmed PD before onset of response, these patients did not meet response criteria by RECIST v1.1; *HPV status was determined from prior documentation, or by using cobas® 4800 HPV Test (Roche) in the dose escalation phase or RNA sequencing (RNASeq) in the expansion phase. ¹Baumli J, et al. J Clin Oncol. 2017;35:1542–49; ²Ott PA, et al. Ann Oncol. 2017;28:1036–41; ³Hollebecq A, et al. J Clin Oncol. 2017;35(Suppl):Abstract 5504; ⁴Chung HC, et al. J Clin Oncol. 2018;36(Suppl):Abstract 5522; ⁵Ferris RL, et al. N Engl J Med. 2016;375:1856–67; ⁶Mehra R, et al. Br J Cancer. 2018;119:153–59; ⁷Morris VK, et al. Lancet Oncol. 2017;18:446–53; ⁸Lacouture ME, et al. Cancer Immunol Immunother. 2015;64:437–46; ⁹Trachtman H, et al. Kidney Int. 2011;79:1236–43



DNA Damage Response (DDR)

Leading DDR portfolio with a broad clinical program

Strategy presented at R&D Update Call 2019



- Only ATR-inhibitor with a POC from an RCT (Ovarian cancer, Berzosertib +/- Gem)
- Multiple NCI studies in various tumor types
- Promising Phase II data (Small cell lung cancer) soon to be published in a leading medical journal



- Two oral ATR-inhibitors currently in Ph I
- Provides optionality

- Rectal cancer (CRT combo): Ph Ib ongoing, Ph II to enroll approx. 150 patients
- Combo with Avelumab: Study with and w/o RT ongoing (PhI, solid tumors)
- Multiple NCI studies in various tumor types



- Exclusive license¹ granted to Vertex in 2019 for use in gene-editing applications

- Clinical candidate/ready for Phase I trials, chemical structure first disclosed at AACR 2019

1: incl. upfront payment + milestone/royalties on future sales; Acronyms: ATMi = Ataxia telangiectasia-mutated; ATRi = Ataxia telangiectasia and Rad3-related inhibitors; CRT = Chemoradiotherapy; DDR = DNA Damage Response; DNA-PKi = DNA-dependent Protein Kinase Inhibitor; PARP = poly(ADP-ribose) polymerase inhibitor; POC = Proof of concept; RCT = Randomized Controlled Trial; RT = Radiation Therapy



We pioneered BTKi development for MS with Evobrutinib

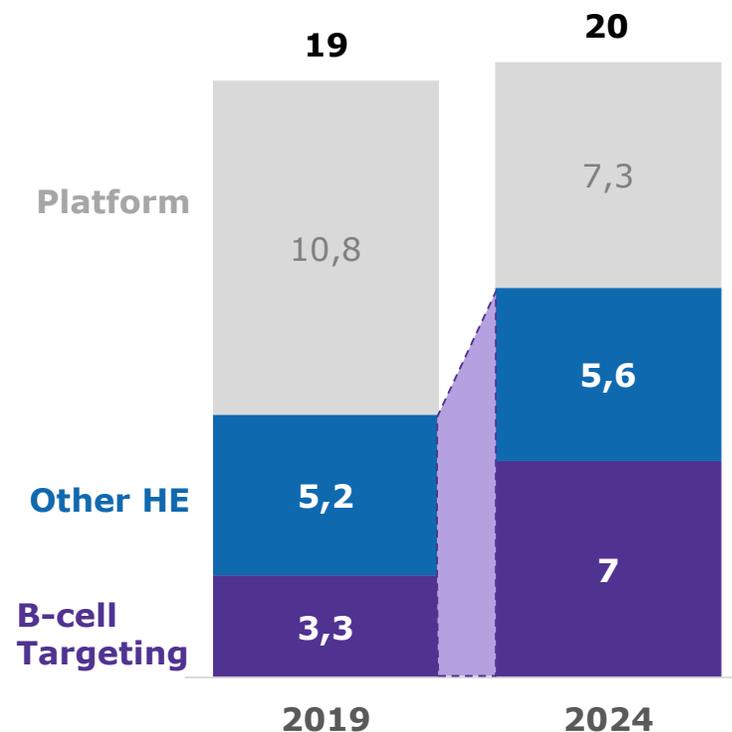
Potential to have 3 complementary MS branded products by 2025

Unmet need in Multiple Sclerosis (MS) – Need for new mechanisms to control disease

- ~50% of patients with **Relapsing MS (RMS)** continue to have ongoing disease activity over 2 years even when treated with the most effective agents
- No therapy with impact on **progression** mediated by **CNS myeloid cells**
- **Systemic side effects** of therapies limit patient acceptance and compliance
- All approved higher efficacy therapies **associated with elevated risk of infection**



Worldwide MS Market [€ bn]¹



B-Cell Targeting + High-Efficacy (HE) Orals represent >60% of MS sales

- ✓ **BTKi is a novel class** of non-depleting therapies selectively targeting both B-cells and innate immune cells including disease progression-relevant microglia
- Merck KGaA, Darmstadt, Germany was the **first to conduct a full Phase II dose-ranging study in MS with Evobrutinib**, a highly selective covalent BTKi²
- ✓ **Merck KGaA, Darmstadt, Germany is a growing MS player** and could have 3 complementary branded products by 2025 – Mavenclad®, Rebif®, Evobrutinib

Platform agents – interferons, copaxone, DMFs and Teriflunomide; Other HE (high-efficacy) - cladribine, S1Ps, alemtuzumab; B-cell Targeting – ocrelizumab, ofatumumab, ublituximab. Includes branded products, generics and biosimilars; 1: Merck KGaA, Darmstadt, Germany internal estimates; 2: Montalban et al. NEJM 2019; 380:2406-2417; Acronyms: BTKi = Bruton's tyrosine kinase inhibitor



Evobrutinib stands out amongst BTK inhibitors under development

Uniquely positioned both in terms of clinical evidence and mode of action

	Fenebrutinib##	Tolebrutinib**	Evobrutinib
Clinical Evidence	Long-term* efficacy on relapses	✗	✓ ⁽¹⁾
	Long-term* safety	✗	✓ ⁽¹⁾
	Convenience (oral)	✓ BID	✓ QD
	Exposure in CSF	✗	✓ ^(2, ##) in HV
	Biomarker of inflammation and progression in MS patients (sNfL)	✗	✗
Preclinical data	BTK occupancy in the CNS	✗	✓ ⁽⁴⁾
	Efficacy in progressive EAE model and reduction of leptomeningeal inflammation#	✗	✓ ⁽⁶⁻⁸⁾

✗ : not reported

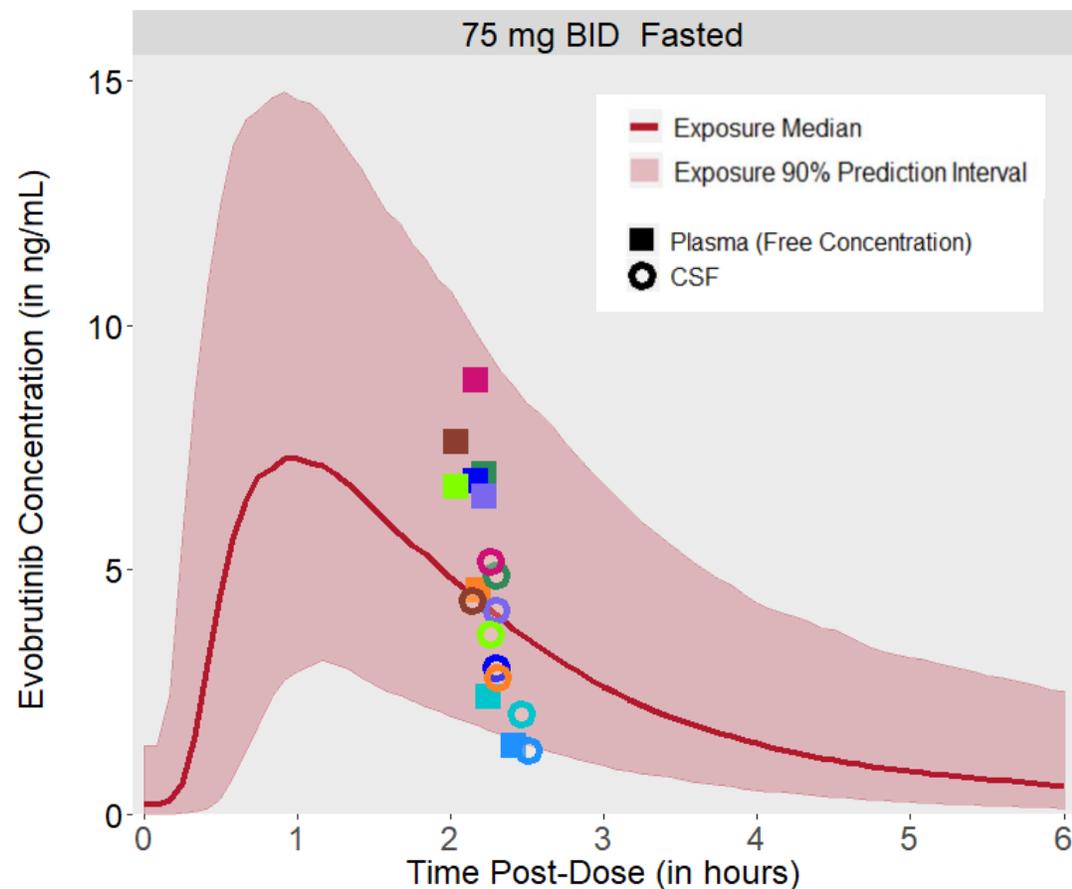


Phase III studies: Recruitment on track → Target data in-house in Q4 2023 and potential filing shortly after

*Long term is defined as the continuous treatment of MS patients for at least 96 weeks; **Extension to Phase II clinical trial in MS ongoing; #Defined as having an evidence on all the following: Inhibition of leptomeningeal and cortical inflammation and progression in preclinical models; ## No reported data in MS patients; 1: Montalban et al., triMS.online conference 2020; 2: Smith et al., ACTRIMS 2019; 3: data on file; 4: Francesco et al.,ECTRIMS 2017; 5: Boschert U et al., ECTRIMS-ACTRIMS 2017; 6: Kim et al., ECTRIMS 2020, 7: Alankus YB et al., ECTRIMS 2018; 8: Rijvers et al., ECTRIMS 2020; Acronyms: sNfL serum Neurofilament Light Chain; BID twice a day; QD once a day; HV healthy volunteers; MS multiple sclerosis



Evobrutinib has the potential to tackle Multiple Sclerosis directly in the brain



- Evobrutinib was quantifiable **in CSF of 9 of 9 clinically stable RMS patients** administered the efficacious 75 mg BID dose in the RMS Phase 2 OLE study*
 - Plasma PK were at steady-state and consistent with other RMS Phase2 patients
- CSF concentrations are consistent with free plasma concentrations**
- The **measured CSF concentrations are biologically relevant**
 - Median BTK trough occupancy >95% observed at similar plasma concentrations



Evobrutinib targets inflammation and progression

Dual mechanism of action offers an innovative oral approach to MS therapy

MOA on B-cells and macrophage/microglia cells is an **innovative oral approach to MS therapy** with potential to impact compartmentalized inflammation and progression

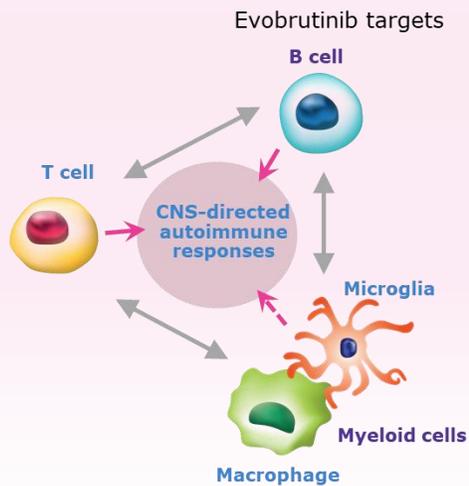
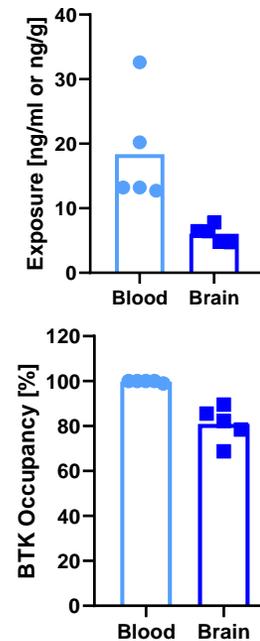


Figure modified from: Li R, et al. 2018.

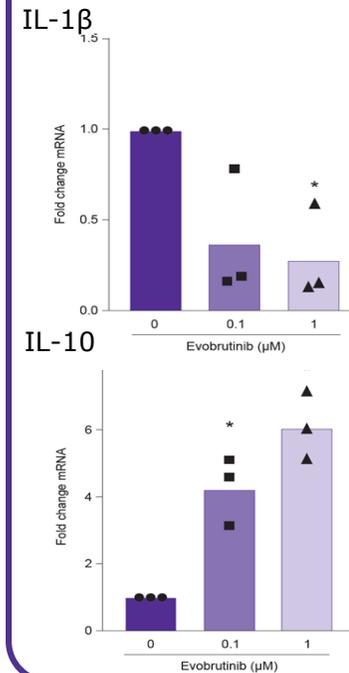
Evobrutinib is a CNS penetrant BTKi²

CNS exposure in EAE mice



Evobrutinib shifts macrophage phenotypes from M1 pro- to M2 anti-inflammatory³

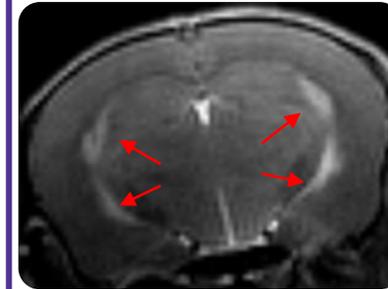
Macrophages after GM-CSF activation



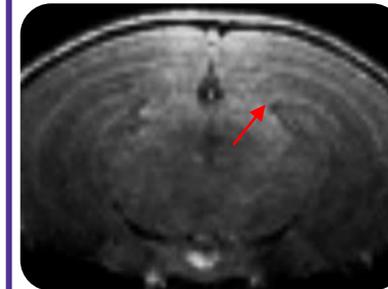
Evobrutinib reduces CNS B cells and leptomenigeal inflammation⁴

Leptomeningeal structures

Vehicle:



Evobrutinib:



EAE in SJL/J mice

- Important role of macrophage/microglia cells in addition to B and T cells in both **periphery and CNS**¹
- Evobrutinib **reaches brain** to potentially impact compartmentalized inflammation²
- Effects may be mediated through effects on **CNS-resident and CNS-migrating cells**^{3,4}

1. Li et al. Nat Immunol 2018; 2. Adapted from Boschert U et al. ECTRIMS-ECTRIMS 2017; 3. Alankus YB et al. ECTRIMS 2018; 4. Sol Kim ECTRIMS 2020



Evobrutinib is optimally dosed to offer best-in-class BTK inhibition

Optimized dose selection & targeted covalent binding results in sustained BTK inhibition that is necessary for robust efficacy

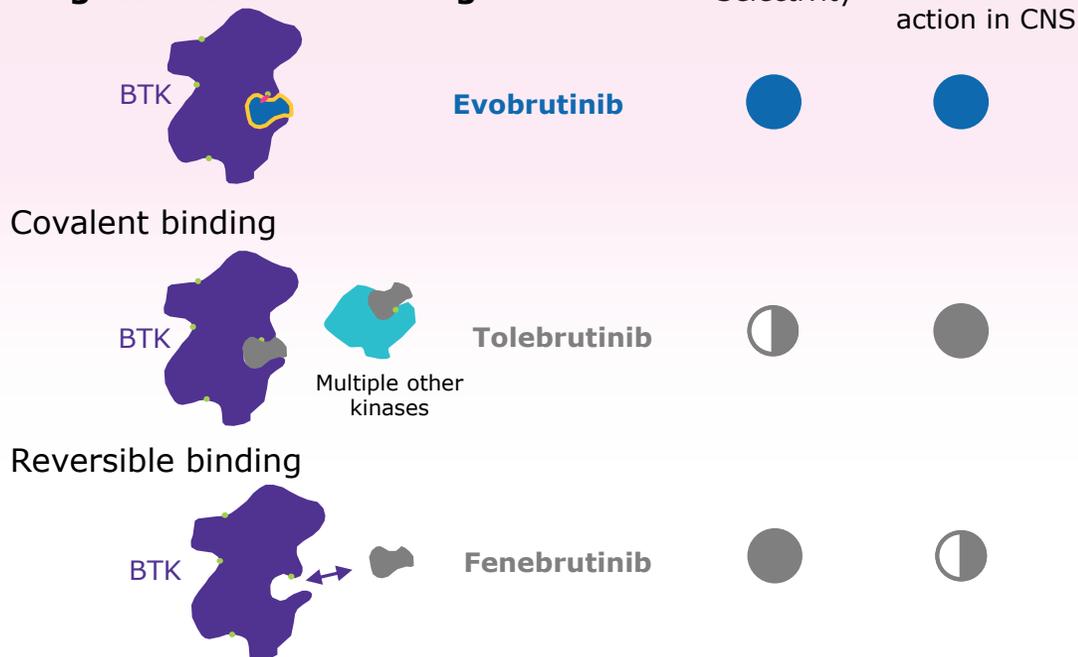
Sustained BTK inhibition in CNS-resident and CNS-migrating cells resulting from covalent binding MOA and BID dosing can be critical to achieve best-in-disease efficacy¹

Targeted covalent binding leads to highly specific continuous target engagement²⁻⁶

BID dosing enables critical >95% BTK inhibition throughout the day in the majority of patients⁷



Targeted covalent binding



BTK Occupancy (SS Trough) Threshold	25 mg QD	75 mg QD	75 mg BID
	% of Population (RMS Ph2)		
95%	23	48	98

No efficacy Maximum efficacy

Efficacy at 48 weeks⁸

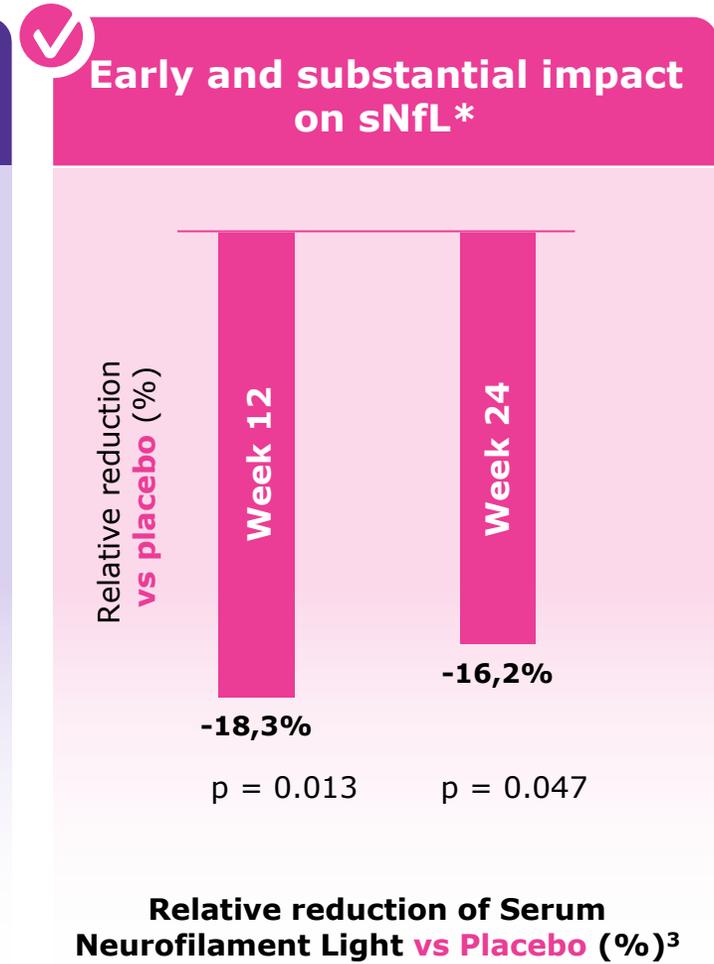
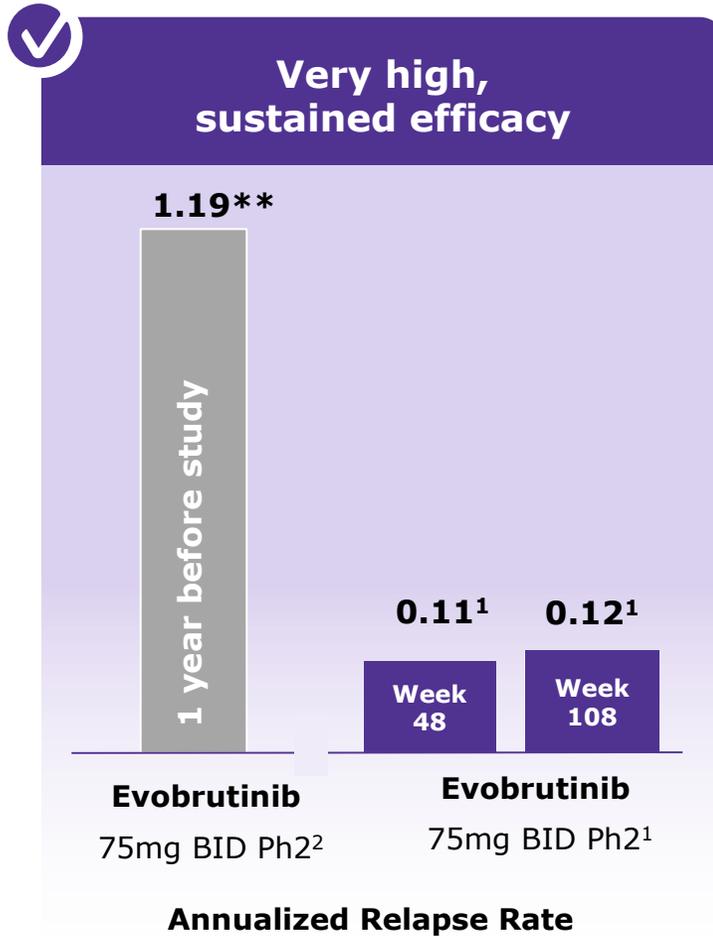
75 mg QD Evobrutinib Fasted: ARR = 0.25	75 mg BID Evobrutinib Fasted: ARR = 0.11
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1. Boschert et al., ECTRIMS 2017; 2. Bianco et al., Trends in Pharmacological Sciences 2020; 3. Bauer R.A., Drug Discovery Today 2012; 4. Swinney D.C., Curr. Top. Med. Chem. 2006; 5. Barf, T. & Kaptein, A., J. Med. Chem. 2012; 6. Caldwell et al., J. Med. Chem. 2019; 7. Montalban et al., EAN 2020., 8. Montalban et al NEJM 2018
*at disease relevant concentrations; ARR: annualized relapse rate; *75 mg BID fasted equals 45 mg BID fed that is a dose used in Phase III EVOLUTION studies



Evobrutinib holds unmatched Long-Term Data among BTKi class in MS

Best-in-disease efficacy & favorable safety over 2 years in largest Phase II study in MS



- Evobrutinib is the **only BTKi to have demonstrated very high, sustained efficacy and favorable safety** in the largest Phase II study in MS (n=267), with an ARR of confirmed relapses of 0.12 up to 108 weeks¹
- Evobrutinib **impacts sNfL levels**, a biomarker of neuronal damage, reflecting **disease activity and drug response in patients with MS³**, starting at 12 weeks and maintained through 24 weeks²
- Evobrutinib is **highly selective resulting in targeted kinase inhibition**, and its safety data in >1200 patients over 2+ years supports the potential for an **optimal long-term safety profile²**

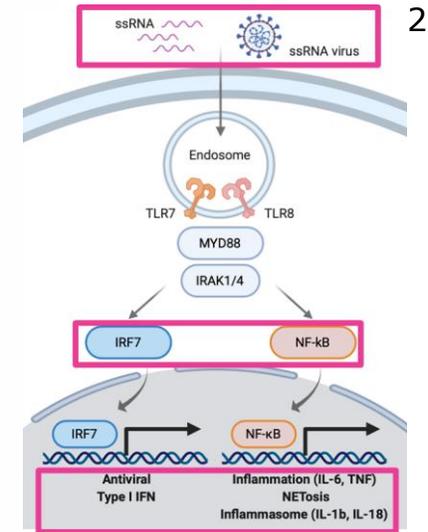


M5049 (TLR7/8 antagonist)

TLR7/8 are drivers of SLE pathology and possibly of COVID-19

Mechanism of Action¹

- M5049 (**discovered in-house**) is a **potentially first-in class small molecule** that blocks activation of Toll-like receptors TLR7 and TLR8, two innate immune sensors that detect single-stranded (ss) RNA from viruses such as SARS-COV-2, the virus responsible for COVID-19, and inflammatory self-RNAs in the context of autoimmunity
- Activation of TLR7/8 leads to immune cell activation and inflammation, which when not properly controlled can cause severe immunopathology



Results from Phase I study in healthy volunteers

(NCT03676322)¹

- **Well-tolerated** over the dosing interval, no significant or dose-limiting adverse event
- Pharmacokinetic parameters linear and dose-proportional from 1 to 200 mg
- Exposure-dependent inhibition of ex vivo-stimulated IL-6 secretion observed, with maximum inhibition achieved at 200 mg



Preliminary Phase I data warrant further investigation as a potential treatment for autoimmune diseases including SLE

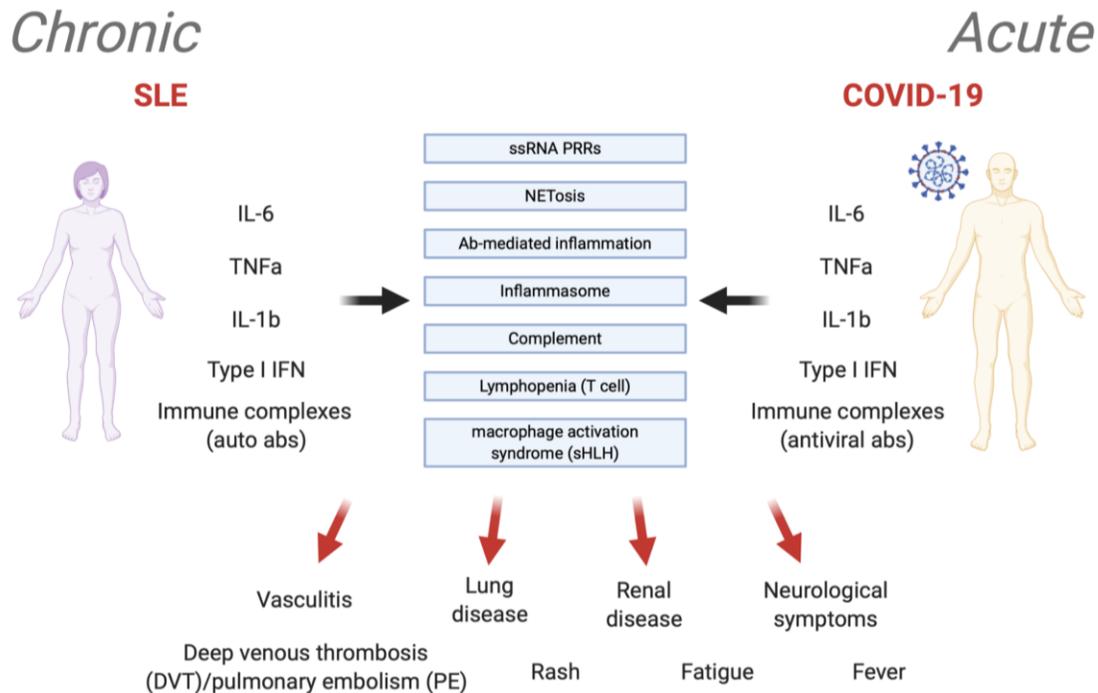
1: Port et al., A PHASE I, FIRST-IN-HUMAN STUDY TO ASSESS THE SAFETY, PHARMACOKINETICS AND PHARMACODYNAMICS OF SINGLE AND MULTIPLE ASCENDING DOSES OF M5049, A DUAL ANTAGONIST OF TLR7/8, IN HEALTHY SUBJECTS, *Lupus Science & Medicine* 2020;7(Suppl 1):A1-A131, conference cancelled due to COVID-19; 2 Adapted from *ImmunoHorizons* July 1, 2018 Dowling, D; Acronyms: SLE = Systemic lupus erythematosus; TLR = Toll-like receptors



M5049 (TLR7/8 antagonist)

Similarities between SLE and COVID-19

Similarities between SLE and COVID-19¹



1: Illustration created in-house; Acronyms: SLE = Systemic lupus erythematosus

Phase II study started in July 2020

Rational:

- Investigate if M5049 intervention at critical point in course of COVID-19 disease may prevent or ameliorate hyper-inflammatory response in patients with COVID-19 pneumonia and **prevent progression to 'cytokine storm'**
- Successful intervention with investigational drug may reduce life-threatening complications of COVID-19, including severe respiratory symptoms often necessitating further interventions such as mechanical ventilation

Design:

- Phase II randomized, controlled clinical study
- Commenced in July 2020

Results:



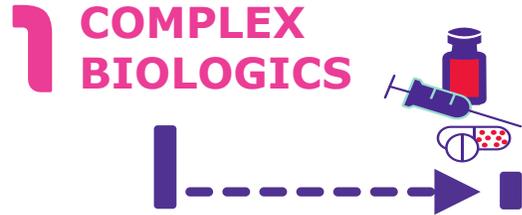
Dependent on recruitment and COVID-19 infection rates
First results expected in Q2 2021



Strategic direction – innovate and invest today to continue above market growth in the future



Capitalizing on three key life science trends



Single Use / End to End

Opened Wuxi site in 2018, and expanded Danvers facility

Viral Vectors

Expanded Carlsbad viral vector manufacturing site in 2016; further doubling of capacity planned for 2021

Antibody Drug Conjugates (ADC)

Launched ADC Express™ for the rapid production of ADCs



#1 eCommerce site in Life Science¹

- **>90%** of Millipore products on eCommerce platform
- **x2** net sales growth of eCommerce vs. non-eCommerce²



Manufacturing/Distribution
Nantong, Wuxi Single use

Commercial expansion
Tier 2 cities

eCommerce partnership



COVID-19 demands align with our strengths but increase supply chain pressure

unit operations				
Cell culture media	●	●	●	●
Biopharm materials	●	●	●	●
Chromatography	●	●	●	●
Hardware	●	●	●	●
Single use	●	●	●	●
Sterile	●	●	●	●
Virus	●	●	●	●
Clarification	●	●	●	●
Tangential flow filtration	●	●	●	●

● = A leading player ● = Significant presence ● = No offering

Sources: press releases, company reports, and internal assessments

COVID-19 Outlook

Type

Implications



mAb

65 programs

Bind and block virus from entering cells

- Universal templates
- A leading position for 8 out of 9 unit ops



Vaccine

199 programs

Protective **immune response**

- Multiple templates
- Leveraging Single Use



Nucleic Acid

43 programs

Leveraging **human factory**

- Emerging manufacturing processes
- Lipids are critical



Process Solutions

Next-generation bioprocessing on the cards

Today's process & portfolio

CHOZN
Cell Line

Ex-Cell®
Advanced™
media

Mobius®
bioreactor

Clarisolve®
Depth Filters

Eshmuno®
Chrom. resin

Viresolve®
Pro Solution

ProSep®
Ultra Plus
Resin

Opticap®
Filters

Pellicon®
Ultrafiltration
Cassettes
Launched 2018

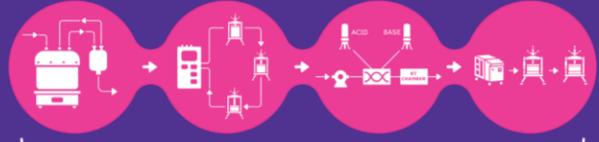
Durapore®
Filtration

Millipak®
Final Fill
Filter
Launched 2018

BioReliance® **cGMP SOLUTIONS & SERVICES** **EMPROVE®**

Tomorrow's process

MAb process intensification 2017 - 2020+



continuous processing >2025



Continuous bioprocessing will ...

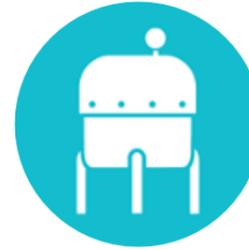
- be an evolution in mAb bioprocessing
- take time to establish
- leverage the present
- lead to hybrid solutions

Process Solutions

Our single-use technologies drive flexibility in modern bioprocessing



30,000 l
stain-less
steel tank



500 l
single-use
tank

Traditional Multi-use facility

CAPEX* required	~\$500 m to \$1 bn
Time to construct	5 to 10 years
Change over time	4 weeks
Footprint	~>70,000 m ²

Innovative single-use facility

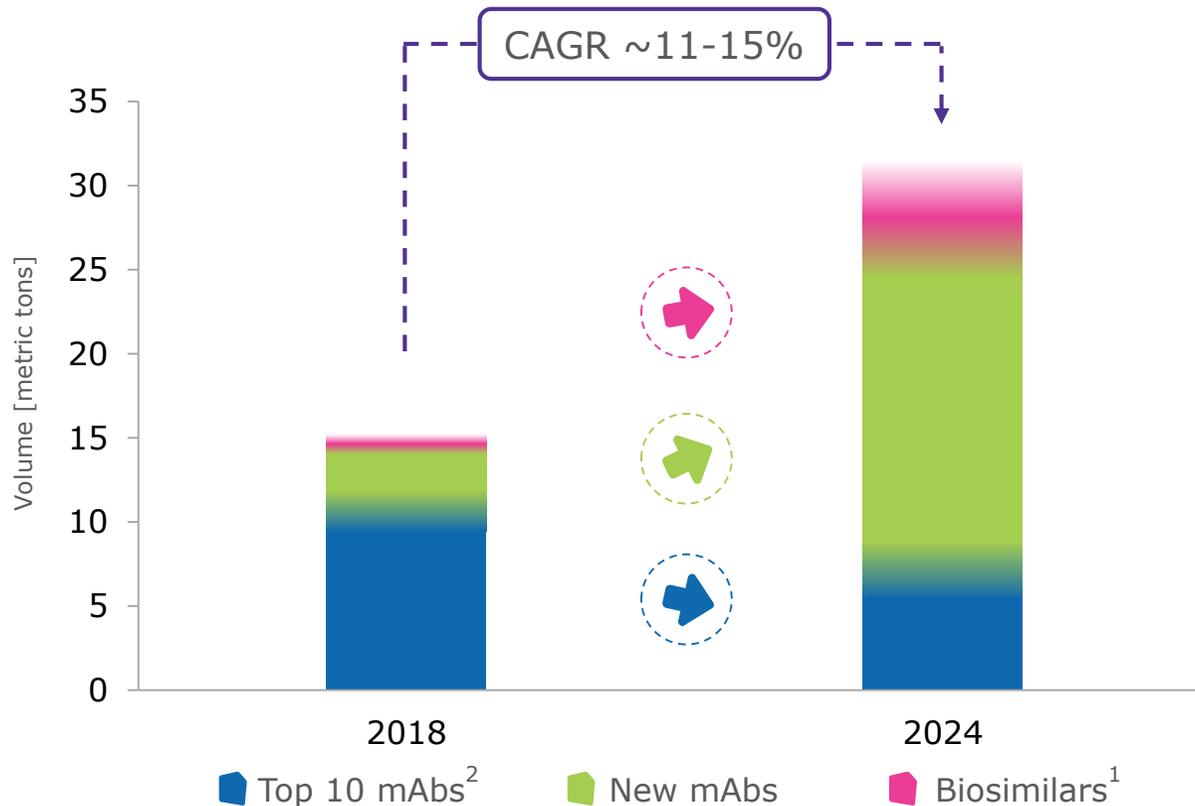
CAPEX required	\$20 m to \$100 m
Time to construct	1.5 years
Change over time	0.5 days
Footprint	~11,000 m ²

Strong demand for single-use technologies and Process Solutions' broad offering was and will remain a key source of growth for Life Science



Democratization of mAbs market will drive diversification, change, variability

mAb volume projections 2018 to 2024



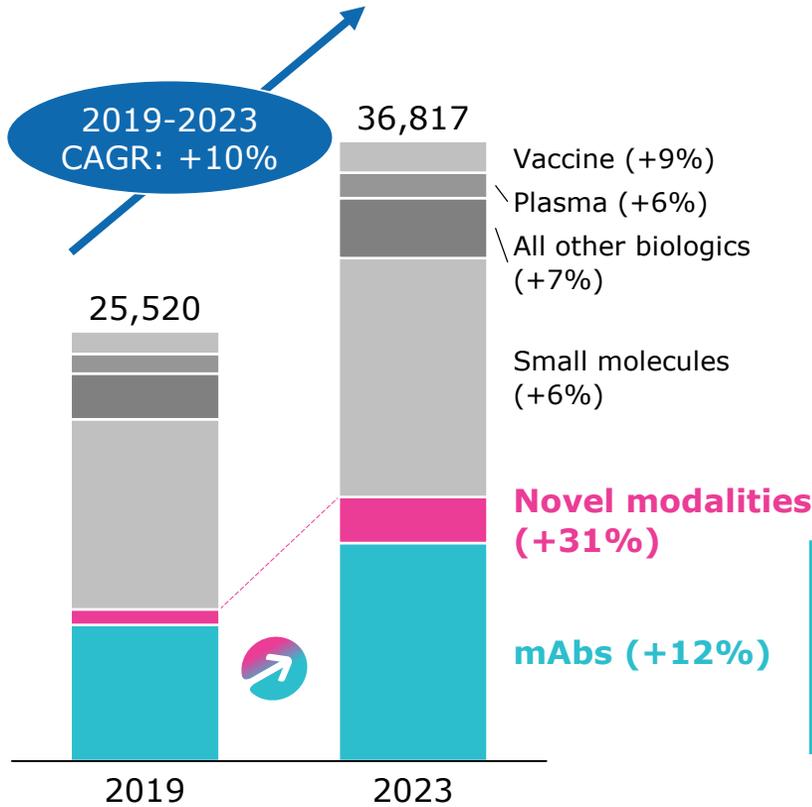
Market development

- Overall mAbs market will grow ~11-15% CAGR
- Top 10 originator mAbs represent ~60% of market volume today and will decline to ~20% in 2024
- Biosimilars will gain share



Process Solutions: Growth opportunities beyond mAbs

Growth potential by segment Accessible market [€m], 2019-2023 CAGR¹



- **Diversifying products and services** in line with the new modalities coming to the market: fusion biologics, viral and gene therapies, cellular therapies
- **Leading technologies:** investments over 15 years, 26 granted CRISPR patents
- **Services:** investments in CDMO capacity for Viral Vector Manufacturing, and HP-API
- **Leading technologies:** Single Use and BioContinuum™ for intensified and continuous bioprocessing
- **Services:** Contract manufacturing for biotechs at 3 global sites

Growth market - China



- **Half of world-wide early stage mAb market** by 2022
- **A leading country** in clinical trials
- **Increased investments** into Nantong and Wuxi manufacturing sites
- **China's first BioReliance® End-to-End Biodevelopment Center** opened in Shanghai in 2017

¹Evaluate Pharma market research; Novel modalities include VGT, Cell Therapy and Stem Therapy; Acronyms: CDMO = Contract Development and Manufacturing Organization, CRISPR = Clustered Regularly Interspaced Short Palindromic Repeats, HP-API = Highly Potent Active Pharmaceutical Ingredients ased on internal Life Science market research; TFF = tangential flow filtration



Broad offering across the dynamic cell and gene therapy value chain



Merck KGaA, Darmstadt, Germany offering

Develop **cutting-edge tools** for scientists to

- Uncover **foundational understanding**, e.g. CRISPR patent grants in 7 geographies
- **Modify** genetic functions, e.g. CRISPR/Cas 9 tools, library and reagents, ZFN

Create **cell lines and cell models** for testing **safety and efficacy**

- Pharmacokinetics (ADME)
- Toxicology testing
- Potency model
- Examples: primary human hepatocytes, Intestine, liver and kidney assays

- Offer cGMP clinical and commercial manufacturing, e.g. manufacture **viral vectors**
- Improve the **supply chain of cell therapy**, e.g. cell and gene therapy products and services

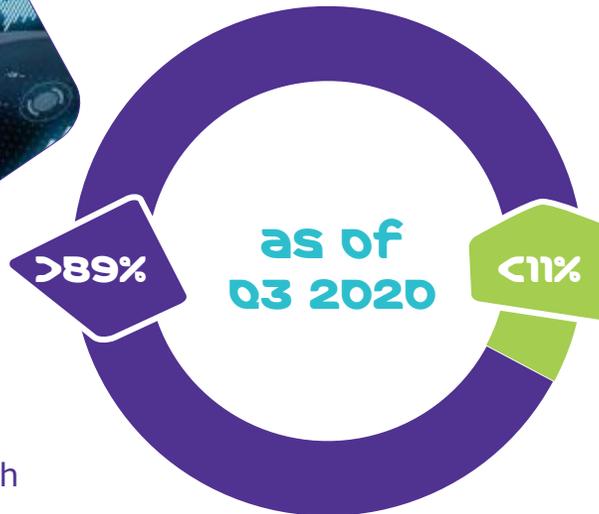
Merck KGaA, Darmstadt, Germany is a supplier of novel products and services with a strong IP portfolio to meet the rapidly growing demand for novel therapies

Performance Materials targets attractive markets – especially in the electronics space



- Driven by digital disruptions and megatrends such as digitalization
- Heterogeneous end-user applications
- Semiconductors as the engine of all electronic systems

Performance Materials sales by end market



- Driven by world GDP growth
- Increasing demand in emerging markets



- Driven by world GDP growth
- Rising living standards and higher disposable income

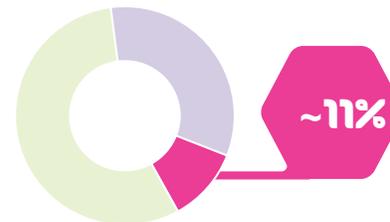
Performance Materials

Three high-tech pillars serving a diverse customer base

Business allocation within Performance Materials



% of sales¹



¹based on 9M 2020

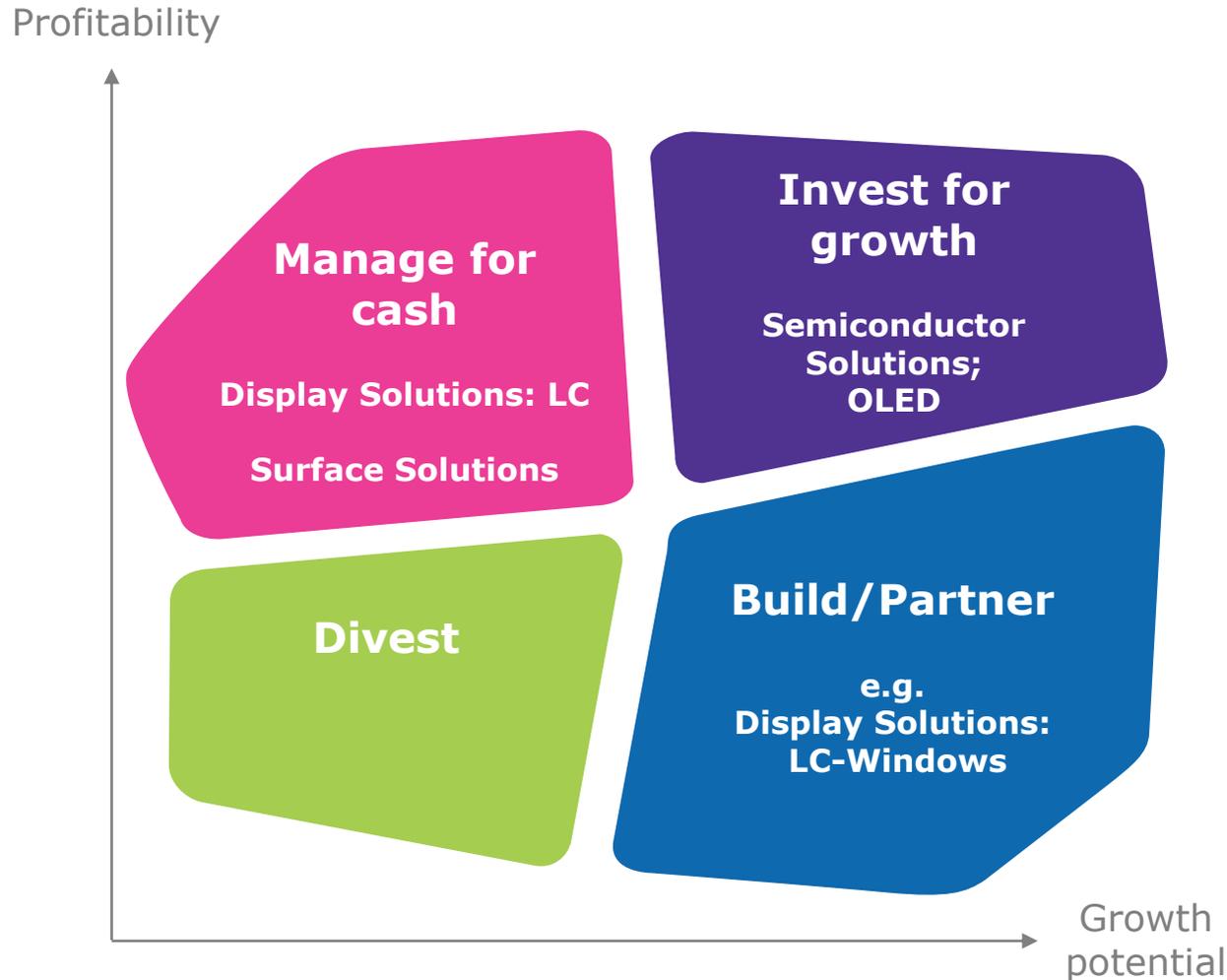
Products

- Dielectrics, colloidal silica, lithography materials, yield enhancers, edge-bead removers
- Polyimide raw materials, printing materials and specialty gases
- Delivery equipment for gas, chemicals and CMP slurries, installation services and parts & support
- Liquid crystals (LC) and photoresists for TVs, smartphones and tablet computers
- Other display and non-display applications (e.g. LC Windows)
- Organic and inorganic light emitting diodes
- Effect pigments and functional materials for coatings, plastics, printing and cosmetics
- Functional materials for cosmetics & special applications
- Functional materials for electronics and energy solutions



Performance Materials

Business portfolio management drives capital allocation and enables future value creation



Invest for growth

- Strong and sustainable market growth
- Leading positions and attractive growth opportunities

Manage for cash

- Mature and lucrative market segments
- Invest in extension, while managing for profit

Build or Partner

- Early industry cycles with strong potential
- Strictly prioritize and diversify risk

Divest

- Regular review for better strategic owner



Unique comprehensive products and services portfolio offers end-to-end solutions, well-placed in high growth segments



Steps of Merck KGaA, Darmstadt, Germany customers in manufacturing integrated circuits



Steps in Merck KGaA, Darmstadt, Germany's Delivery Systems & Services business

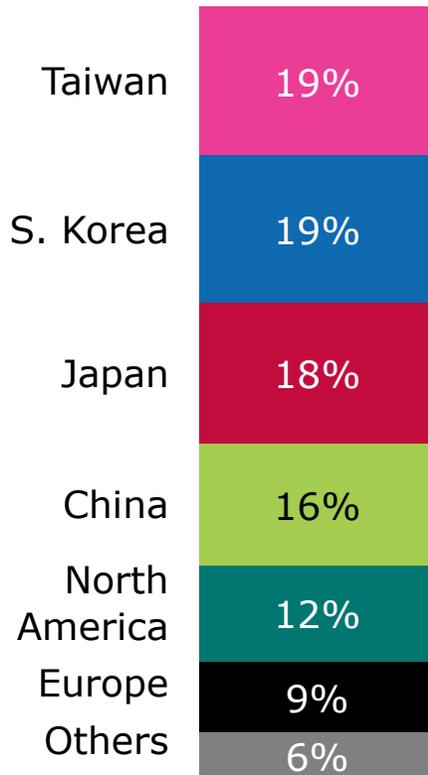


- Semiconductor Materials offering
- Delivery Systems & Services offering
- Intermolecular products & services



Beyond a comprehensive portfolio Semiconductor Solutions also has an industry spanning customer base, supplying various end markets

2019 wafer capacity by region¹



Selected customers per region²



Semiconductor Solutions has **OVER 100 CUSTOMERS** supplying all top 10 chip makers and virtually all of the top 100³

- Focus on logic chips
- Focus on memory chips
- Focus on other chips

¹SEMI World Fab Forecast Q3 2020 - Dec 2019 capacity,

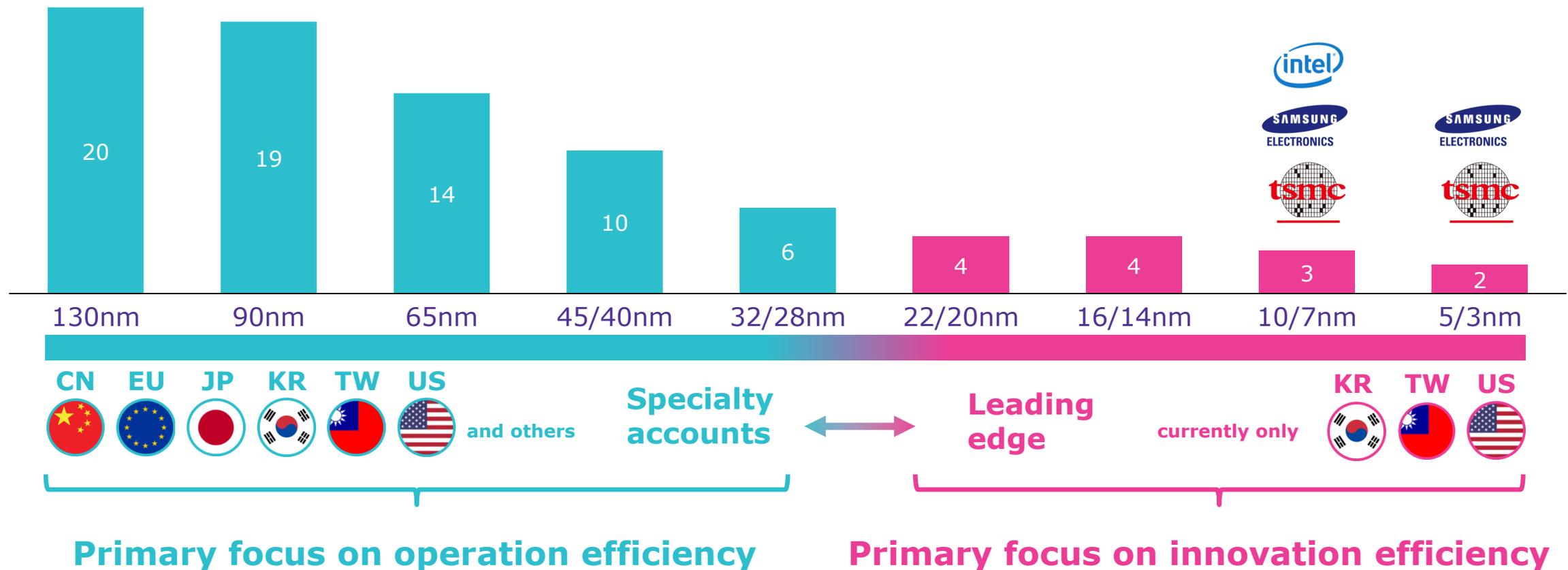
²Representative, non-exclusive list, not based on any underlying criteria

³Based on H1 2020 Sales



Only three companies are currently running volume production <7nm These companies have the largest market shares across all nodes

Number of companies currently running volume production per logic chip node¹



¹Source: Wikichip.org and own data; volume production as of Sep 2020; countries are listed in alphabetical order

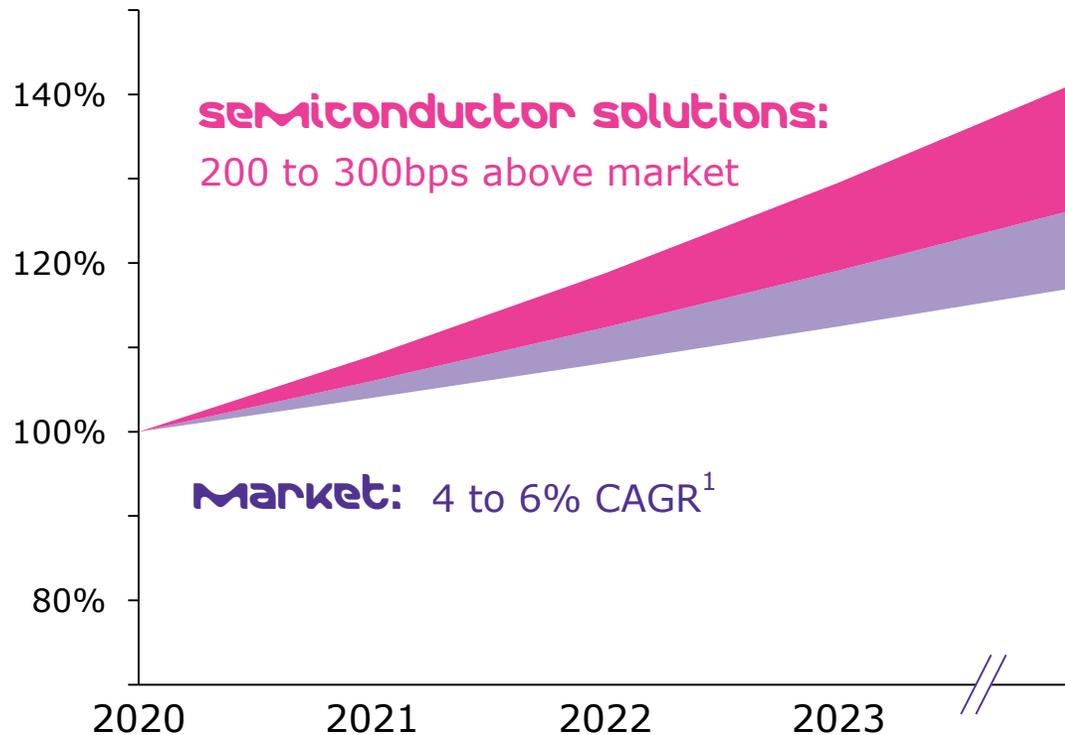


Semiconductor Materials

Set to outgrow highly attractive semiconductor materials market

Semiconductor Solutions sales guidance vs. market

[Indexed 2020 = 100%]



¹Source: Jan 2020 IC Insights 2018-2024 CAGR for wafer starts in million units

Market

- Technological trends inevitably drive **exponential data growth**
- More data requires **more chips** and **higher complexity of chips**
- **Rising materials value added** per wafer

SEMICONDUCTOR SOLUTIONS

- **Comprehensive offering** focusing on **attractive materials categories**
- Integration **topline synergies**
- **Critical mass** and deep **customer centricity**
 - Better customer understanding: know-how exchange and collaboration across **DS&S** and **Semiconductor Materials**
 - Cutting-edge innovation and **R&D capabilities**



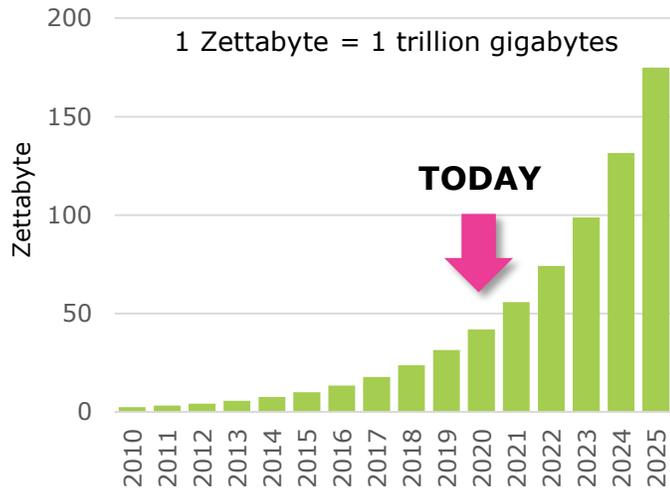
Technology trends inevitably drive exponential data growth... ...more chips needed to generate, transfer, process & store data

Data created worldwide
is growing +30% annually

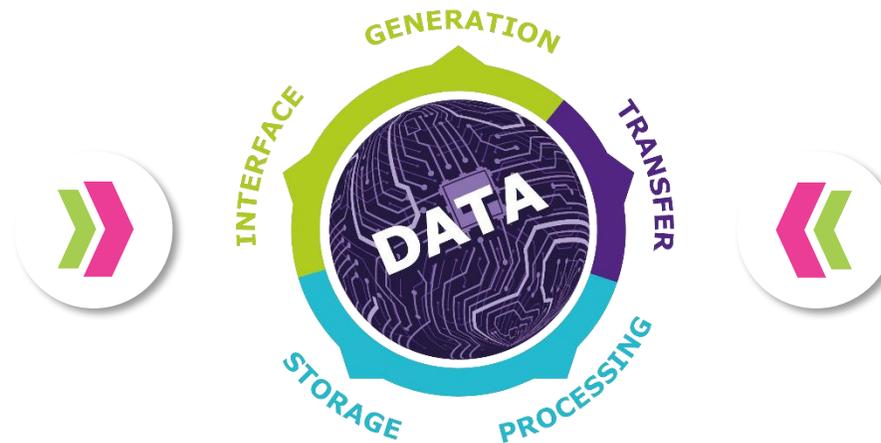
All segments of data application
are affected by global data growth

Technology trends strongly impact
relevance of data application segments

Size of global data sphere



Source: IDC DataAge 2025 Whitepaper



Technology market growth - examples

5G Technology¹
>122% CAGR

Artificial Intelligence²
>33% CAGR

IoT Sensors³
>24% CAGR

Data Center Services⁴
>13% CAGR

Autonomous Driving⁵
>18% CAGR

Semiconductor Solutions supports growth trend as part of “**the company behind the companies, advancing digital living**”

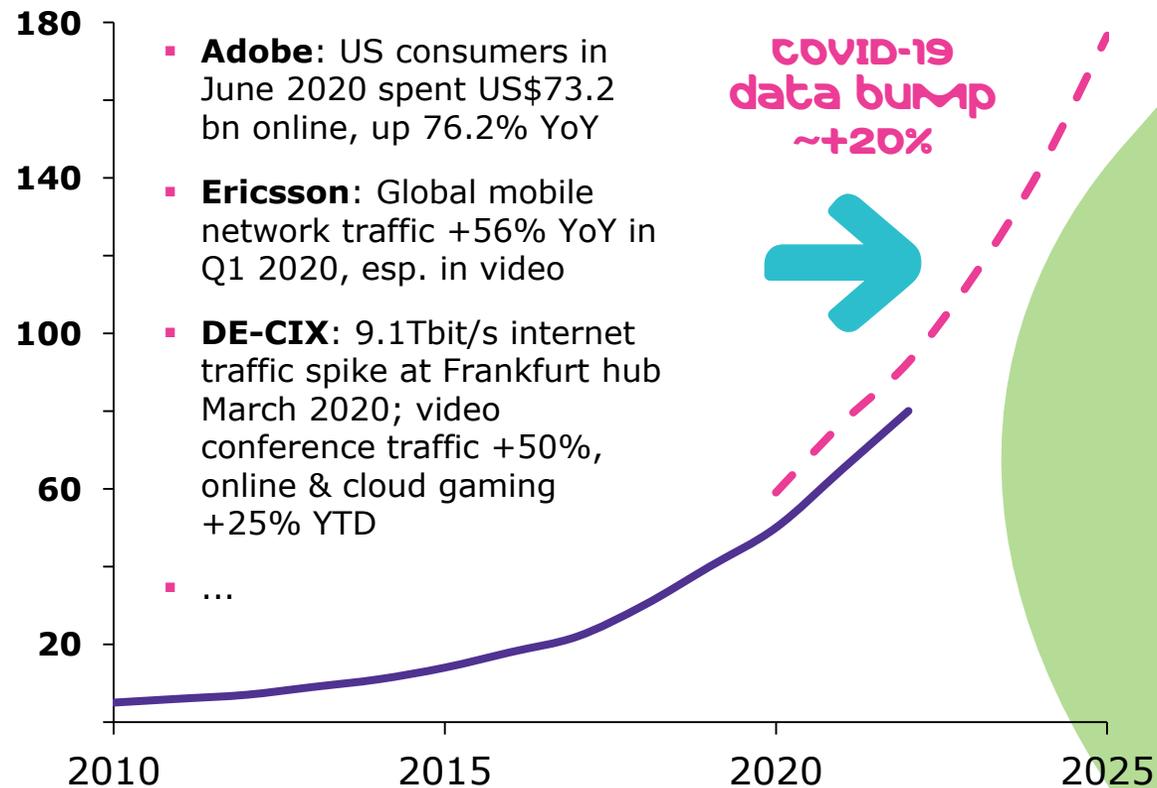
1) alliedmarketresearch.com, Prismark 2020, CAGR 2021-2026; 2) fortunebusinessinsights.com, post-gazette.com, CAGR 2018-2026; 3) mordorintelligence.com, computerweekly.com, CAGR 2020-2025; 4) mordorintelligence.com, Prismark 2020; CAGR 2020-2025; 5G = 5th-generation cellular wireless; IoT = Internet of Things 5) mordorintelligence.com, autonomous car market value CAGR 2020-2025



Semiconductor Solutions

COVID-19 has vaulted the “digital transformation” by ~5 years¹

Expected COVID-19 impact on global datasphere² [zetabytes]



COVID-19 impact on data growth expected to be positive

- 1 Work-from-home/stay-at-home economy
Significant increase in video conferences, online shopping, online gaming, streaming
- 2 Change in consumers' and enterprises' digital behavior expected to be long-lasting
- 3 Need for more, faster & more reliable data processing, storage and bandwidth
Acceleration of semiconductor demand

semiconductor solutions stands ready to support increased demand

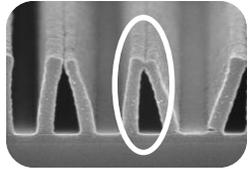
¹Source: McKinsey May 2020 “The COVID-19 recovery will be digital: A plan for the first 90 days”;

²Source: Seagate, IDC April 2020, Merck KGaA, Darmstadt, Germany

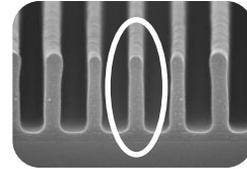


Expanding the limits of how small you can go

Pattern collapse

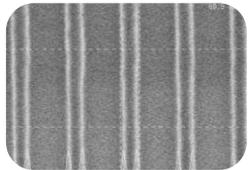


AZ® rinse materials



As lines get narrower and closer together in advanced chip generation, lines tend to “stick” due to surface tension.

Lithography limitation

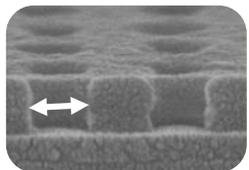


Directed self-assembly (DSA)

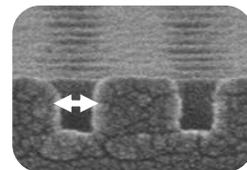


Block copolymer can generate small lines or contact holes by self-assembly. This allows miniaturization without expensive new equipment.

Wide features



AZ® shrink materials



Shrink materials “shrink” the gap between lines and, hence, allow the manufacture of narrower features otherwise not possible.



Merck KGaA, Darmstadt, Germany delivers highly innovative solutions for complex customer problems

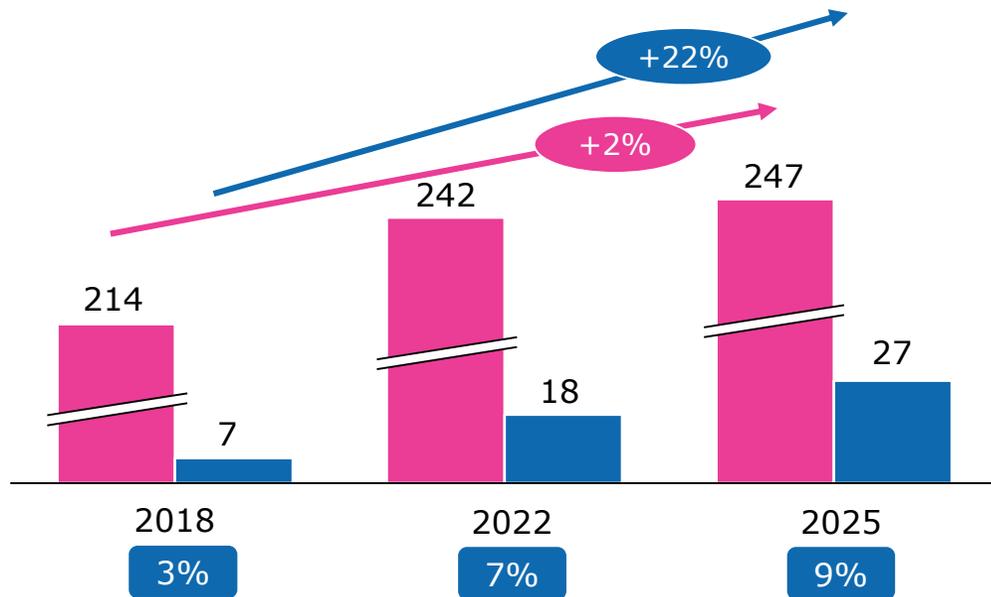


Performance Materials

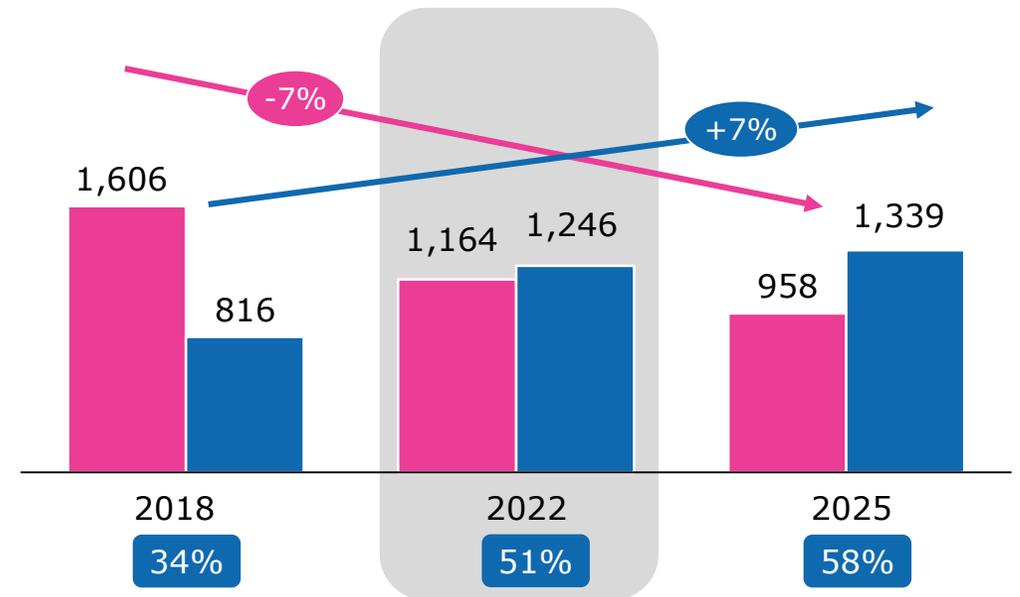
Display Solutions - OLED material market to exceed LC material market by 2022

x% OLED shipment area / addressable material market [in % of total] Liquid Crystals OLED

Display shipment area¹
[km²]



Addressable material market²
[€m]



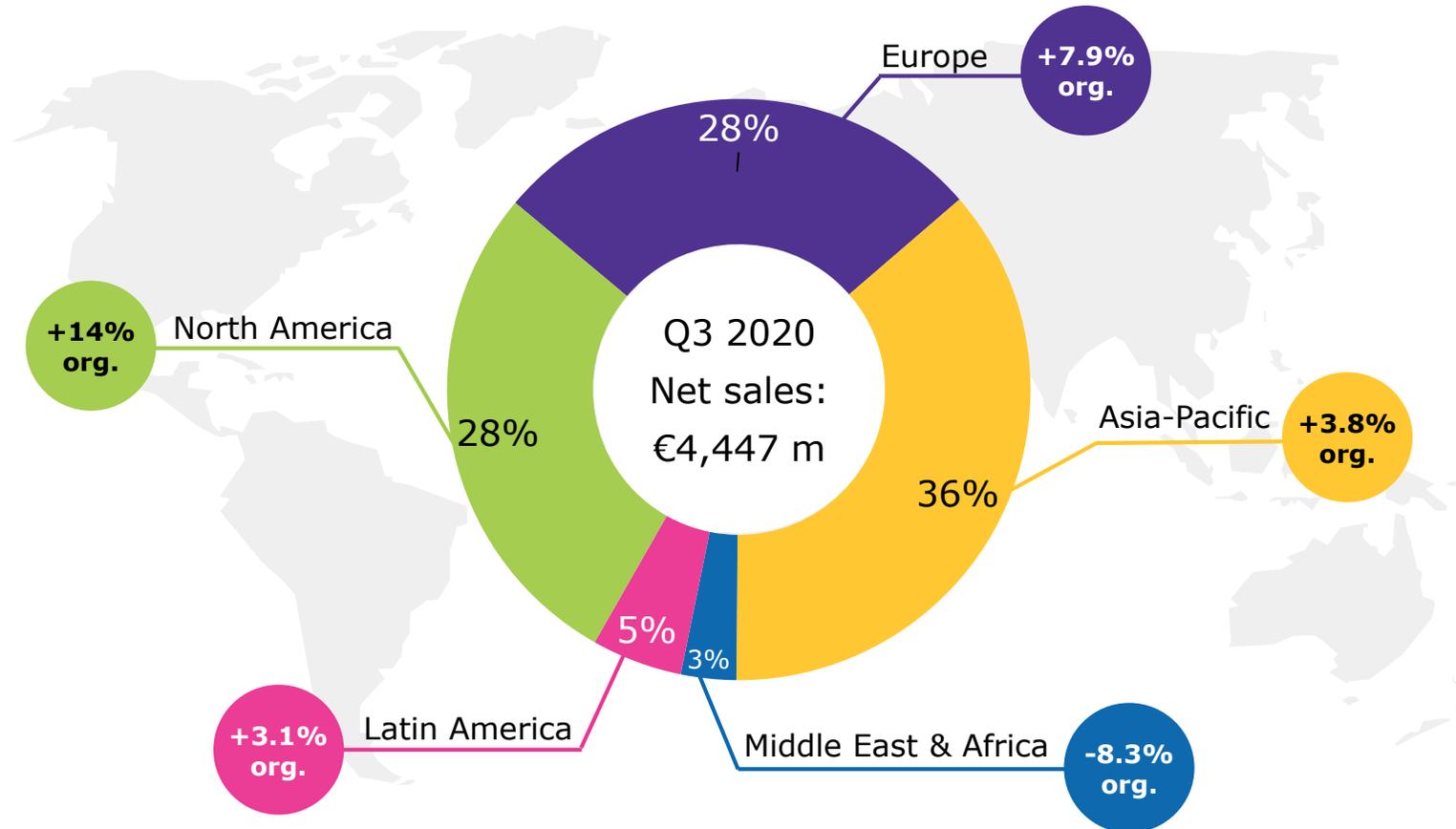
- **Continued growth** across all technologies
- **OLED growing faster than LCD**, but **LCD to command 90+% area share** for foreseeable future

- **Material value** per OLED display **higher** than in LCD
- **OLED material market to exceed LC material market by 2022**, but market split between **many more players**



Nearly all regions resumed growth despite persisting pandemic impacts

Regional breakdown of net sales [€m]



Regional organic development

- APAC: double-digit growth in Life Science and Semiconductor Solutions overcompensates for declines in Display, Surface Solutions and Fertility
- Europe: Neurology & Immunology as well as Research Solutions rebound
- North America: double-digit growth in Life Science, particularly strong in Process Solutions; strong Mavenclad[®] and Fertility; solid uptake of UC 1L
- LATAM resumed while Middle East & Africa now impacted, particularly by the effects of COVID-19 in Fertility

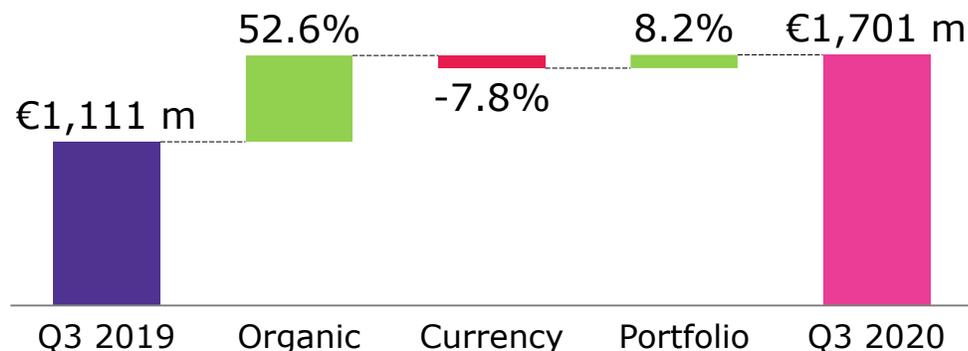
7% organic sales growth driven by swift recovery from COVID-19 in most businesses including “BIG 3” (HC pipeline, Process & Semi Solutions)

Q3 YoY Net Sales

	Organic	Currency	Portfolio	Total
Healthcare	3.2%	-5.1%	-1.2%	-3.1%
Life Science	15.6%	-4.2%	0.0%	11.3%
Performance Materials	-5.4%	-2.8%	51.6%	43.4%
Group	7.2%	-4.4%	6.9%	9.7%

- Healthcare back to organic growth with Mavenclad® rebounding (+72%), Bavencio growing strongly (+53%), General Medicine & Endocrinology slightly positive; Fertility back to pre COVID-19 levels
- Process Solutions underlying strength amplified by COVID-19 business with 27% organic growth; Research catching up post lockdown (+10%); Applied Solutions moderate growth (+4%)
- Semiconductor Solutions continues growth path with 8% organic increase; YoY decline in Q3 less than half of Q2 rate for Display and Surface Solutions, but COVID-19 still weighing on both

Q3 YoY EBITDA pre



- EBITDA pre grew 20% -i.e. approx. 3 times faster than sales with even excl. Biogen provision release and despite lower non-recurring income
- Cost discipline in all sectors further supported by reduced face-to-face activities amid pandemic
- Margin accretive Versum portfolio effect
- FX headwinds across most currencies with largest impact from USD, BRL and CNY



Healthcare: Organic growth based on a strong Q1 and a swift recovery in Q3 while EBITDA pre further elevated by €365 m Biogen provision release

Healthcare P&L

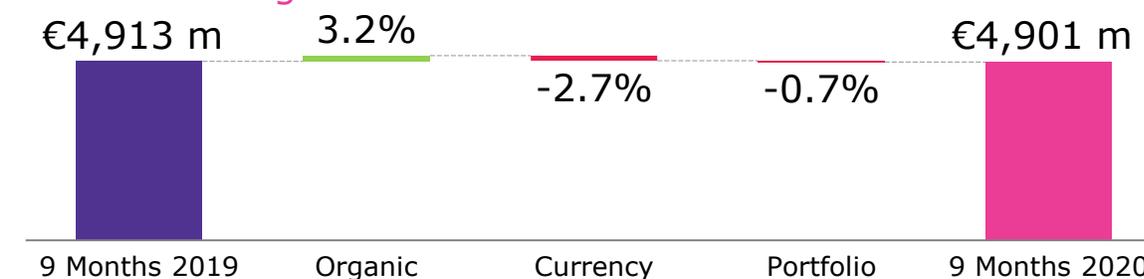
[€m]	IFRS		Pre	
	9M 2019	9M 2020	9M 2019	9M 2020
Net sales	4,913	4,901	4,913	4,901
M&S*	-1,710	-1,215	-1,708	-1,203
Admin	-254	-236	-248	-233
R&D	-1,204	-1,161	-1,203	-1,161
EBIT	798	1,499	804	1,491
EBITDA	1,355	1,752	-	-
EBITDA pre	1,361	1,742	1,361	1,742
(in % of net Sales)	27.7%	35.5%	27.7%	35.5%

Comments

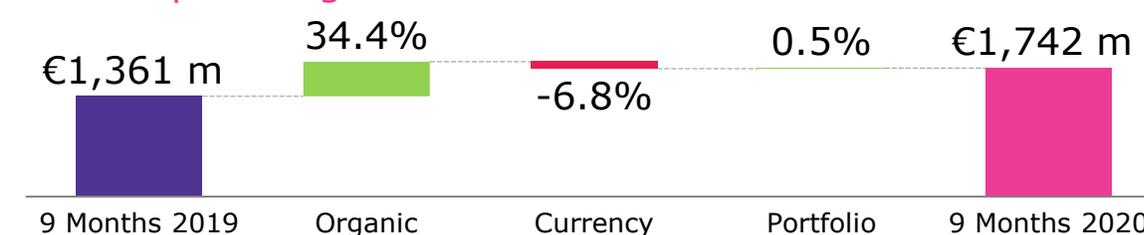
- Mavenclad® swiftly recovered from the dip in Q2, back to expanding dynamic shares in high efficacy and oral class; Rebif® above underlying trajectory with support from fewer switches amid pandemic
- Fertility back to pre COVID-19 levels as of Q3, but picture remains mixed across regions
- Erbitux® showing slight organic growth despite pandemic; Bavencio® starting to benefit from UC 1L launch in the U.S. and growing strongly versus last year (+53%) and QoQ (+41%)

* Marketing and selling expenses

Net sales bridge



EBITDA pre bridge



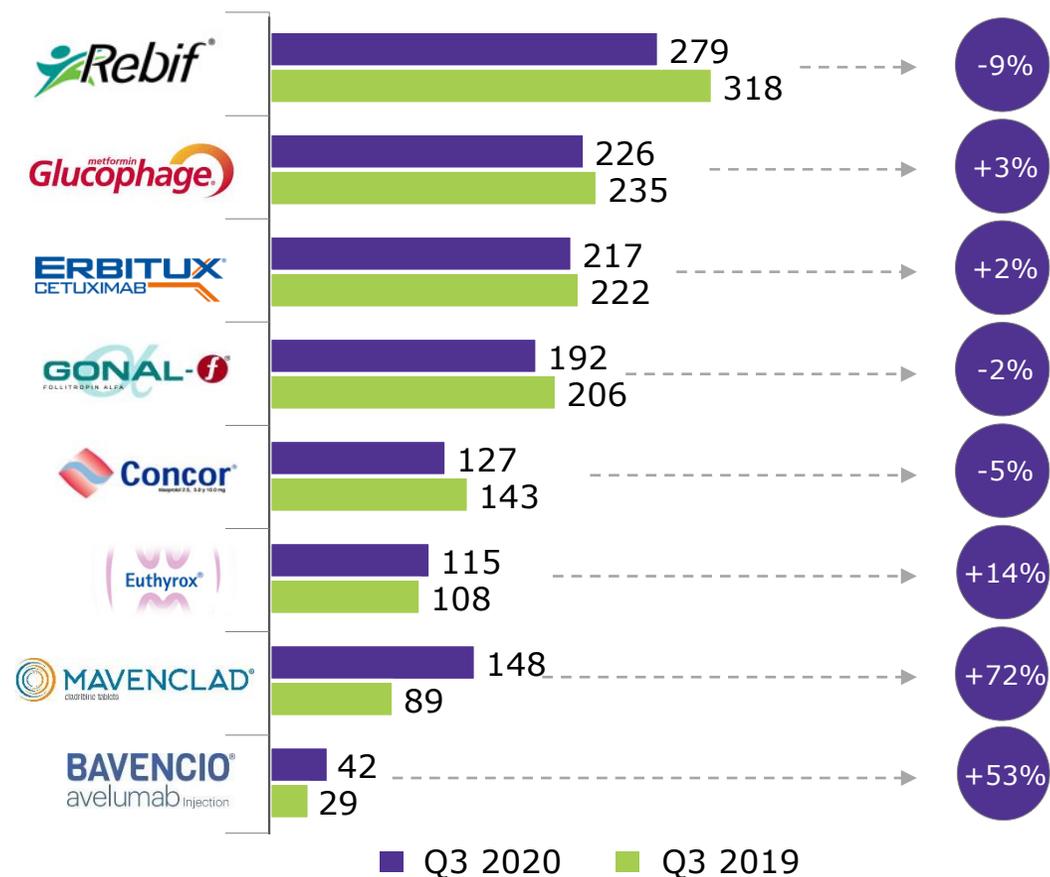
- M&S decrease due to rigorous cost management, further supported by reduced face-to-face activities during COVID-19 in parallel to appropriate expansion of digital activities; expired amortization of Rebif®
- Lower R&D reflects ongoing stringent cost control while maintaining focus on priority programs
- Underlying EBITDA pre margin of 28.1% further elevated by €365 m Biogen provision release to 35.5%

Totals may not add up due to rounding

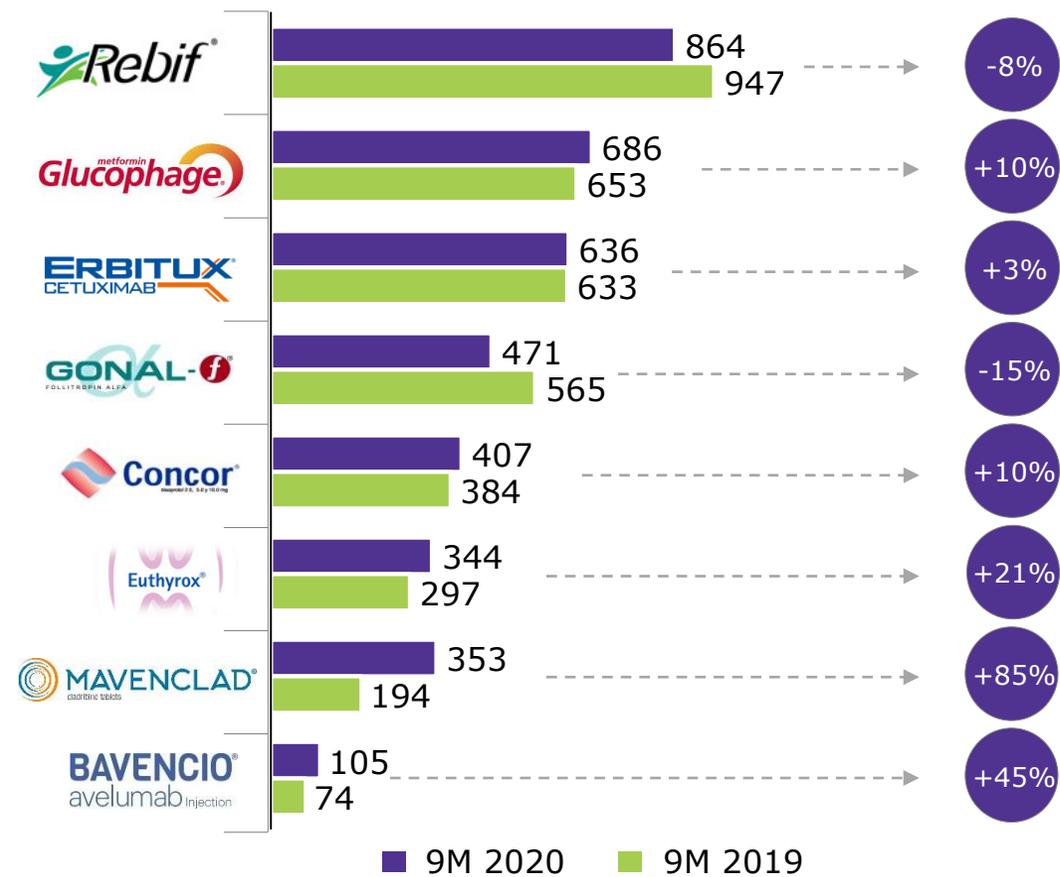


Healthcare organic growth by franchise/product

Q3 2020 organic sales growth [%]
by key product [€m]

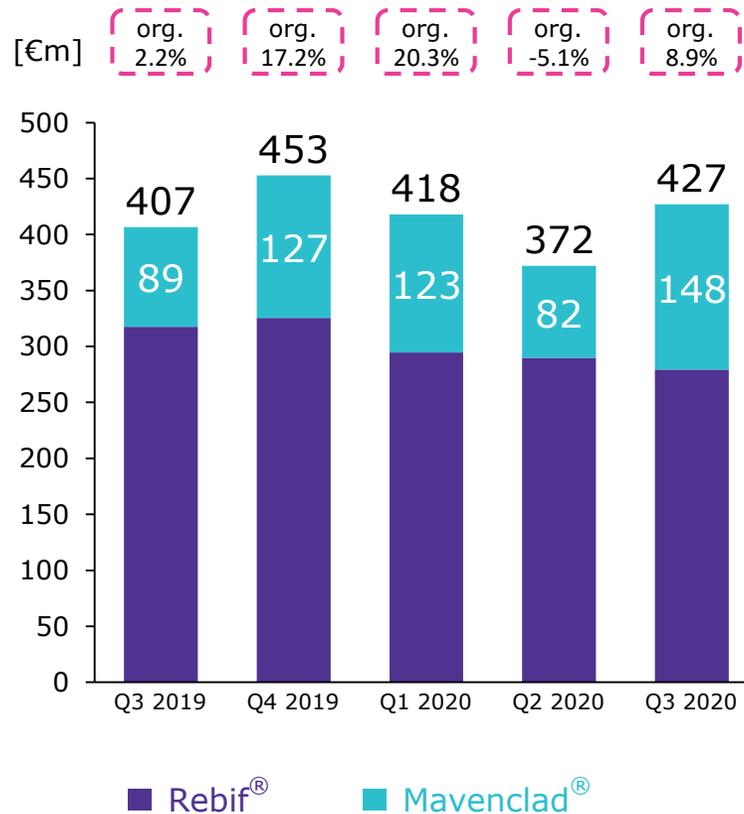


9M 2020 organic sales growth [%]
by key product [€m]



Neurology & Immunology: back to 9% organic growth in Q3 as Mavenclad[®] ramp-up clearly recovers starting June

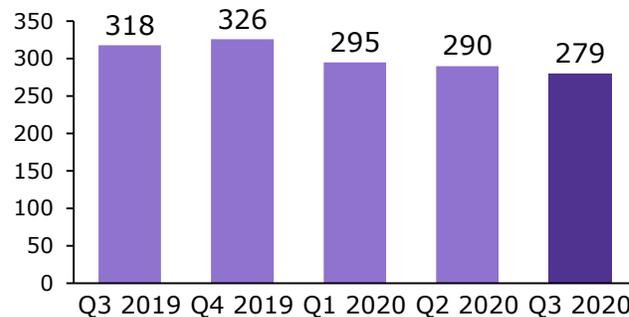
Sales development NDI, [€m]



Mavenclad[®] TRx¹



Rebif[®] net sales, [€m]



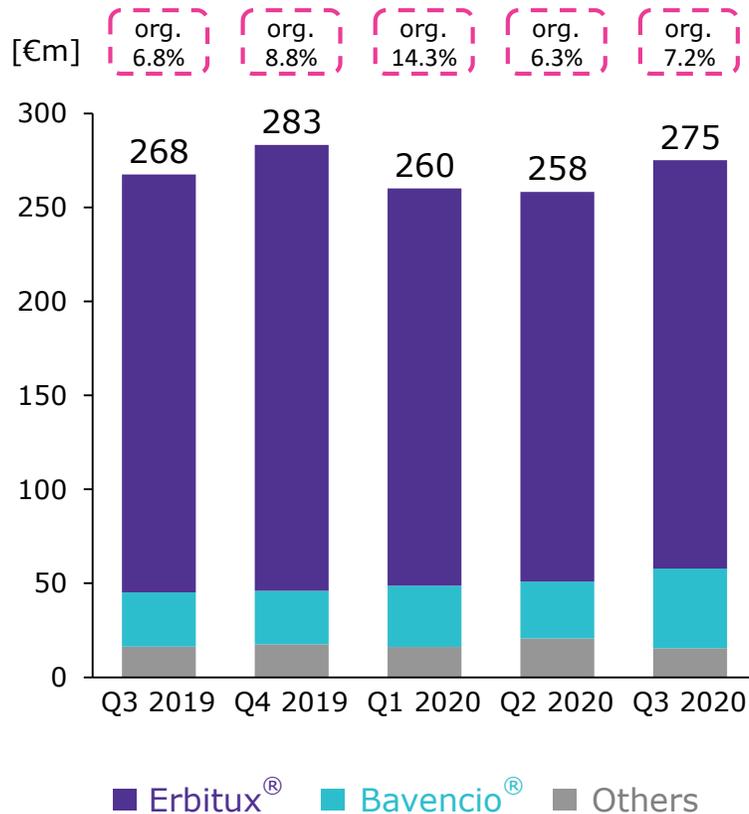
- **Highest quarterly sales since launch**
- **US: continued market share gains** in both dynamic high efficacy segment (+2%-points) and oral segment (+4%-points) throughout pandemic²
- Dynamic **volumes still depressed** post COVID-19

- Rebif[®] €279 m in Q3 remains above anticipated trajectory with -9% decline supported by lower switches amid pandemic
- FX headwinds of -3.5% largely from the U.S.

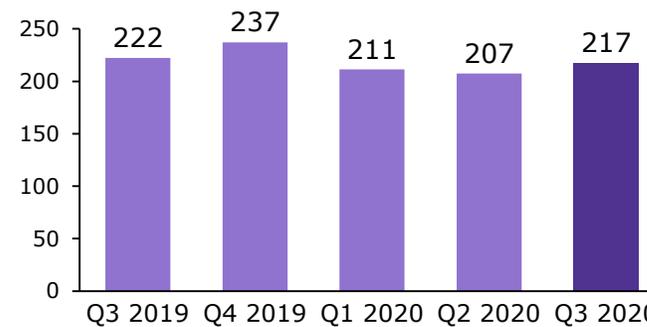


Oncology: Bavencio® showing strong YoY and sequential growth; Erbitux® also resilient, growing vs. Q2 and YoY during COVID-19 pandemic

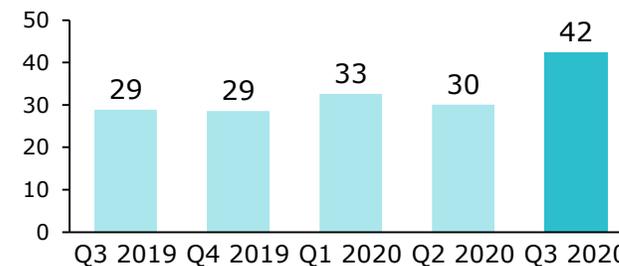
Sales development Oncology, [€m]



Erbitux® net sales, [€m]



Bavencio® net sales, [€m]



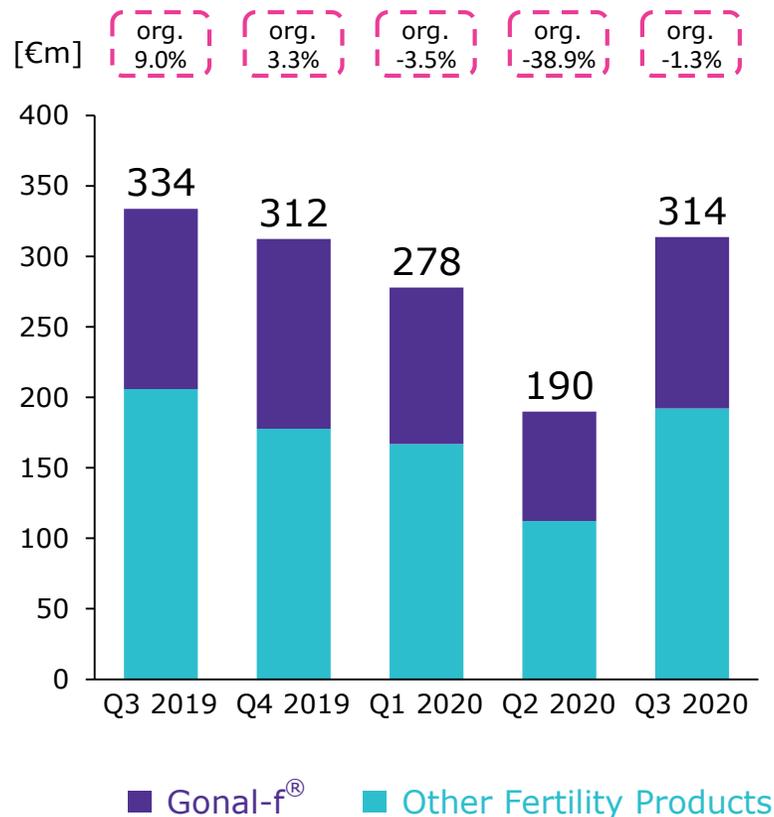
- Absolute sales of €217 m reflect resilient growth of 2% in Q3
- YTD growth at 3.4% driven by solid performance in China and emerging markets
- Overall limited negative impact from COVID-19

- Bavencio® up 41% sequentially vs. Q2
- UC 1L progressing very well in first three months of U.S. launch; strong foundation for 2021

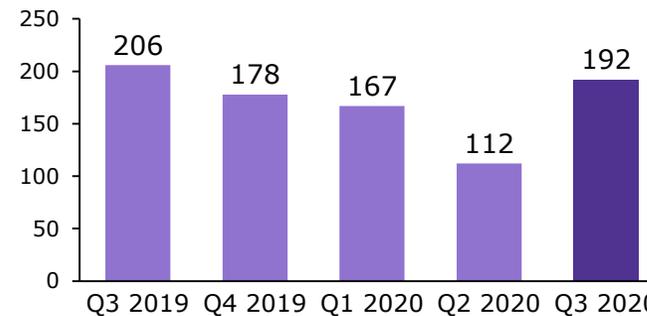


Fertility: visible recovery to pre COVID-19 levels across Fertility portfolio, however still differentiated picture across geographies during pandemic

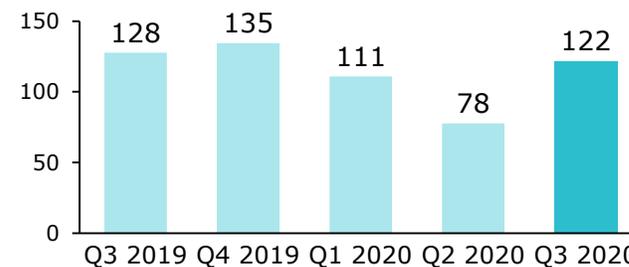
Sales development Fertility, [€m]



Gonal-f[®] net sales, [€m]



Other Fertility net sales, [€m]

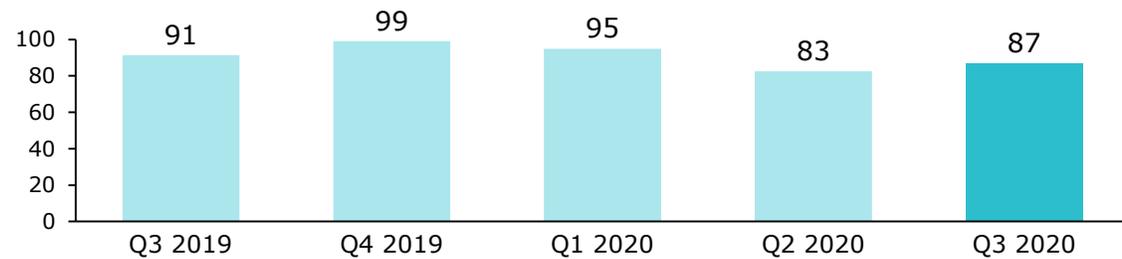


- In Q3 2020 Fertility portfolio broadly in line with particularly strong Q3 2019 sales
- YTD still 15% below 2019 as lost Q2 sales are not recovered based on differentiated picture across regions
- While North America is already growing YTD September, other regions are still catching up

General Medicine growing organically, Endocrinology up vs. Q2 2020 and flat vs. Q3 2019

Sales evolution

[€m] Endocrinology

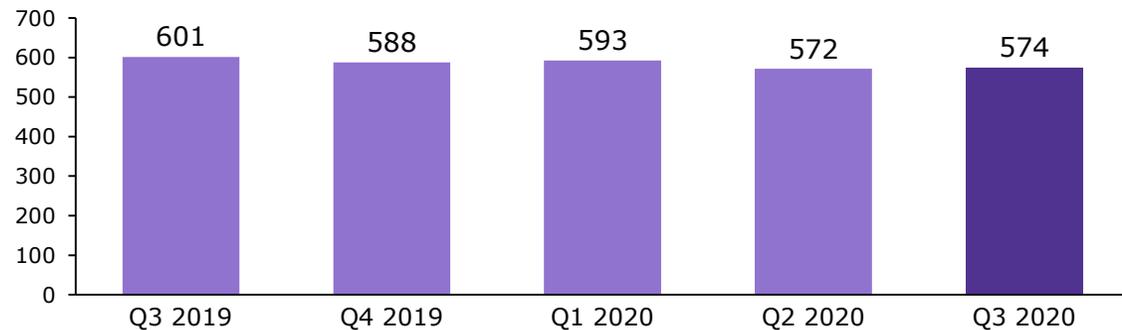


➔ Organic
-0.2% org.

Q3 2020 organic drivers

- Endocrinology impacted in the U.S. and to minor extent in Europe amid COVID-19 pandemic; stable to growing in other regions

[€m] General Medicine*



➔ Organic
+1.5% org.

- Concor® saw anticipated impact from VBP¹ in China
- Rest of portfolio more that offsets this leading to 1.5% organic growth in Q3

¹ Volume Based Procurement

*includes CardioMetabolic Care & General Medicine and Others



Life Science: Strong YTD performance with Process Solutions double-digit growth; Research & Applied recovering from COVID-19 impacts

Life Science P&L

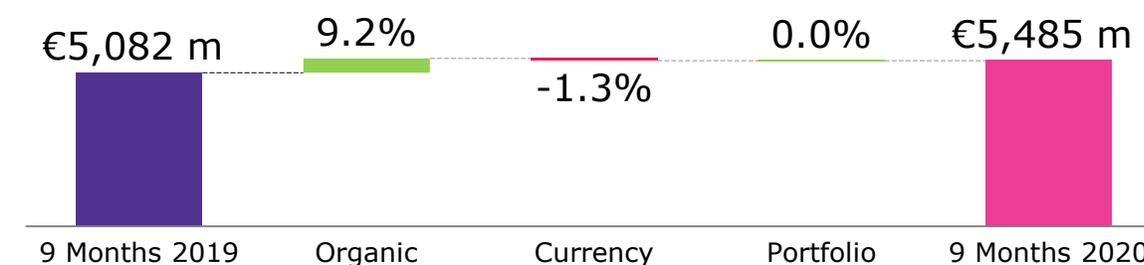
[€m]	IFRS		Pre adjustments	
	9M 2019	9M 2020	9M 2019	9M 2020
Net sales	5,082	5,485	5,082	5,485
M&S*	-1,434	-1,464	-1,432	-1,462
Admin	-239	-278	-228	-248
R&D	-199	-226	-198	-226
EBIT	951	1,148	995	1,162
EBITDA	1,536	1,737	-	-
EBITDA pre	1,580	1,752	1,580	1,752
(in % of net Sales)	31.1%	31.9%	31.1%	31.9%

Comments

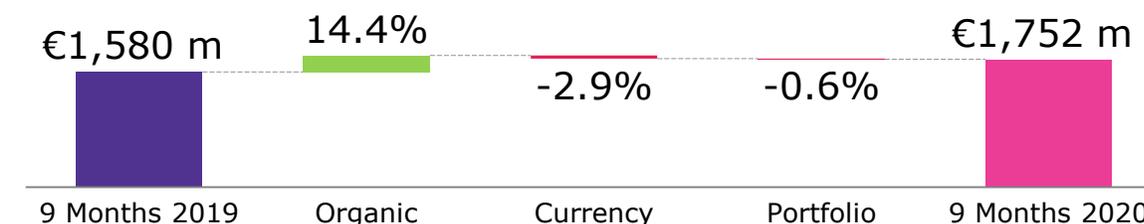
- Double-digit organic growth of Process Solutions mainly driven by downstream and single use, elevated by additional COVID-19 demand
- Research Solutions about stable due to recovery, partial catch-up and partial pull-in in Q3 after significant impact from lab closures in H1
- Applied Solutions back to moderate growth in Q3 but unable to recover lost H1 sales from COVID-19 impact
- Cost-consciousness and lower travel expenses partially offset increased

* Marketing and selling expenses

Net sales bridge



EBITDA pre bridge



- freight cost in M&S
- Admin increase driven largely by COVID-19 related cost for additional safety precautions, however below sales growth
- Investments in strategic projects in R&D
- Outstanding operational leverage in Q3 temporarily boosts EBITDA pre margin close to 32%

Totals may not add up due to rounding



Performance Materials: Versum portfolio effect and continued organic Semiconductor growth far outweigh declining Display and Surface

Performance Materials P&L

[€m]	IFRS		Pre adjustments	
	9M 2019	9M 2020	9M 2019	9M 2020
Net sales	1,776	2,550	1,776	2,550
M&S*	-193	-402	-187	-398
Admin	-78	-121	-69	-110
R&D	-194	-205	-172	-206
EBIT	293	162	374	355
EBITDA	488	697	-	-
EBITDA pre	560	778	560	778
(in % of net Sales)	31.6%	30.5%	31.6%	30.5%

Comments

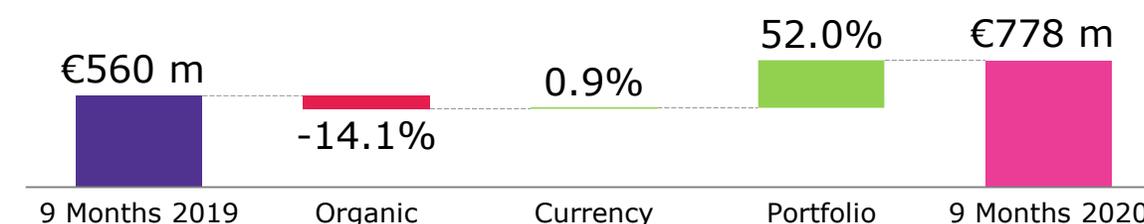
- Sales growth of 44% mainly due to portfolio effect from Versum overcompensates organic decline in Display and Surface
- Semiconductor Solutions: persistent strong organic growth
- Display Solutions: COVID-19 impact eased somewhat in Q3 but still weighs on LC's negative underlying trajectory particularly against still elevated comps in 9M 2019; OLED also impacted YTD
- Surface Solutions: heavy COVID-19 impact on automotive and cosmetic

* Marketing and selling expenses

Net sales bridge



EBITDA pre bridge



end markets resulting in business decline

- M&S and Admin reflect consolidation of Versum acquisition and diligent underlying cost management as part of the Bright Future transformation
- R&D 9M 2020 include Versum consolidation and show underlying Bright Future cost management
- EBITDA pre growth driven by additional gross profit from Versum

Totals may not add up due to rounding



Cash flow statement

9M 2020 – cash flow statement

[€m]	9M 2019	9M 2020	Δ
Profit after tax	1,002	1,553	551
D&A	1,391	1,442	51
Changes in provisions	134	-294	-428
Changes in other assets/liabilities	14	-75	-89
Other operating activities	-46	0	46
Changes in working capital	-330	-437	-107
Operating cash flow	2,166	2,189	23
Investing cash flow	-1,408	-1,242	167
thereof Capex on PPE	-561	-769	-208
Financing cash flow	2,175	-141	-2,315

Cash flow drivers

- Higher EBIT
- Higher depreciation & amortization from Versum PPA and impairments in PM
- Changes in provisions reflect reduced litigation provisions and fluctuations in LTIP*
- 2019 changes in other assets and liabilities elevated by GSK upfront, and milestone payments
- Increased working capital from growing receivables and higher inventories to secure supply in the face of COVID-19
- Financing cash flows returning to normal levels post Q3 2019 financing measures



Group

Regular portfolio review remains key to success

strong track record

- Acquisitions and divestments are part of our history
- Licensing and partnerships remain on our agenda
- All prior transactions earned their cost of capital



defining portfolio guard rails

- Three strong pillars with no business marginalized
- Leading market position in attractive markets
- Focus on innovation and sustainability through science and technology



clear financial M&A criteria

- Supporting profitable growth strategy
- $IRR > WACC$
- EPS pre accretive
- Maintain investment grade rating



Current set-up is strong and organic investment opportunities are attractive

Expect to regain financial flexibility by 2022 to pursue external growth opportunities

Targeted and more regular bolt-on approach more likely than large transformative deals

Adjustments in 9M 2020

Adjustments in EBIT

[€m]	9M 2019		9M 2020	
	Adjustments	thereof D&A	Adjustments	thereof D&A
Healthcare	5	0	-8	2
Life Science	44	0	15	0
Performance Materials	81	8	194	112
Corporate & Other	58	0	56	0
Total	188	8	256	114

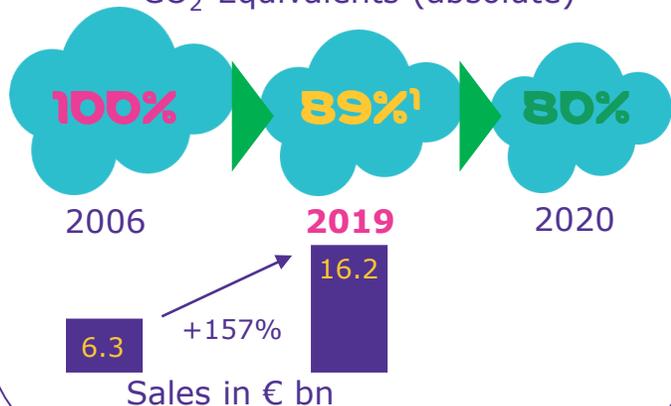
Environmental Targets until 2020

Emissions, Water, Waste reduced despite growing business

Emission-Target:

- Growth-independent reduction of Group's greenhouse gas emissions of **20% until 2020** vs. 2006
- Despite sales growth of 137% 2006 vs. 2018 we achieved a 11% reduction of CO₂ equiv.
- We still confirm our goal for 2020 expecting positive impact from latest initiatives, e.g. process optimizations and change to renewable energy

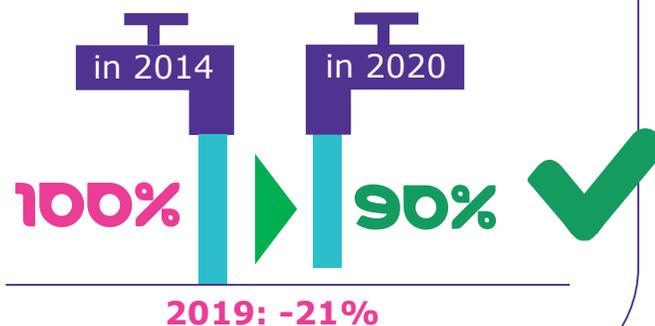
CO₂-Equivalents (absolute)



Water-Target:

- At 24 sites with relevant water use in areas of high water stress we aim to cut water consumption by **10% until 2020** vs. 2014
- 2018, we lowered our water consumption by 11% resulting from sustainable water management and re-usage
- All pharmaceutical manufacturing facilities have wastewater treatment plants

Water consumption in water stress areas



Waste-Target:

- We reduce waste and recycle as much as possible - we aim to reduce the environmental impact of our waste by **5% until 2025** compared to 2016
- The Company Waste Score allows us to compare the amount of waste our sites are producing
- We ensure that raw materials are recycled and that unrecyclable waste is discarded

Merck KGaA, Darmstadt, Germany Waste Score



Sustainability Rankings

External stakeholders value our engagement



MSCI rated us AAA (Leader) according to its exposure to ESG risks and how well they manage those risks relative to peers.



Sustainalytics put us among the **leading pharmaceutical companies**



Since 2008, we are part of **FTSE4Good Index**, measuring the performance of companies with strong ESG practices (Top 15).



In 2020, **ISS Oekom** rated us a "B-" rating which means we have once more achieved **prime status**.



In 2019, our share was again **included in STOXX Global ESG Leaders Index**, a sustainability index based on key environmental, social and governance criteria.



We have been **reconfirmed** as a constituent of the Ethibel Sustainability Index (ESI) Excellence Europe since May 2020, based on VigeoEiris.



We received **Platinum** status in 2020, among the **top 1% of companies**.

EcoVadis annually examines ~60,000 suppliers from 155 countries.



Participation in CDP (formerly Carbon Disclosure Project) since 2008.

CDP Climate: In 2019, we scored "C" (2018: C).
CDP Water: In 2019 we received a "B" (2018: B-).



In the **2018 Access to Medicine Index** we maintained **4th place**. The ranking appreciates our initiatives e.g. the commitment to open innovation.



Financial calendar

Date	Event
March 4, 2021	FY 2020 Earnings release
April 23, 2021	Annual General Meeting
May 12, 2021	Q1 2021 Earnings release
August 5, 2021	Q2 2021 Earnings release
November 11, 2021	Q3 2021 Earnings release



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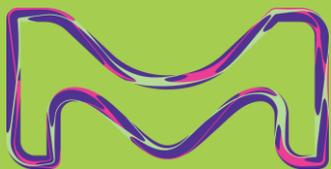


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