Q3 20 Roadshow

Merck KGaA, Darmstadt, Germany

Investor Relations

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Agenda

Business overview

01

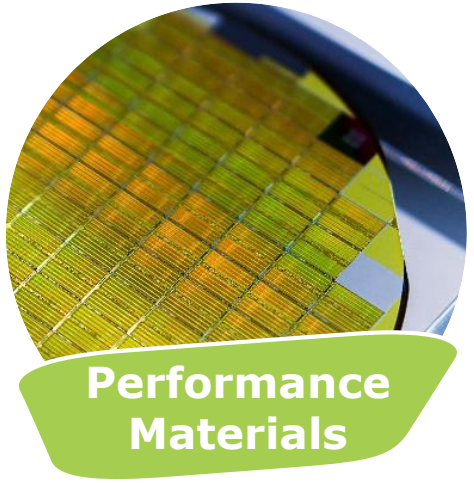
Group
Three high-tech businesses competing in attractive markets

Leading in specialty pharma markets

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

Leading life science company

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



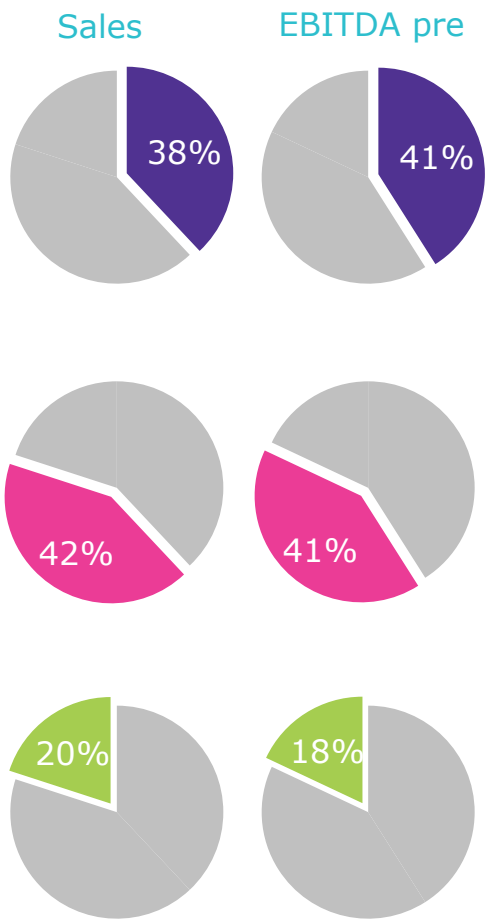
Leading company in high-tech solutions

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

Group

Group today – three strong pillars as basis for profitable growth

9M 2020 contribution to



1. Healthcare

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

2. Life Science

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

3. Performance Materials

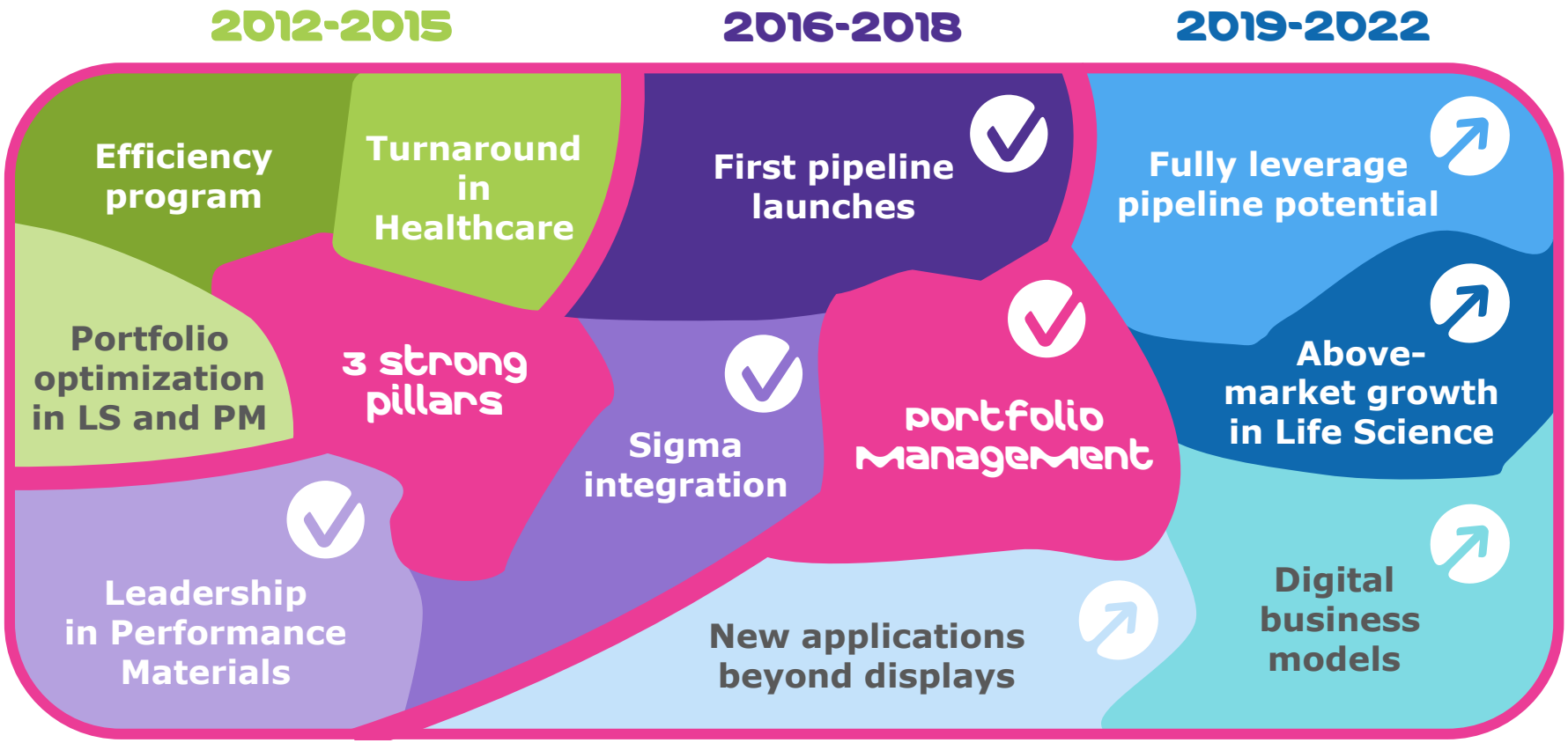
Leading electronics player poised for accelerating growth

- **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

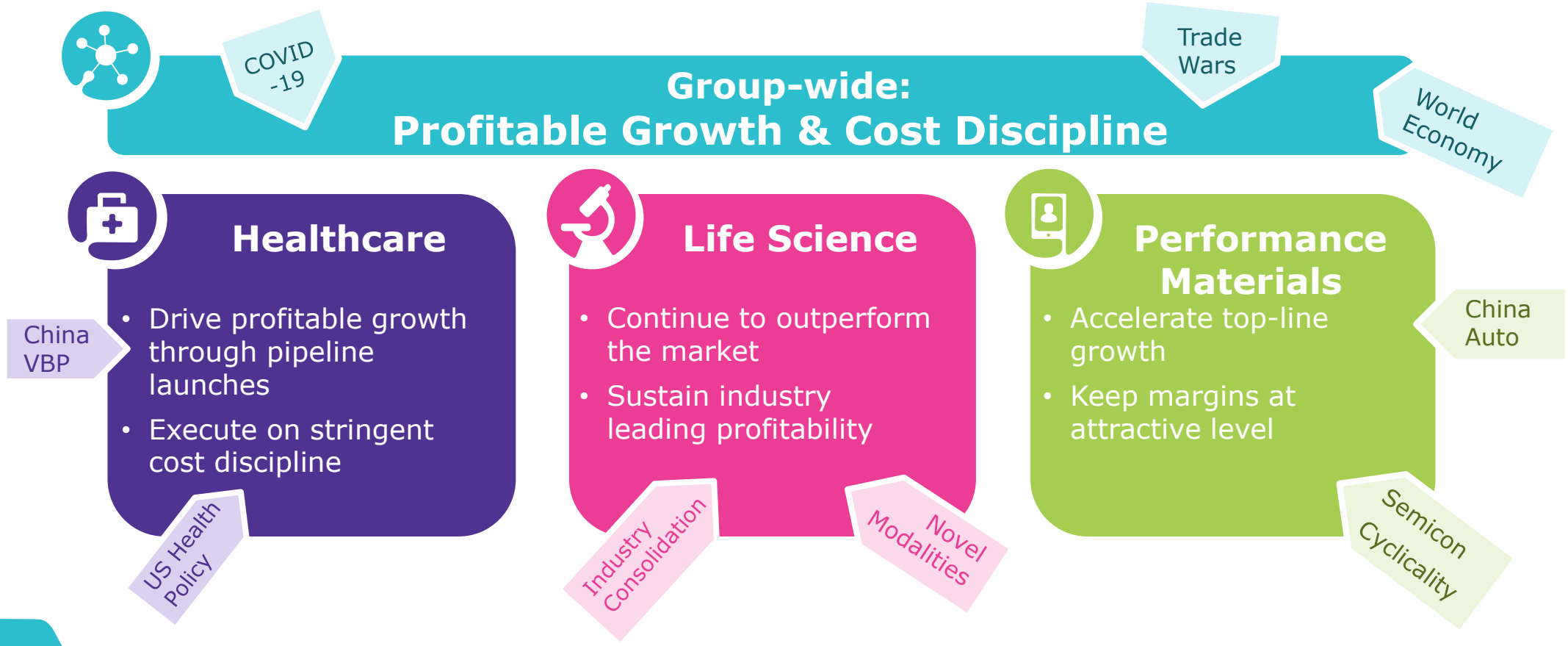


Executing on the growth and expansion phase of the 2016-22 strategic agenda

✓ = delivered; ↗ = well on track

Group

2021 and beyond – poised for growth in a challenging environment



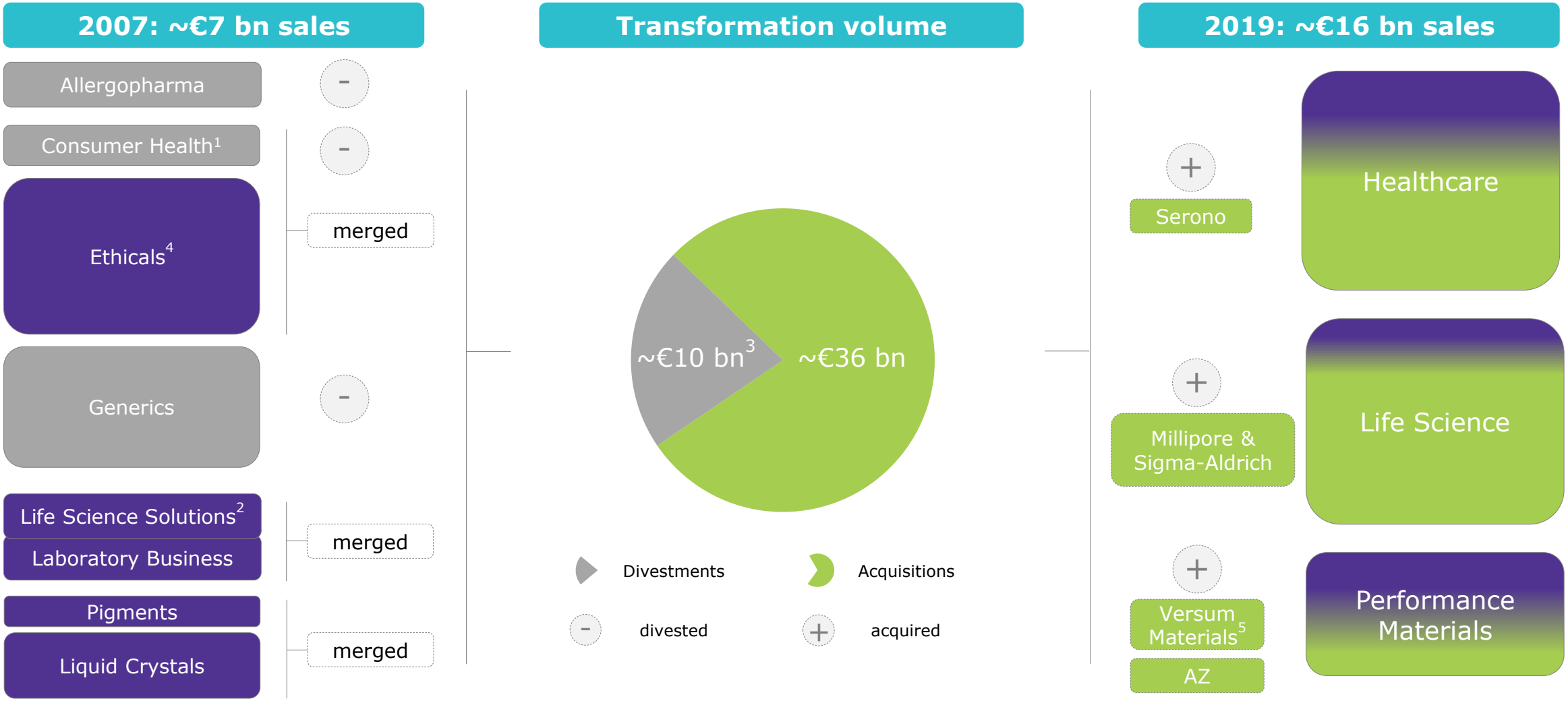
Acronym: VBP = volume based procurement

02

transforming the company

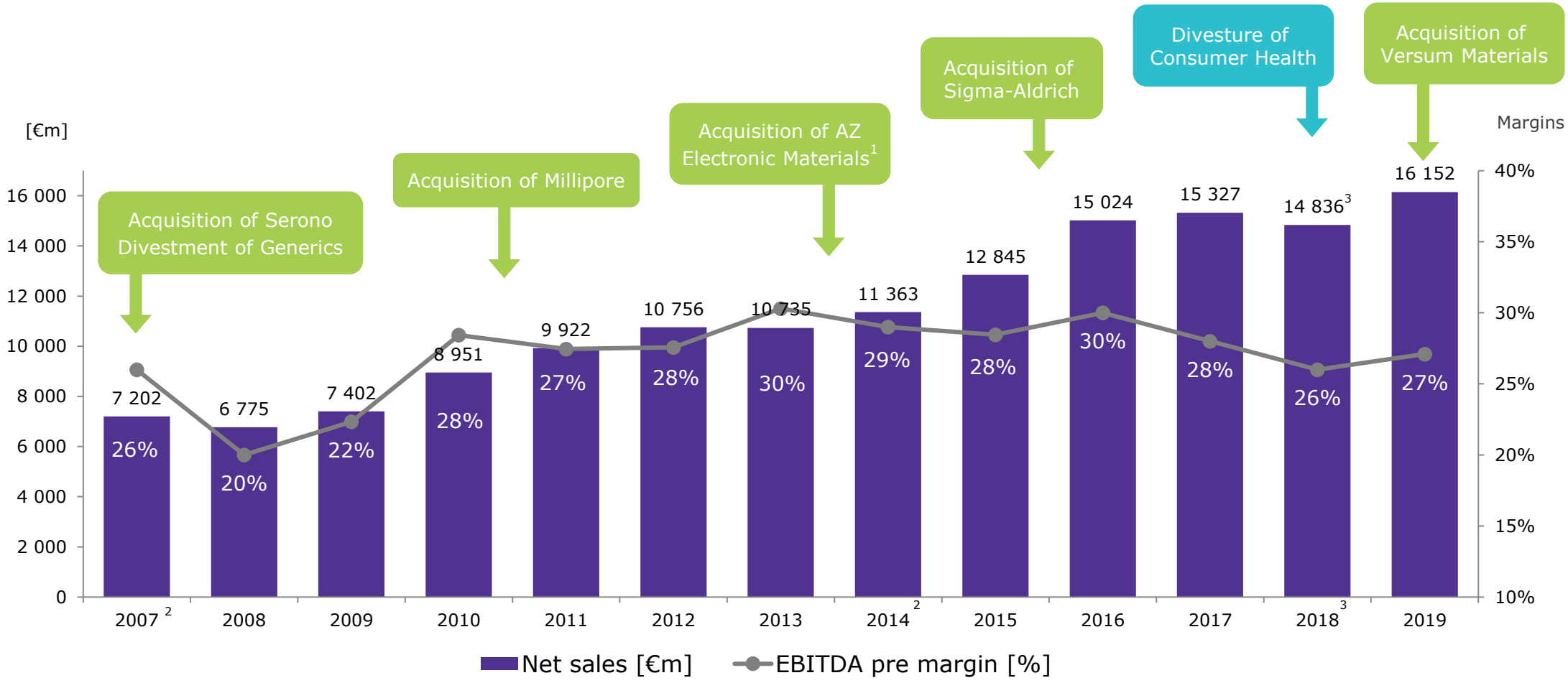
Group

We have added scale and strengthened the attractiveness of our portfolio



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

Continue to transform to a science and technology focused company



[1]Included since 2 May 2014; [2]2007 and 2014 EBITDA pre margin adjusted for comparability; [3]2018 net sales reflect Consumer Health divesture (reduction of ~€1 bn net sales p.a.)

Group

All three business sectors delivering on their strategic priorities

Healthcare

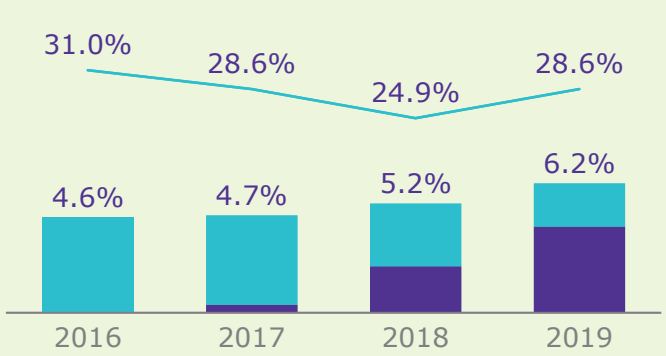
- **Accelerating organic growth** with rising contribution from launches (Mavenclad®, Bavencio®)
- **Margin trough behind, pipeline progressing** well

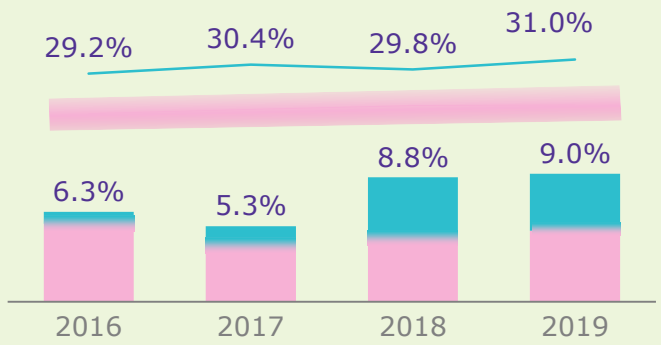
Life Science

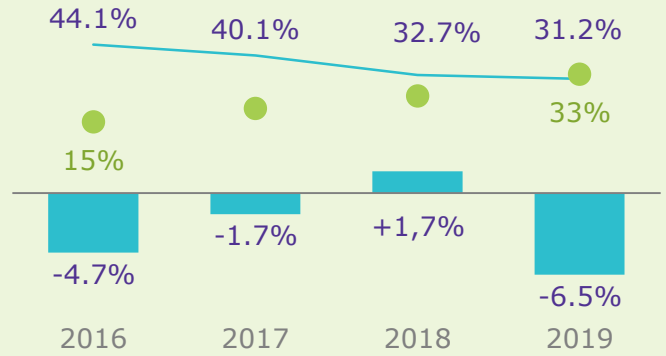
- **Above-market organic growth** paired with **industry-leading margin**
- Significant **growth investments** (organic, inorganic & partnerships)

Performance Materials

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







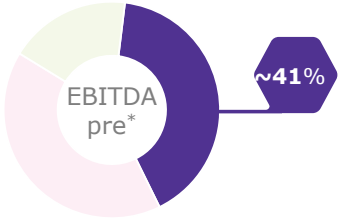
EBITDA pre margin | org. sales growth | new product share (pp.) | Industry margin avg.[1] | Market growth[1] | Semi. Solutions as % of PM sales

[1] Company estimate based on industry data and reporting by peers

Group

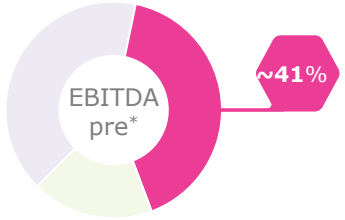
Clear set of priority goals

Healthcare



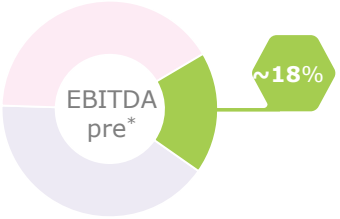
- **Deliver on ambition to keep core business at least stable until 2022**
- **Transition from investment to earnings phase by 2019**
- **Foster successful Bavencio® and Mavenclad® ramp up**
- **Stringent pipeline execution**

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

Group

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

Global economy[1]

Global GDP

~3% to 4%

End markets[1]

Global pharma industry
~4% to 5%

Global life science industry
~5% to 6%

Global electronics industry
~4%

Σ ~4% to 5%

Focus market areas[1]

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

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

Semi materials: ~4% to 6%

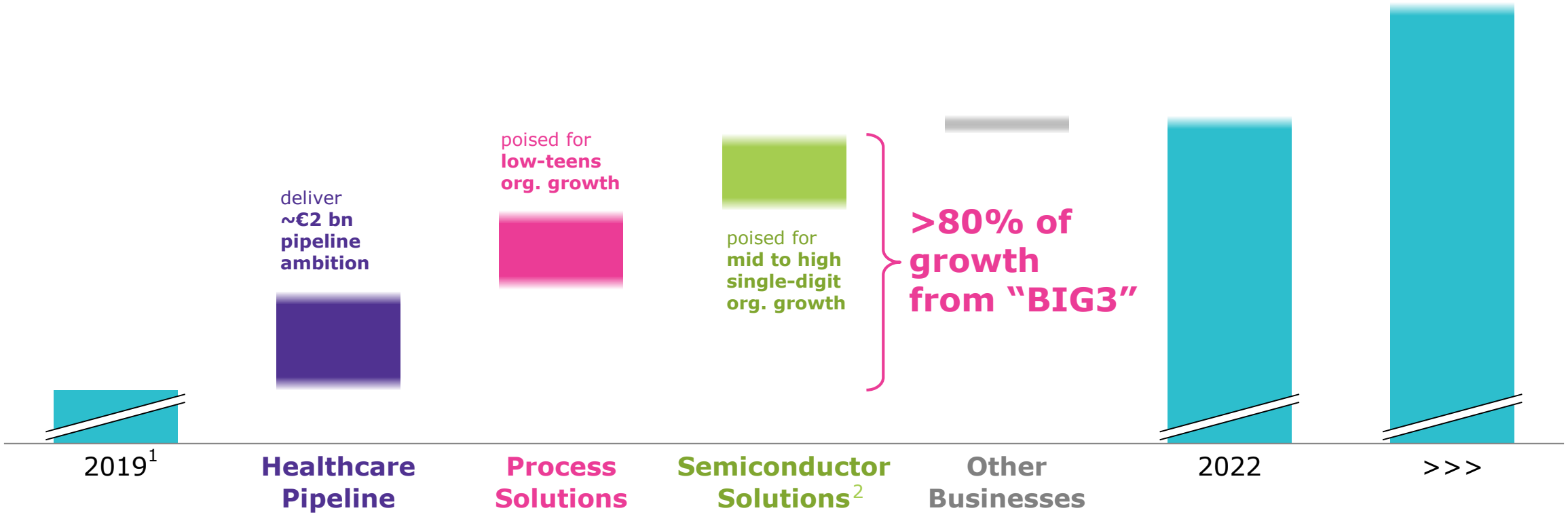
Σ 6%-plus

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

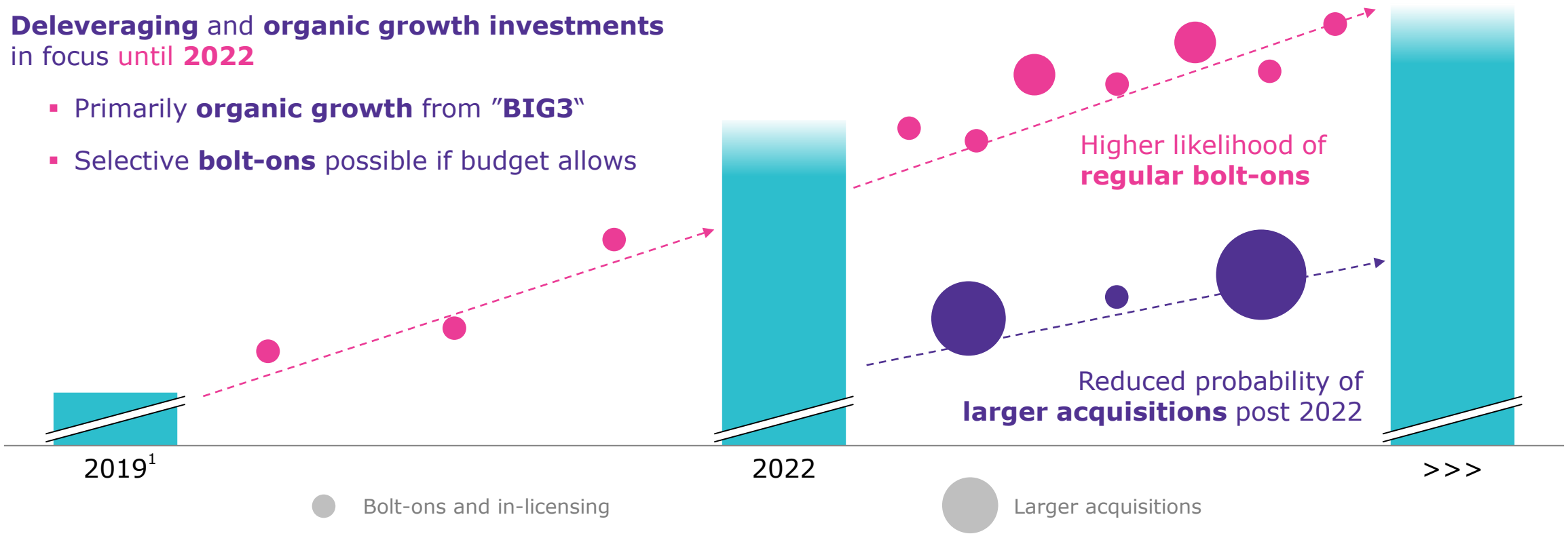
[1] 2019 Group sales of €16.2 bn; [2] Including Versum portfolio effect

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

Funding for success

03

Healthcare

Creating optionality through focused pipeline approach

Pipeline and launch progress supported by strong core

Pipeline quality

- Early stage pipeline fueled by **in-house innovation**
- Potentially **transformative late-stage pipeline** assets (Evobrutinib, Bintrafusp alfa)
- **Optimized risk profile** through strategic partnerships (Pfizer and GSK) and focused externalization

Launch activity

- **Mavenclad®** approved in 80 countries including the U.S.
- **Bavencio®** launched in MCC[1], RCC[2], and UC 1L/2L[3]
- **Tepotinib** first-in-class approval of an oral MET inhibitor[4]

Strong core business due to **excellent life cycle management**

Mid-term outlook
Healthcare

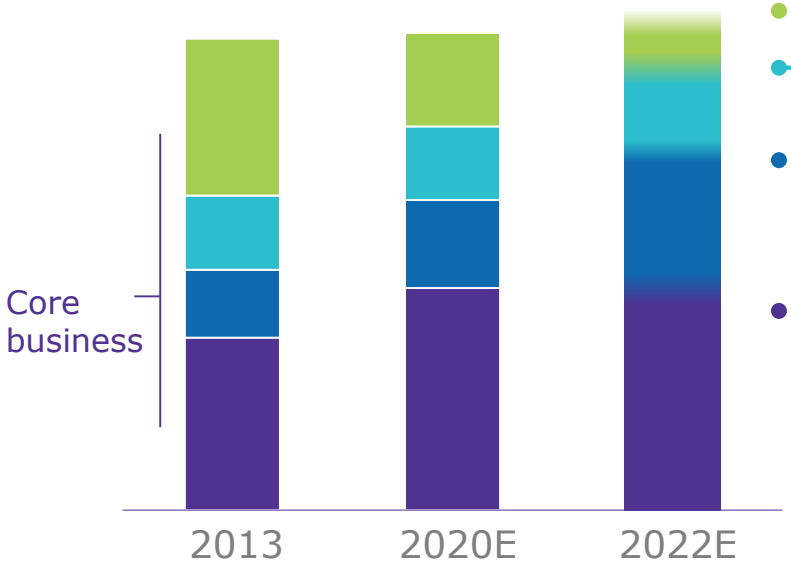
~€2 bn pipeline sales & stable core business **until 2022** + significant **growth potential** beyond

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



Rebif®
Decline in line with interferon market

- Maintain solid track record of patient retention
- Integrate into joint franchise with Mavenclad®
- Explore new treatment options (COVID-19)

Erbitux®
Stable to slightly growing

- Drive EM[1] growth and mitigate competitive / price pressure in EU by clear branding
- Expect continued inclusion in China's NRDL post update at the end of 2020

Fertility
Recovery as of mid 2020, mid single-digit growth beyond 2021

- Drug demand driven by emerging markets growth and demographics
- Leverage competitive strengths (e.g. broad and innovative portfolio, security of supply)
- Drive recovery after COVID-19

General Medicine²
Stable in 2021, mid to high single-digit growth beyond

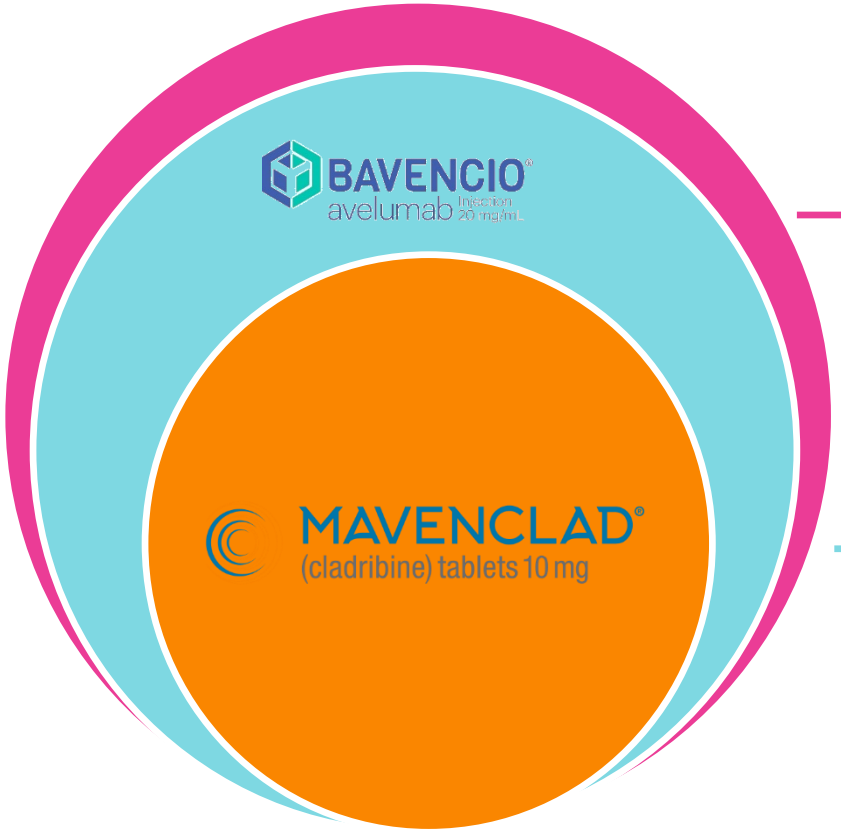
- Increasing prevalence of diabetes and cardiovascular diseases
- Mitigate VBP pressure in China through EM growth, effective life cycle management, and portfolio expansion

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



Tepotinib

- 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

Bavencio®

- 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)

Mavenclad®

- 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

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

Launch Update: Mavenclad® recovering and gaining share; Bavencio 1L UC USA launch driving strong inflection

Mavenclad®
Regaining momentum globally

- New data at 2020 ACTRIMS-ECTRIMS highlight **rapid onset of action and reassuring post-approval safety on malignancy, viral infections, and COVID19 outcomes**
- **Q3 2020** highest selling quarter since launch
- **US:**
  - **New Rx regaining momentum**, with reactivation of base and adding new Rxer's
  - **Continued share point growth** in both dynamic HE segment and Oral segment throughout the pandemic
  - Increasing willingness to Rx
- **Ex-US:**
  - **New initiations rebounding** after April low point across all major Ex-US markets
  - **Strong performance for year 2 return** patients

MAVENCLAD® cladribine tablets

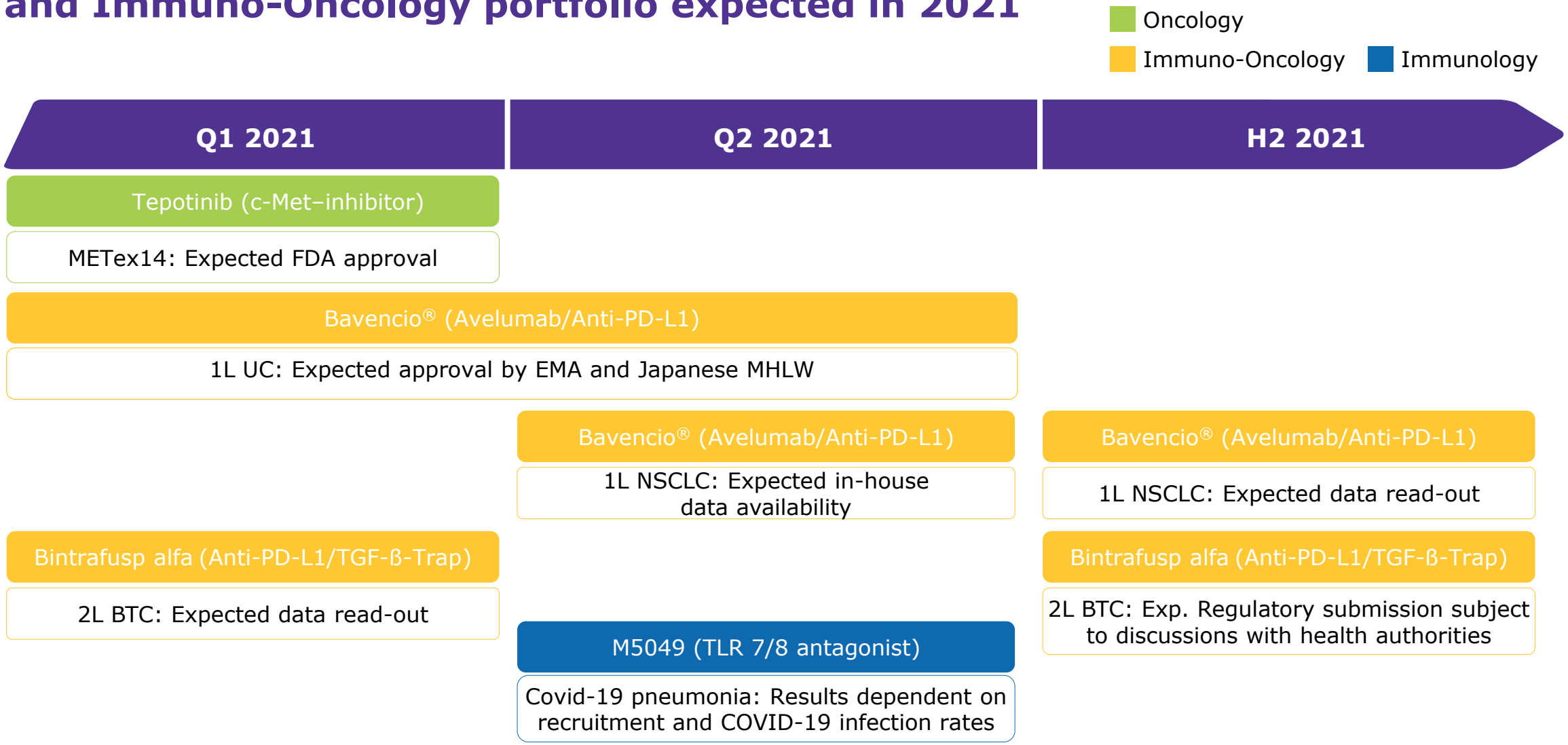
Bavencio® UC 1L
3 months into launch, a clear inflection

- Strong early launch performance, and reception in community validates **significance of OS advantage**
- Encouraging data points discussed in September R&D update continue to trend positively:
  - **Continued increase in penetration** in indicated segment, R3M penetration ~50%
  - Sustained **increase in accounts ordering Bavencio®**
  - Continued **leading share of voice (>50%)** amongst all IOs indicated across bladder cancer despite the pandemic
  - **Clear message recall** on OS message
  - **Steep unit growth** vs pre-approval period
- **On track to change SOC** within indicated segment

BAVENCIO® avelumab Injection 20 mg/mL

Acronyms: HE = High efficacy; IO = Immuno-oncology; OS = Overall survival; RWE = Real-World Evidence; Rx = Prescription; R3M = Rolling 3 months; SOC = Standard of care; UC = Urothelial cancer

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



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

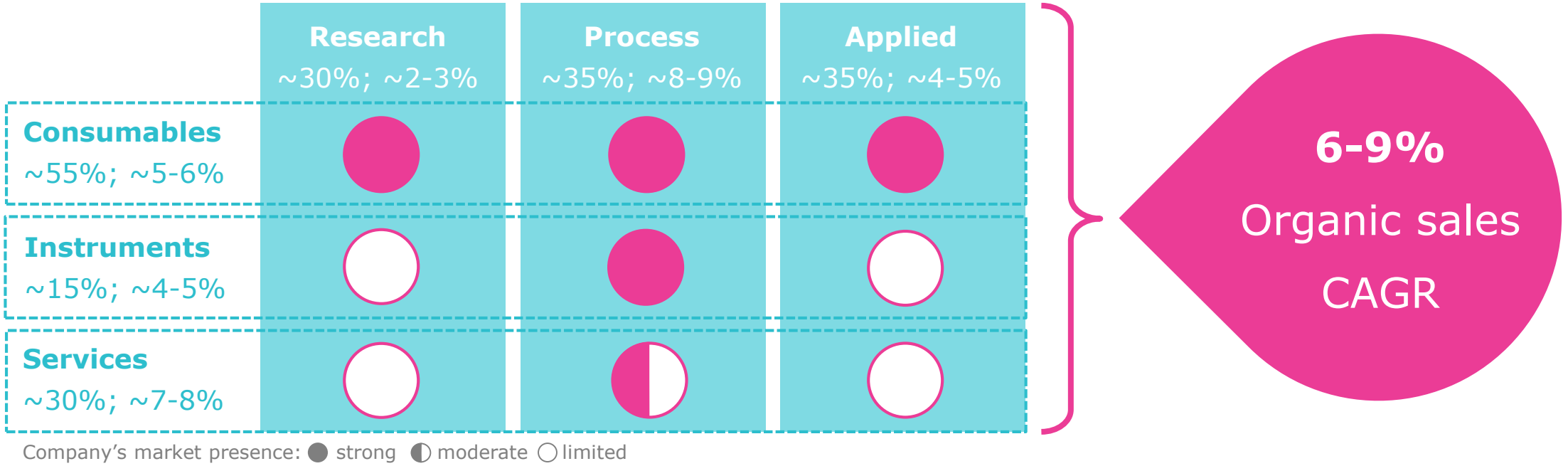
Focusing on profitable growth

04

Life Science

Building growth momentum with focus on attractive market segments

Total Life Science Market[1]
~€170-180 bn; ~5-6% CAGR



Mid-term outlook
Life Science

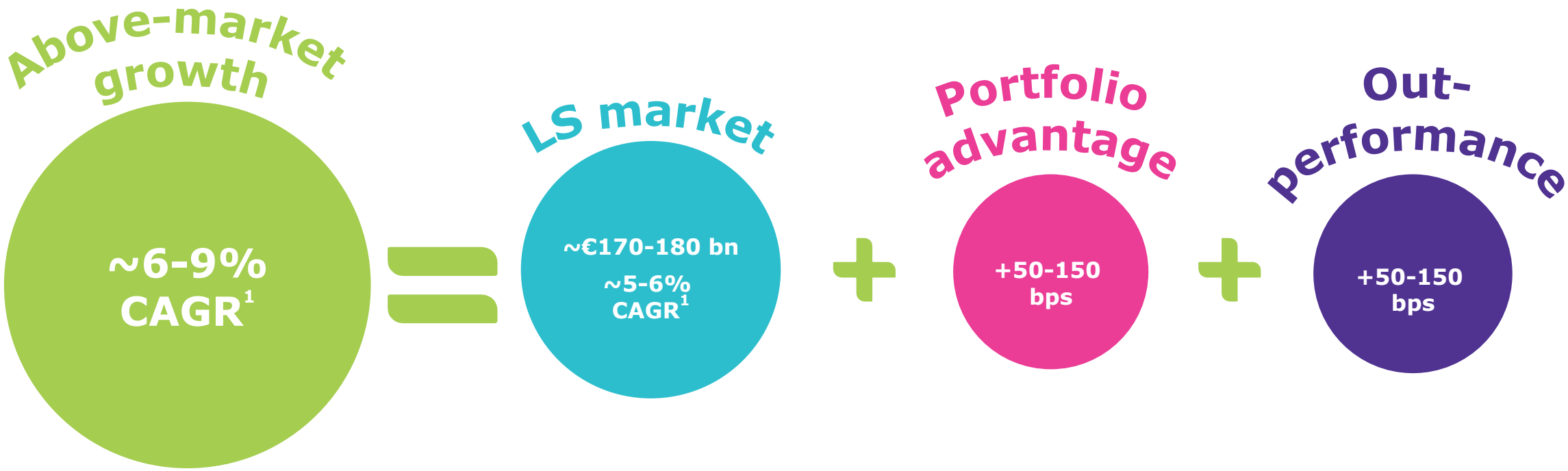
6-9%
Organic sales
CAGR

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

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

Life Science

Improved mid-term outlook driven by market and portfolio focus



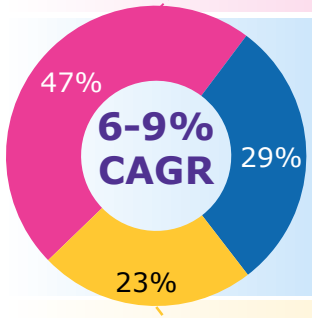
- **Market outlook improving** further, mainly due to **Process** segment
- **Above-market growth set to continue** due to **portfolio advantage** and **outperformance**

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

Life Science

All business units contributing to above-market growth

Sales split[1]



Mid-term outlook[2]

Process Solutions

Low-teens growth

vs. market of 8-9%

Research Solutions

Low single-digit growth

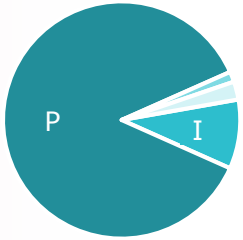
vs. market of 2-3%

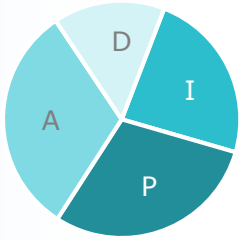
Applied Solutions

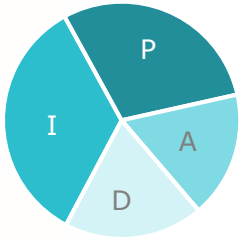
Mid single-digit growth

vs. market of 4-5%

Customer Split[3]







Fundamental growth drivers

- **Biologics:** global mAbs[4] production growing by ~11-15% p.a. for 2020-2024[5] driven by new molecules and biosimilars
- **Diversification:** contribution by top 10 molecules will decline to ~30% until 2024 from ~50% in 2020[6]
- **Novel modalities:** cell & gene therapy market with >30% CAGR 2020-2024[5], complex delivery drives demand for services and viral vectors

- **Research activity:** >9,000 pre-clinical projects in research pipelines[7]; rising number of experiments backs healthy growth in biotechs/CROs[8]
- **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

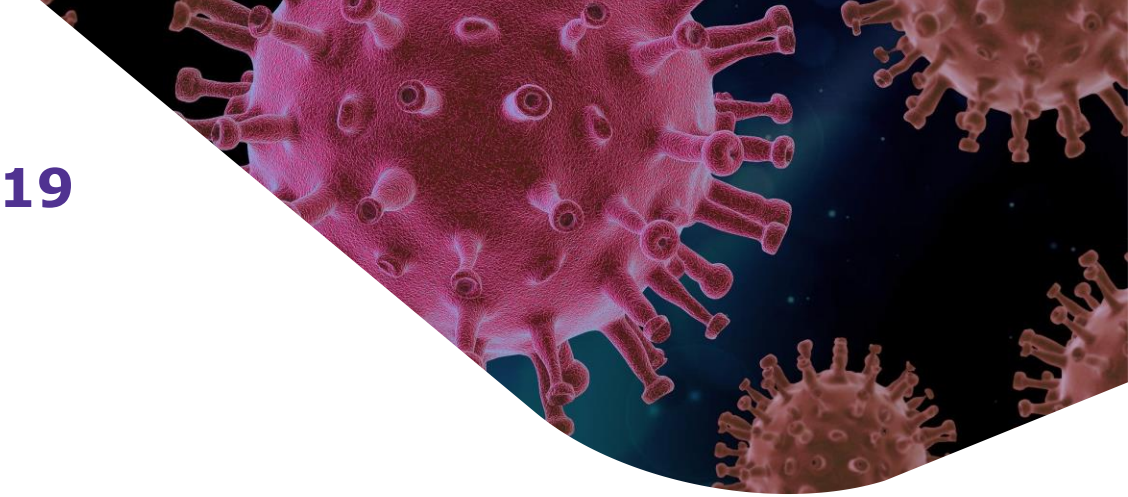
- **Regulation:** rise in quality standards and increasing demand for testing across customer segments
- **Population and economic growth:** demand for access to more sophisticated products and services rises, e.g. in emerging markets
- **Speed:** need for fast testing results raises requirements for 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

Life Science

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

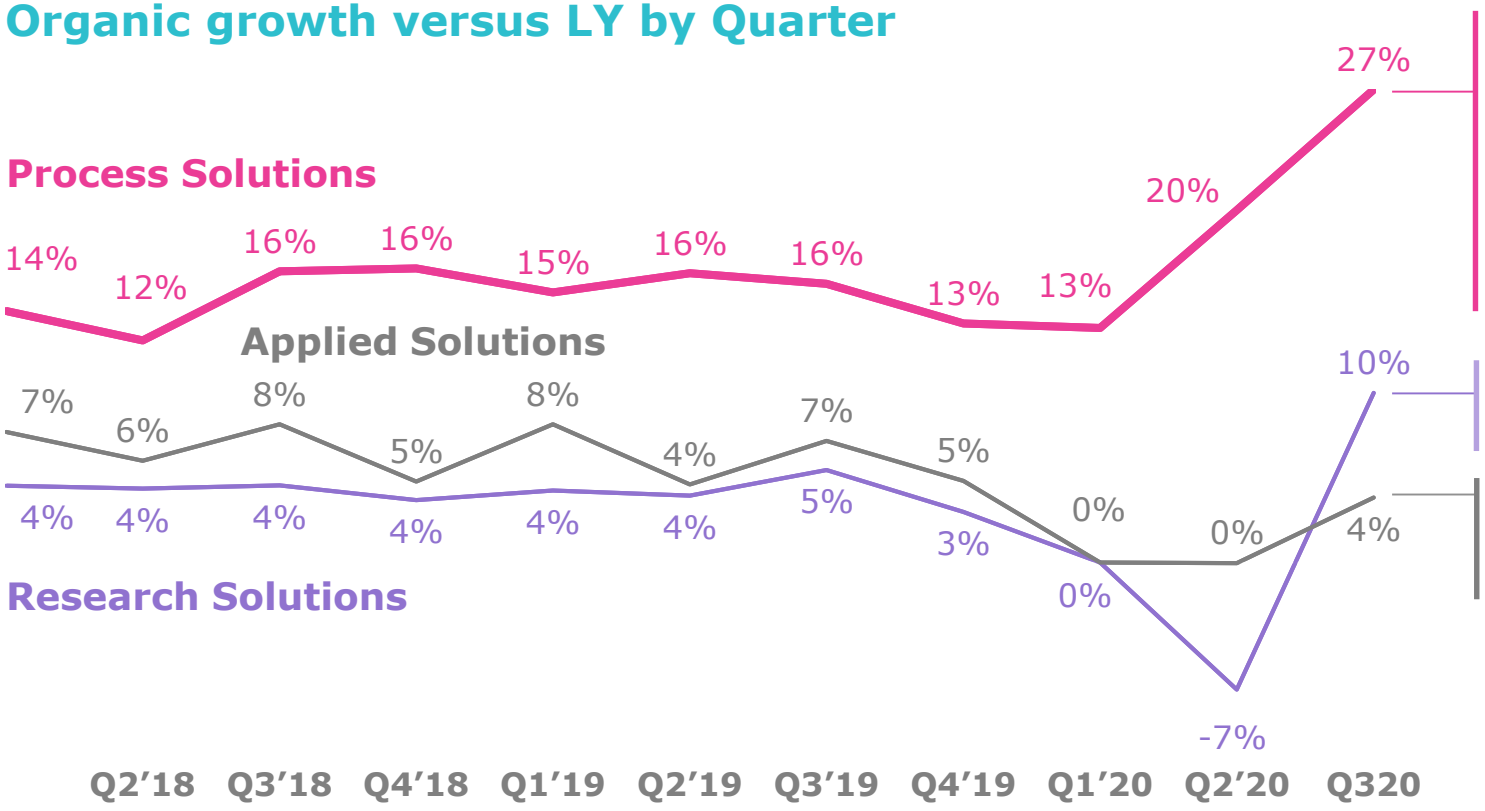
- **Offering is among largest biologic reagents and hardware portfolios**
- **Effective vaccines and therapies start with reliable virus characterization**
- **Highest quality reagents needed for understanding of viral attachment, genomics, or proteomics**

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

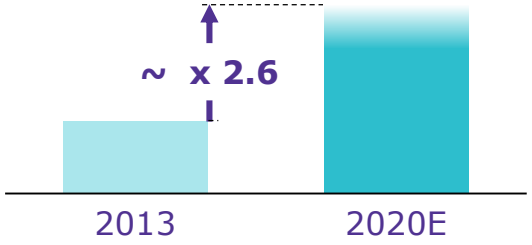
Maintaining leadership and innovation

05

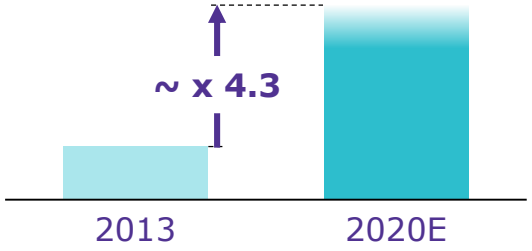
Performance Materials

Electronics focus leads to greater resilience and accelerated growth

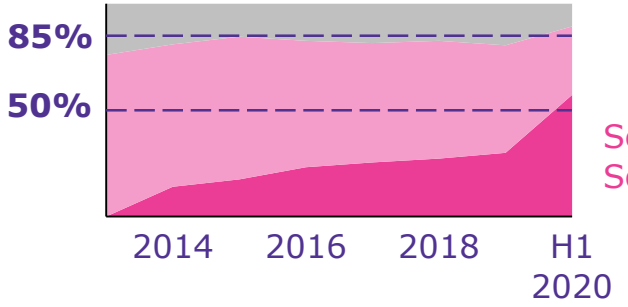
of customers
[that make up 80% of Sales]



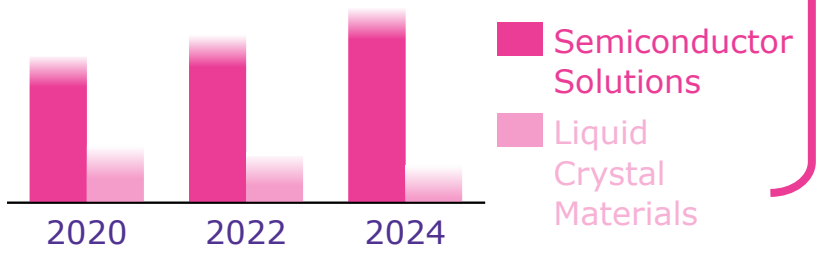
of product groups
[that make up 80% of Sales]



Performance Materials sales split
[% of total]



Semi vs. Liquid Crystals
[illustrative anticipated sales development]



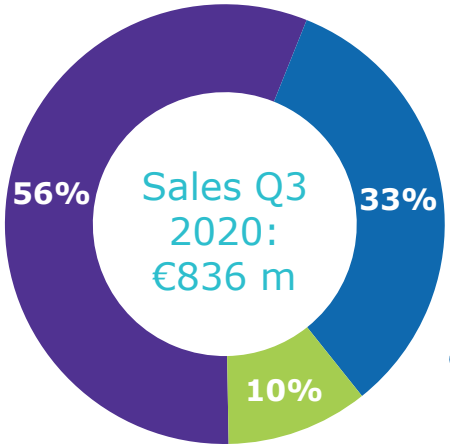
Mid-term outlook
Performance Materials

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

- 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 growth[1]
- 200 to 300bps above-market growth from share gains & better portfolio (incl. 100 to 150bps additional growth from integration top-line synergies)

display solutions

Low single-digit decline

- Driven by trend to **bigger TV size, higher resolutions, more mobile devices**
- 3 to 4% growth of total LCD m² area[2], while price pressure continues
- 18 to 22% growth of total OLED m² area[2] with slight to moderate market share gains
- OLED material market to exceed LC material market by 2022[3]

surface solutions

Low single-digit growth

- 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 beyond[4]

[1]Source: Jan 2020 IC Insights 2018-2024 CAGR for wafer starts in million units; [2] Source: Omdia Display Market Outlook, Q1 2020; [3]Internal 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

back to organic growth

3-4% CAGR[1]

resource allocation & process excellence

~30% Margin

- Site closures in Atsugi, Japan (2021) and Chilworth, UK (2019) announced
- Outsourcing progressing; reduction of LC production capacity in Darmstadt until 2022 announced
- Cost saving measures ahead of plan; target of approx. 500 FTE worldwide until 2022

portfolio management

- Acquisition of Versum Materials and Intermolecular successfully closed

cultural change

- Significant changes in composition of leadership team
- Cultural change addressed in three dedicated initiatives focused on customer centricity, market-driven innovation and corporate culture

[1]New mid-term CAGR guidance starting 2020

Performance Materials

Strategic roadmap materializing

Measures for a bright future

Darmstadt

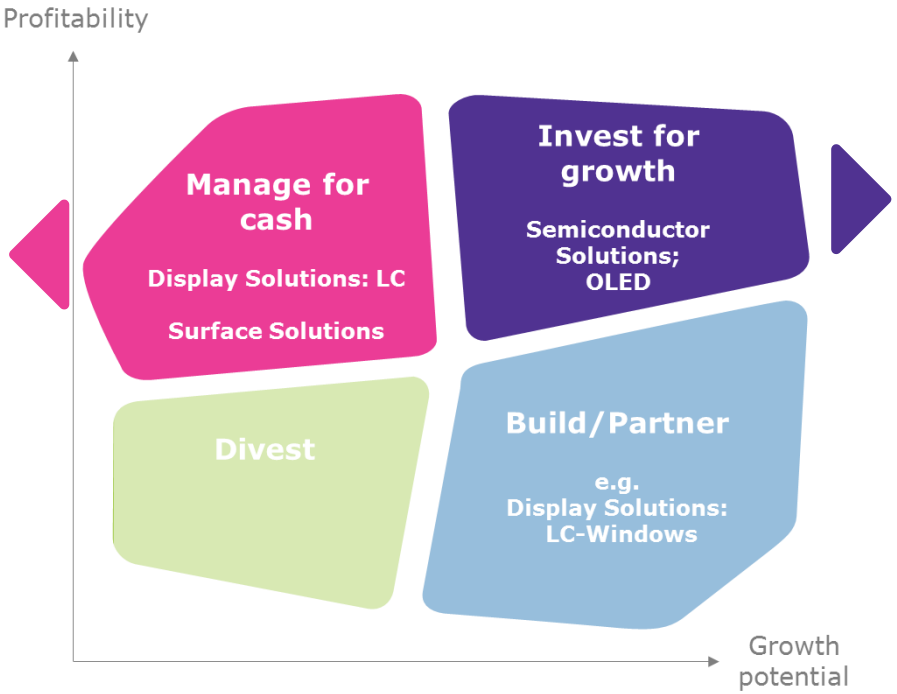
- In Darmstadt focus on R&D and production
- Immediate bottom-line contribution from 2019 onwards
- Reduce the number of FTEs by ~15% = ~400 FTEs

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



VERSUM MATERIALS

- 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**

INTERMOLECULAR®

- Leading in advanced materials innovation
- Acquisition to strengthen semiconductor technology offering

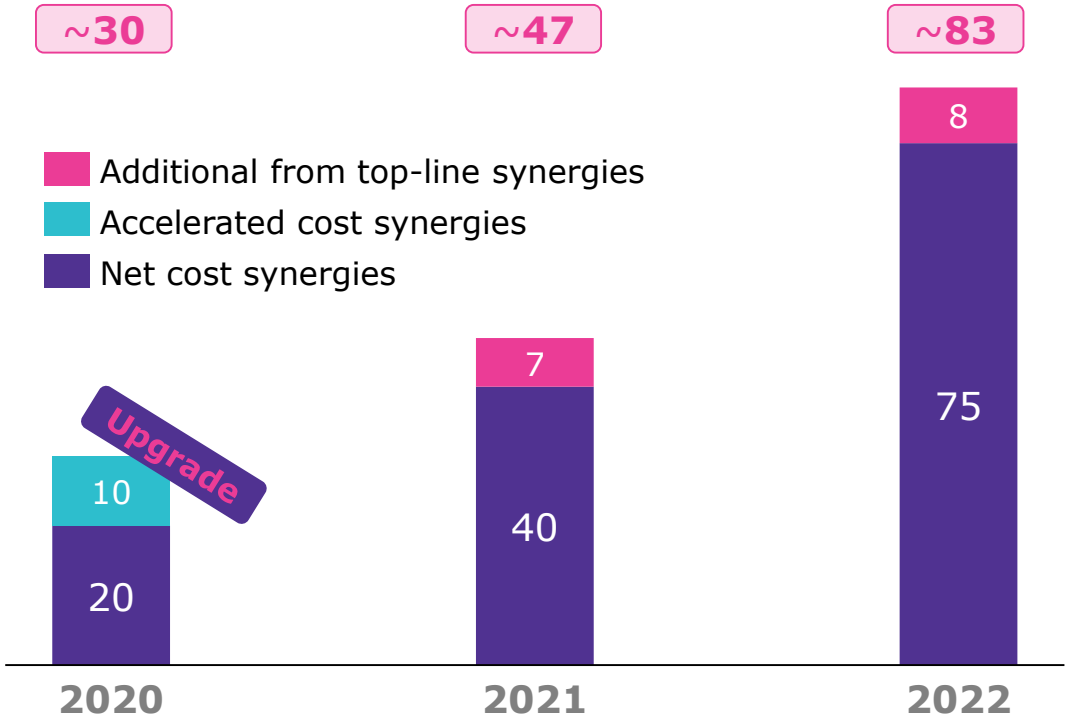
➢ Application specific **materials expertise with** that **perfectly complement** Group's business and technology portfolio

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

Both transactions successfully closed

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

Who we are

Innovation Power

- Merck KGaA. Darmstadt, Germanyis a leading science and technology company with curious minds dedicated to human progress
- Long track-record in offering innovative products in attractive markets and serving important megatrends

Pioneering Products

- Well-equipped for developing new product classes: Portfolio of life-improving products in all businesses
- Enabling customers incl. scientists and developers to design next-gen products

Responsible Governance

- Resilient operations from sustainable leadership and risk-mitigation approach
- Responsibility is in our DNA: reflected by legal form, corporate governance and long history of more than 350 years

Targets

Target #1: Dedicated to human progress

In 2030, we will advance human progress for more than 1 bn people through sustainable science & technology.

- Sustainability in innovation for our customers
- Health & wellbeing impact of our technologies and products

Target #2: **Creating sustainable value chains**

By 2030, we will integrate sustainability into all our value chains.

- Integration of sustainable culture & values
- Sustainable and transparent supply chain
- Secured social license to operate across regions

Target #3: **Reducing our ecological footprint**

By 2040, we will achieve climate neutrality and reduce our resource consumption

- Climate change & emissions
- Water & resource intensity

Integration

Linked

- Part of the overall strategy
- Integrated in steering and operations
- Gradually built into compensation schemes

Reviewed

- Executive & Supervisory Board
- Corporate Sustainability Committee
- Audited as part of the Annual Report

Disclosed

- Development and reporting of meaningful KPIs
- Annual Report, Sustainability Report
- Investor events

ESG: Environmental, Social, Governance

Potential to increase sustainable value for business and society

High-impact SDGs	Where we can contribute	Target
 Good Health and Well-being	➢ We are able to contribute with dedicated products, know-how, partnerships and initiatives in pharma, science and technology.	1 3
 Decent Work and Economic Growth	➢ Our ambition of future growth considers health and safety of employees also in the supply chain.	1 2
 Industry, Innovation and Infrastructure	➢ Our innovation power will lead to more sustainable products and processes in various industries.	1 2
 Responsible Consumption and Production	➢ Being a responsible supplier, we will also challenge suppliers to support in reaching company targets.	2 3
 Partnerships for the Goals	➢ To unleash even more power, we foster collaborations with capable partners to sum up know-how for more sustainable impact.	1 3

and benefit

Business opportunities

- Develop a new range of sustainable products & services, benefiting from our innovation power
- Open up additional customer groups and expand regional reach

Risk management

- Reduce risks through higher awareness and longer-term view
- Secure supply chain resilience

Partnerships

- Contribute as supplier of choice to customers' ESG strategy
- Improve ESG impact of our suppliers
- Increase depth, meaning, and strategic focus of partnerships

Operations

- Increase attractiveness as employer
- Reduce costs of capital
- Benefit from grants and reliefs (politics, insurance, etc.)
- Incentivize through integrated compensation schemes

SDGs: Sustainable Development Goals of the United Nations ESG: Environmental, Social, Governance

Next steps towards the ESG targets

0 ✓ Analysis of requirements: Strategy, business, regulation, stakeholders (done and institutionalized)

1 ➢ Build an effective data platform for internal steering

2 ➢ Develop ESG-KPIs for reporting and integrate in compensation schemes

3 ➢ Further incorporate ESG in R&D, controlling, M&A, supply chain

4 ➢ Decide on dedicated investments and initiatives to achieve targets

Target 1: **Dedicated to human progress**

Target 2: **Creating sustainable value chains**

Target 3: **Reducing our ecological footprint**

2020 **2021** **2022** **2030**

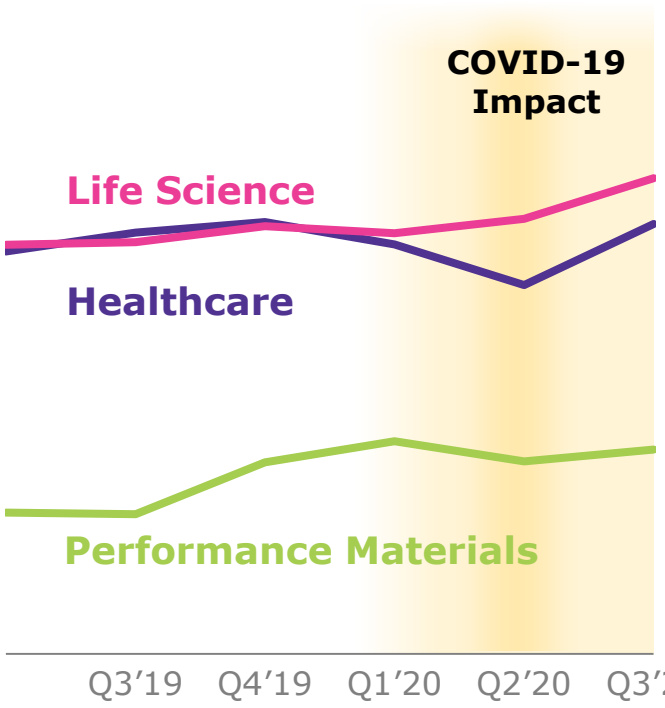
ESG: Environmental, Social, Governance

06

executive summary and guidance

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**

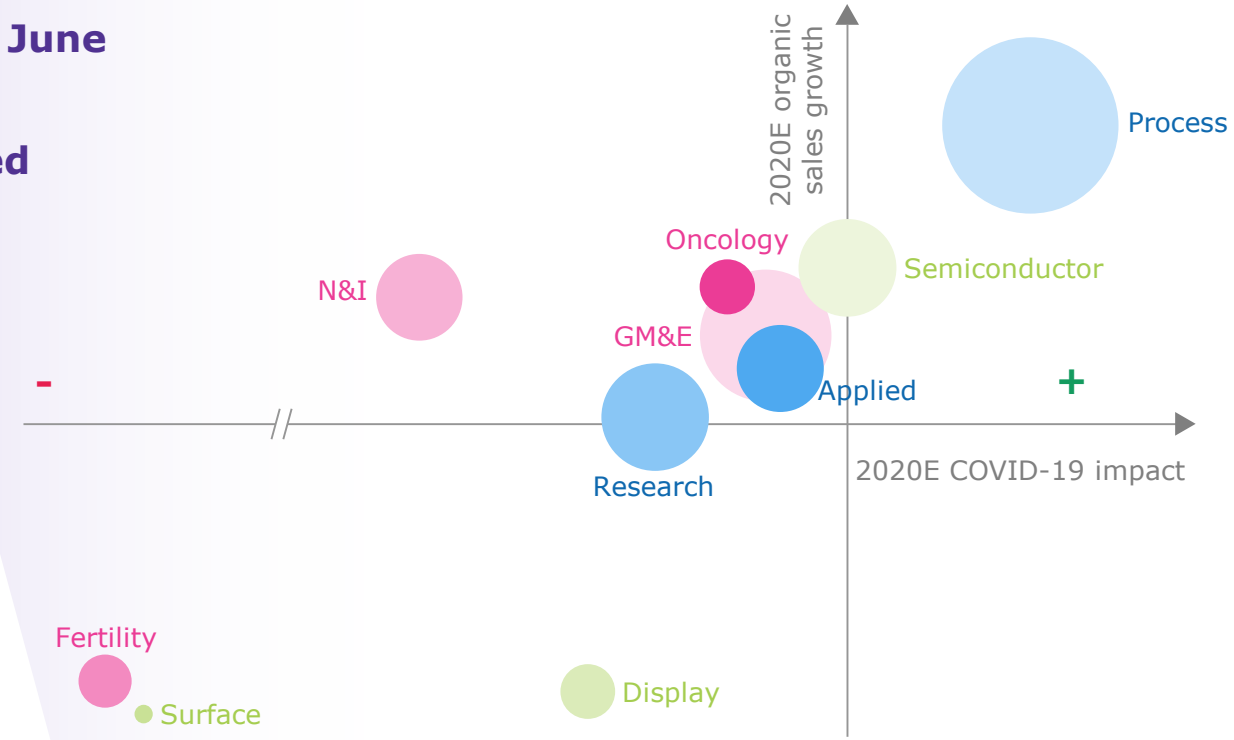
* At fixed 2019 FX rates

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

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

Growth and COVID-19 impact by business[1]



Delivery on priorities during crisis

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

CMD 2019

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

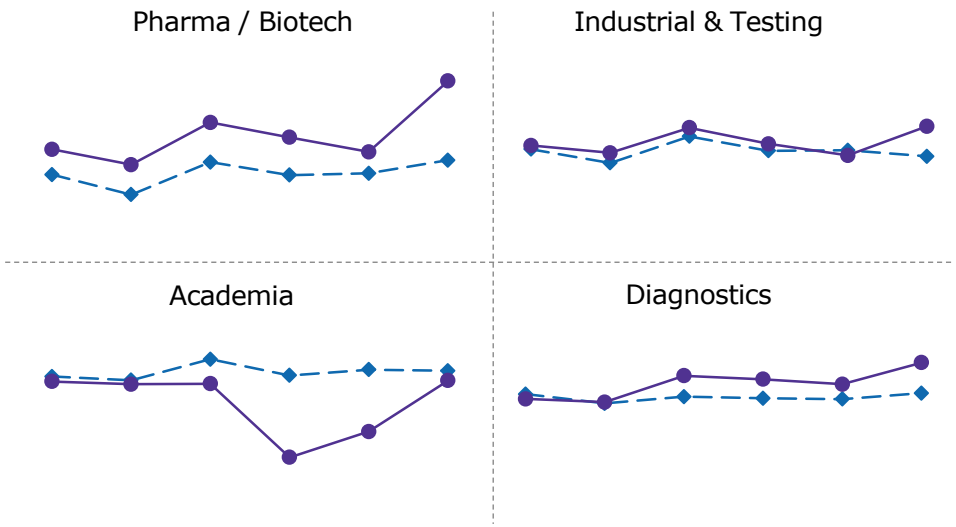
Life Science highly resilient and well positioned to participate in potential mid-term upside from COVID-19

2020 heatmap of COVID-19 impact by customer segment

	Pharma/ Biotech	Industrial & Testing	Academia	Diagnostics
Process Solutions	+++ -	COVID-19 insensitive	COVID-19 insensitive	COVID-19 insensitive
Research Solutions	+	COVID-19 insensitive	- - -	++ -
Applied Solutions	+ -	+ -	- -	+

+ upsides from COVID-19 - downsides from COVID-19

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 Biogen[1]: +6% to +8%)*
Mid-single digit % growth from Versum
FX: -3% to -5% YoY
~€5.05 – 5.25 bn *(thereof Biogen[1] €365 m)*

EPS pre:
~ €6.50 – 6.80
(thereof Biogen[1] €0.63 m)

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

Executive Summary

steady earnings growth with high margins and a low risk profile

Group

Successfully driving **transformation into a leading science and technology company**

setup

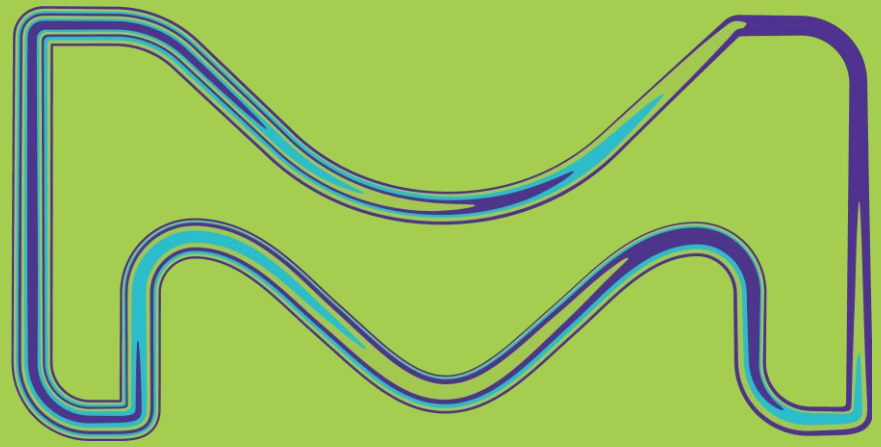
Three-pillar structure strengthened further as a resilient basis; COVID-19 crisis as another proof point

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 guidance[1]

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 Biogen[2]: +6% to +8%)
- FX: -7% to -9% YoY
- ~€2,220 – 2,290 m
  (thereof Biogen[2] €365 m)

Life Science

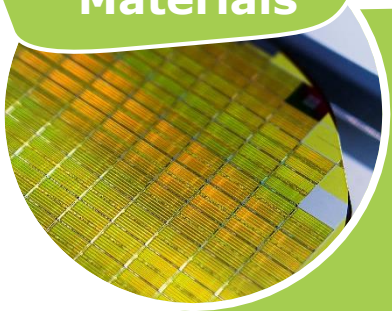
Net sales

- 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

[1]Business 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**

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

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

Focus on organic growth and deleveraging to 2022

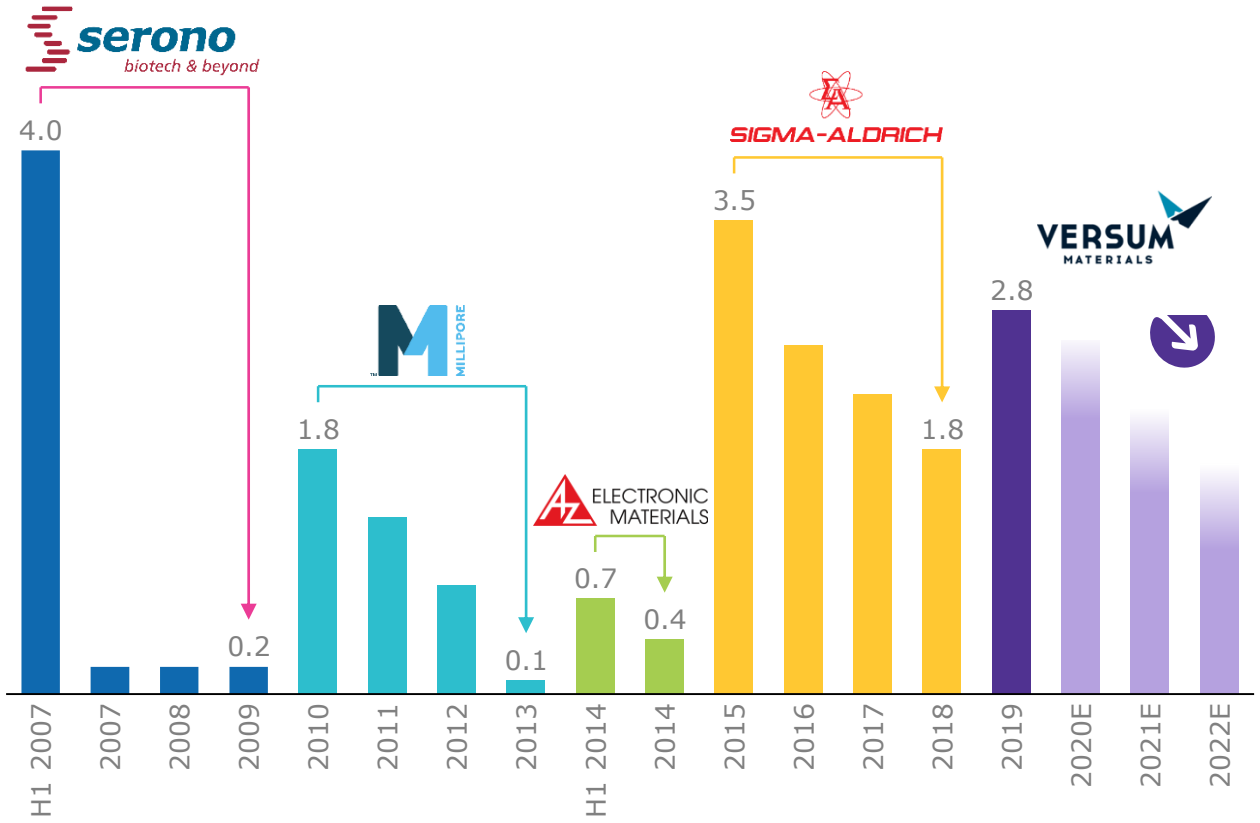
Proven swift deleveraging
after major acquisitions

UPDATE

- **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**

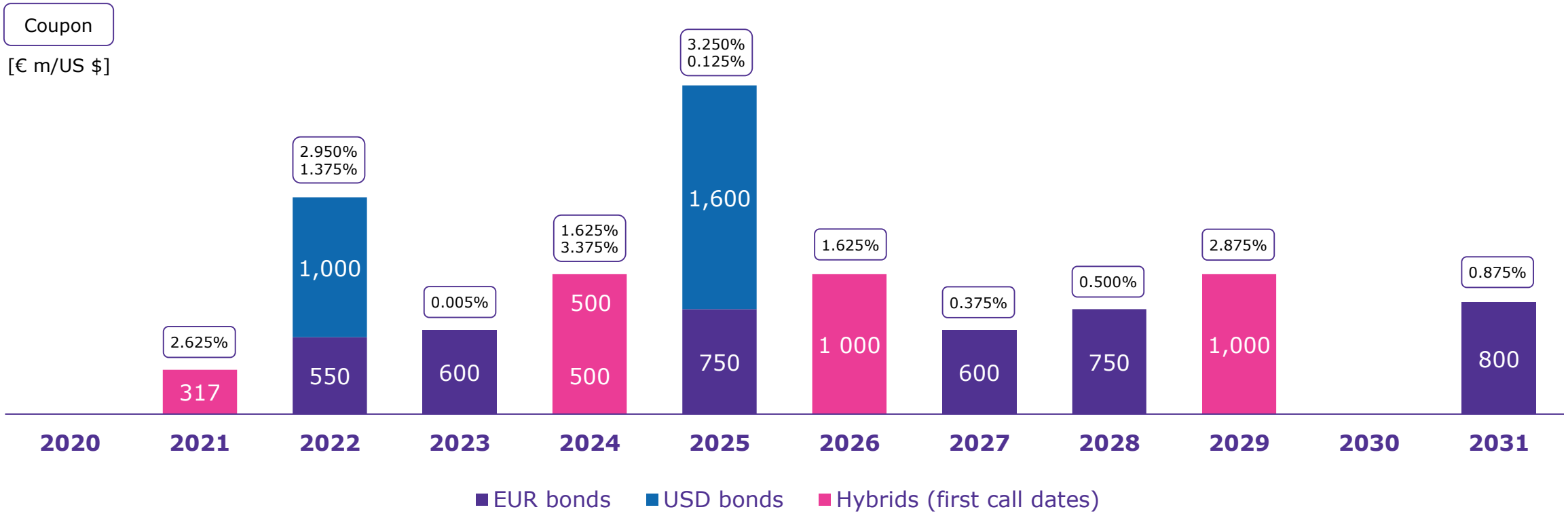
Net debt / EBITDA pre track record & outlook



Financial Update

Balanced maturity profile: lower refinancing risks & higher flexibility

Maturity profile as of September 30, 2020



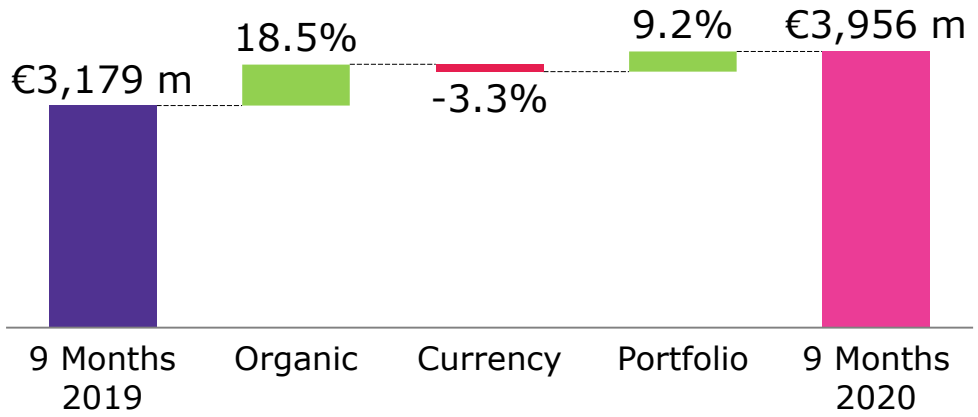
Early refinancing of 2021 hybrid first call date successfully executed.

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%

Totals may not add up due to rounding

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

Totals may not add up due to rounding

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%
Effective tax rate (%)	26.0%	**25.0%**	-1.0pp
Net income	1,002	**1,551**	54.8%
EPS (€)	2.31	**3.57**	54.5%

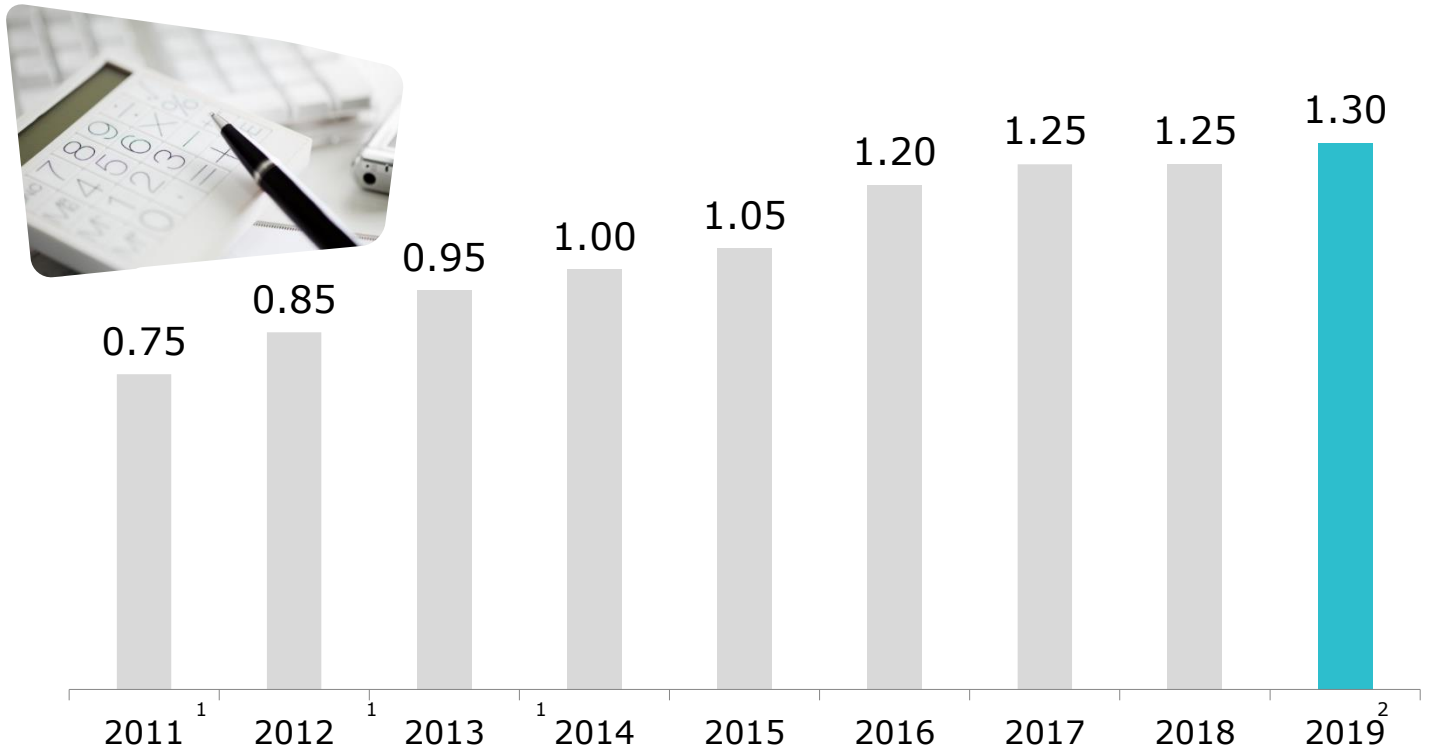
Comments

- 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

Totals may not add up due to rounding

Sustainable dividend growth

Dividend[1] development 2011-2019



2019 dividend

- Dividend of €1.30 (+4% YoY) per share proposed[2] for 2019
- Payout ratio of 23.4% of EPS pre in 2019; we aim at 20–25% of EPS pre
- Dividend yield[3] of 1.2%

[1]Adjusted for share split, which has been effective since June 30, 2014; [2]Final decision is subject to Annual General Meeting approval;
[3]Calculated with 2019 year-end share price of € 105.35 per share.

China's VBP: Round 3 completed with implementation expected before year end, sustained confidence in keeping base business at least stable

Round 1 | Round 2 | Round 3

2019

March: 4+7 pilot initiated in 4 municipalities[1] and 7 key cities in other provinces[2]

June/July: Provincial expansion to Fujian & Hebei provinces

September: remaining 25 provinces added to "4+7"

December: Official announcement of Round 2 (incl. Concor®)

As of April: Gradual implementation of Round 2, 2 winners granted exclusive access to 60% of total hospital market[3], non-winners (incl. Concor) retain access to remaining 40% of hospital market at a gradient price cut[4] + can freely compete in non-hospital/ retail market

2020

July: Official announcement of Round 3 (incl. Metformin IR and XR), tender parameters: up to 8 winners granted up to 80% of hospital market[3], all manufacturers requested to comply with NMPA guidance on NDMA testing

2021

UPDATE

August: Bidding completed on August 20 with 8 winners (all local Chinese manufacturers), Glucophage not among winners but full access retained to non-hospital/retail market and ~15% of hospital market accessible at gradient price cut

Sustained confidence in **at least stable base business** until 2022

- ✓ **Growing market:** Chinese metformin market to grow >10% p.a. over the next 5 years
- ✓ **„up to" 80% access and up to 8 winners only a guidance**, to be finalized post-bidding
- ✓ Non-hospital/retail market **not subjected to gradient price cut**
- ✓ Company following a **carefully crafted bidding strategy**

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: NMPA = National Medical Products Administration, VBP = Volume-Based Procurement, NDMA = N-nitrosodimethylamine, also known as nitrosamine

Clinical pipeline

October 31, 2020

Phase I

berzosertib (M6620)
ATR inhibitor
Solid tumors[1]

peposertib (M3814)
DNA-PK inhibitor
Solid tumors[2]

M1774
ATR inhibitor
Solid tumors

M3258
LMP7 inhibitor
Multiple myeloma

M4344
ATR inhibitor
Solid tumors

M8891
MetAP2 inhibitor
Solid tumors

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Solid tumors

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

M6223
TIGIT inhibitor
Solid tumors[3]

M5049
TLR7/8 antagonist
Immunology

M6495
anti-ADAMTS-5 nanobody
Osteoarthritis[4]

M5717
PeEF2 inhibitor
Malaria

- Oncology
- Immuno-Oncology
- Immunology
- Neurology
- Global Health
- *Program under out-licensing agreement*

Phase II

peposertib (M3814)
DNA-PK inhibitor
Rectal cancer

tepotinib
MET kinase inhibitor
Non-small cell lung cancer, *MET*ex14 skipping

tepotinib
MET kinase inhibitor
Non-small cell lung cancer, *MET* amplified[5]

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 tumors[6]

avelumab
anti-PD-L1 mAb
Non-small cell lung cancer[6]

avelumab
anti-PD-L1 mAb
Urothelial cancer[6]

atacicept
anti-BlyS/APRIL fusion protein
Systemic lupus erythematosus

atacicept
anti-BlyS/APRIL fusion protein
IgA nephropathy

sonelokinab (M1095)[7]
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, *MET*ex14 skipping[8]

avelumab
anti-PD-L1 mAb
Urothelial cancer 1L-M[9]

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

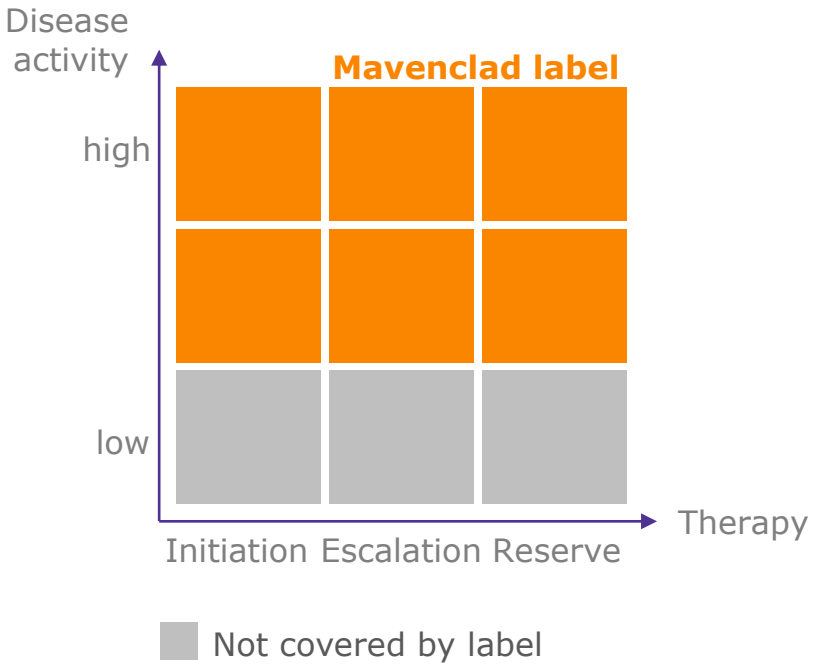
Mavenclad's attractive label in Europe supports integrated franchise strategy

Mavenclad label covers 60-70% of patients with RRMS[1] within the MS[1] patient population in Europe

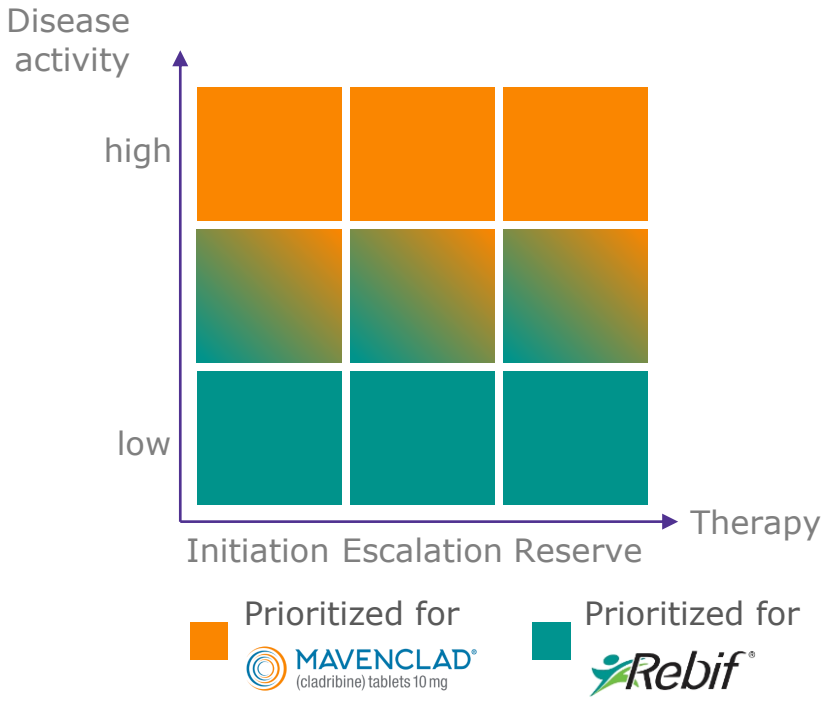
Our overall NDD franchise will cover a broad MS patient pool

Integrated franchise strategy

MS patient population[2]



RRMS patients, EU-5[3]



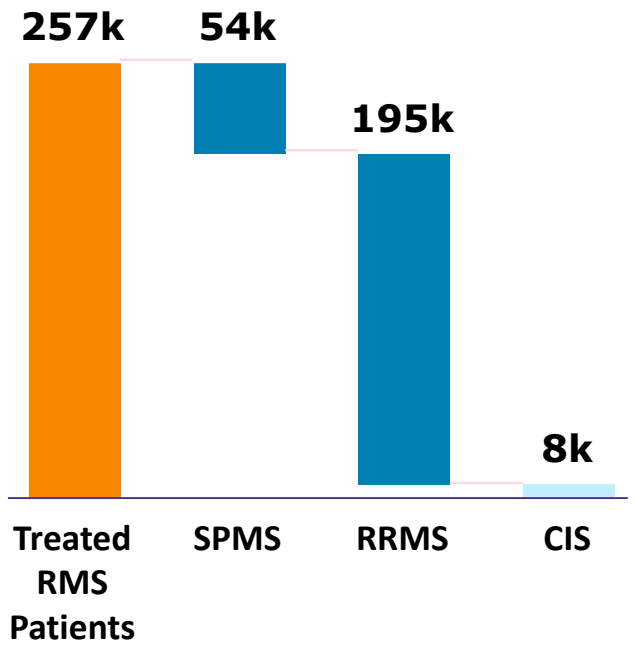
- At patient level: Rebif and Mavenclad are **highly complementary**
- At physician level: High overlap
- Franchise infrastructure investment benefits both brands

[1]Approved by EMA for treatment of highly active relapsing multiple sclerosis; Abbreviations: RRMS = Relapsing-Remitting Multiple Sclerosis; [2]Source: Merck KGaA, Darmstadt, Germany [3]Source: Merck KGaA, Darmstadt, Germany, Ipsos; As of May 2019, Mavenclad was approved in 55 countries globally and reimbursed in half

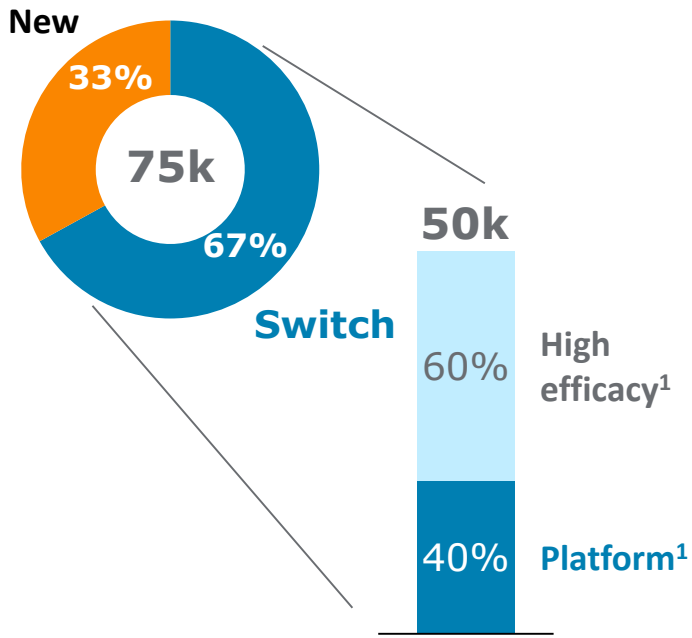
Mavenclad

On March 29, 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**

Source: Decision Resource Group, MS Epidemiology Overview, October 2017; [1]High efficacy includes Ocrevus, Tysabri, Lemtrada, Gilenya – platform includes all other approved agents

Tepotinib (MET kinase inhibitor)

First-in-class launch in MET Exon14 sets foundation for EGFRm/ METamp opportunity and exploration in other tumor types

TEPMETKO® tepotinib

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 Japan[1] in March 2020, Sakigake designation[2] 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®**

ERBITUX CETUXIMAB

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**

Tepotinib + Erbitux® (Cetuximab) - Adressing 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**

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

- **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

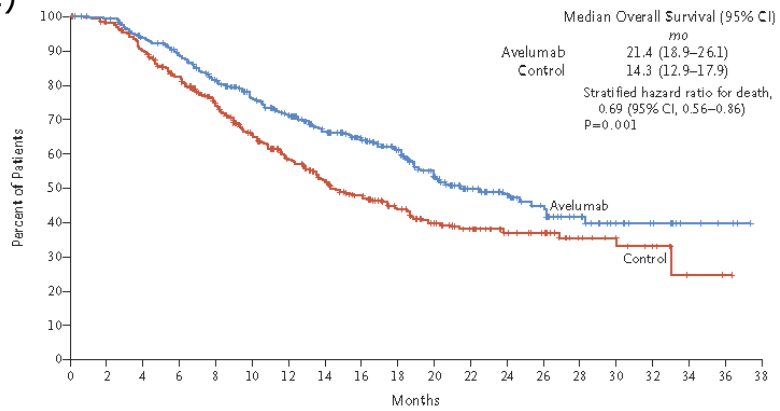
1: Piotrowska et al., "Landscape of Acquired Resistance to Osimertinib in EGFR -Mutant NSCLC and Clinical Validation of Combined EGFR and RET Inhibition with Osimertinib and BLU-667 for Acquired RET Fusion", AACR Cancer Discovery 2018; 2: Wu et al., „Long term outcomes to tepotinib plus gefitinib in 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

„Avelumab Maintenance Therapy for Advanced or Metastatic Urothelial Carcinoma", Powles et al., NEJM, published September 18, 2020[1]

- **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

ESMO 2020 – Additional analyses support the use of Bavencio® as a new addition and advance to the standard of care[2]

New data

Broad indication[3]:

- 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 maintenance[4]:

- 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]:

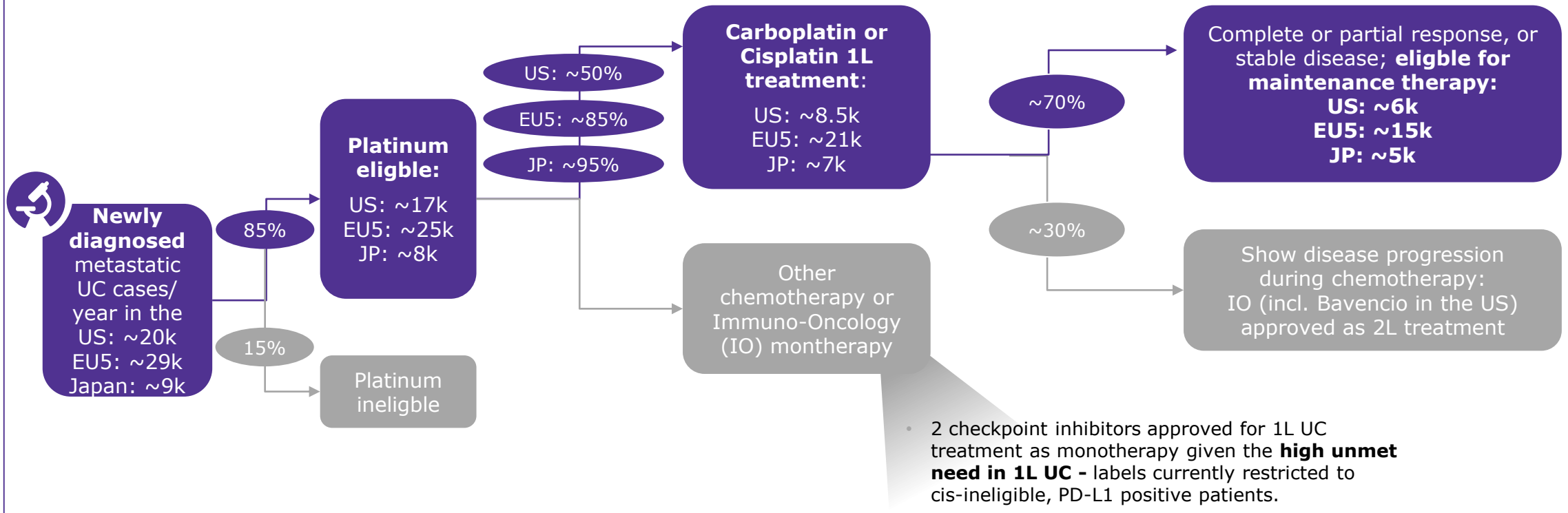
- Bavencio® 1L maintenance therapy improves OS with no negative effect on clinically relevant PROs, supporting the use of avelumab as a new addition and advance to the standard of care

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 treatment[1]



- 2 checkpoint inhibitors approved for 1L UC treatment as monotherapy given the **high unmet need in 1L UC -** labels currently restricted to cis-ineligible, PD-L1 positive patients.

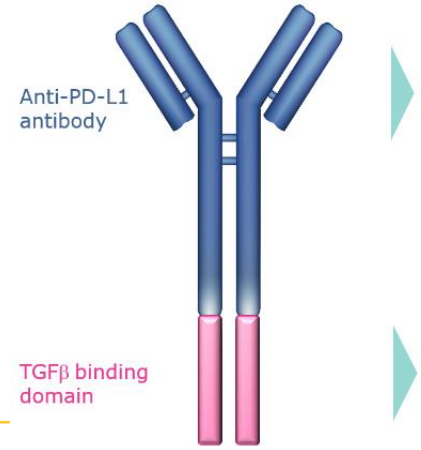
1: Kantar Health Patient Metrics & Kantar Health Treatment Architecture for epidemiological data; IMS Claims, Kantar and IPSOS for triangulation of market shares

Bintrafusp alfa[1]

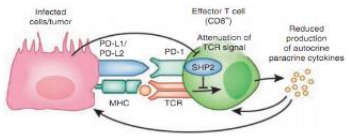
An innovative first-in-class bifunctional fusion protein discovered in-house leading the TGF-β immuno-oncology field

Mode of action

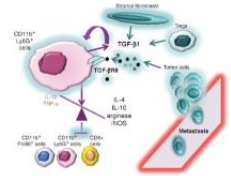
- Innovative **first-in-class bifunctional fusion protein** designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF-β signaling)
- Demonstrated **superior anti-tumor activity in pre-clinical study** compared to anti-PD-L1 alone, and anti-PD-L1 and TGF-β given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



PD-1/PD-L1 immune checkpoint[1]



TGFβ immunosuppressive cytokine[2]



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

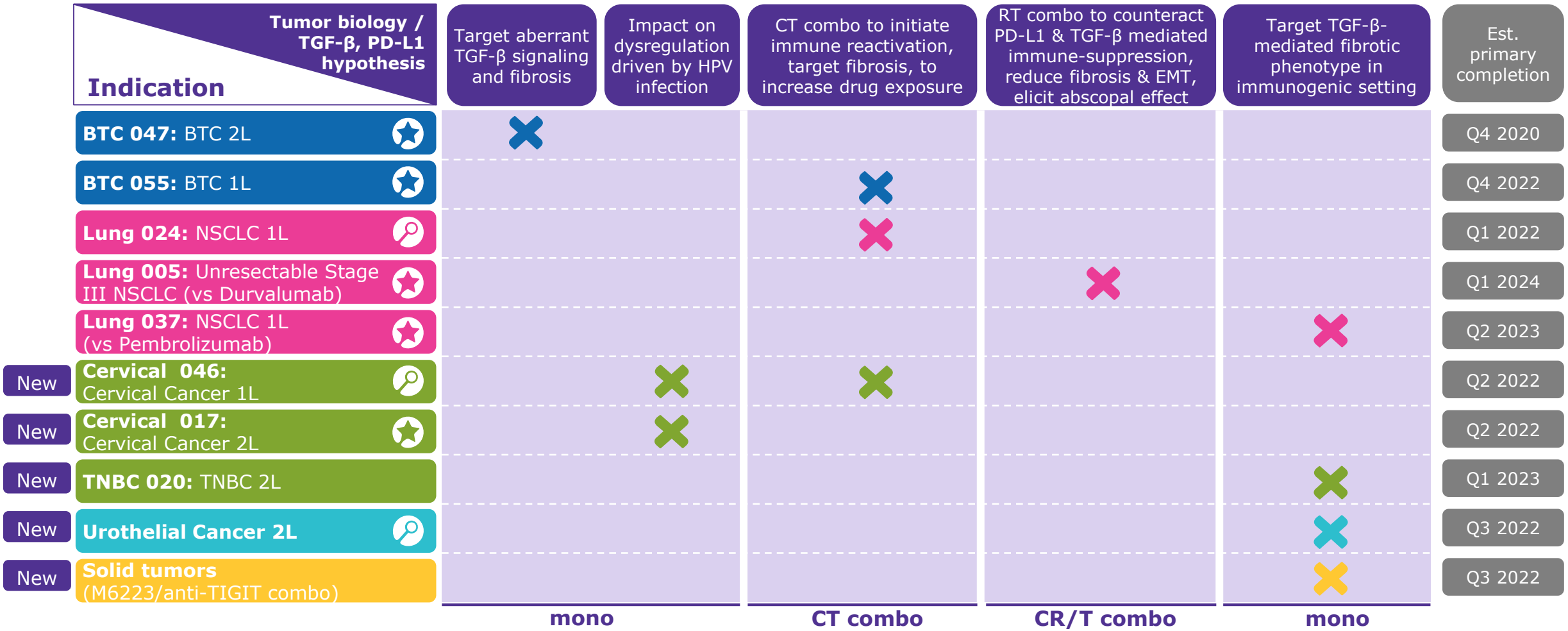
clinical development plans

- **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**

[1]proposed International Nonproprietary Name (INN)
Acronyms: NSCLC = Non-small Cell Lung Cancer, IO = Immuno-Oncology

Bintrafusp alfa: Development Strategy

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



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 037[1]

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

INTR@PID LUNG 037

Interim Analysis passed[2]

- 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 future[3]

	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 activity[2]** in 30 Asian patients with pretreated biliary tract cancer
- **ORR[2]:** 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 2L[1])
- Responses observed **irrespective of PD-L1 expression levels[2]**
- **Orphan Drug Designation** granted by FDA in December 2018

Leading PDx data presented at ASCO 2019[3]

- **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

[1]Lamarca A, et al. Ann Oncol. 2014;25(12):2328–2338; [2]Yoo et al., Poster presented at the 43rd European Society for Medical Oncology Annual Meeting, Munich, October 19–23, 2018; [3]Bang et al., "Pembrolizumab (pembro) for advanced biliary adenocarcinoma: Results from the KEYNOTE-028 (KN028) and KEYNOTE-158 (KN158) basket studies", presented at ASCO 2019; Acronyms: DoR = Duration of Response, NSCLC = Non-small Cell Lung Cancer, NR = Not Relevant, MSI = Microsatellite Instability Status , OS = Overall Survival, PFS = Progression-Free Survival

Bintrafusp alfa: Developmental Progress

NSCLC Stage III cCRT Combo trial

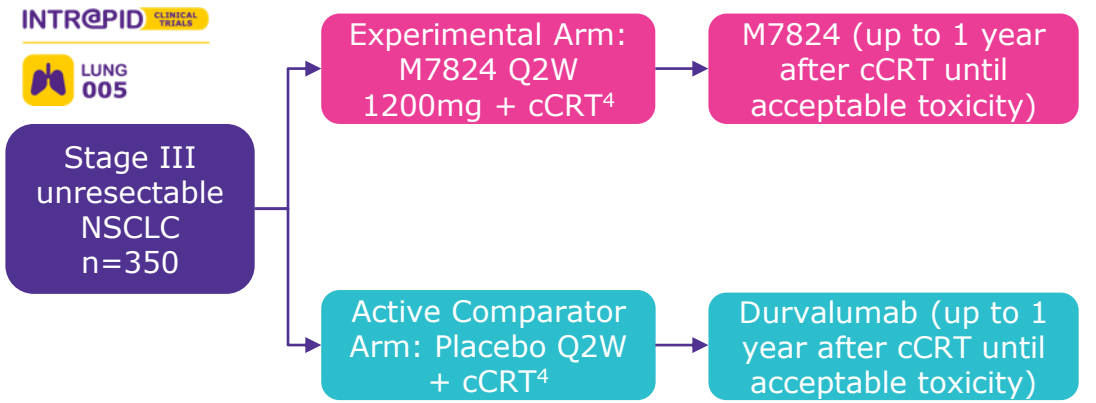
NSCLC 2L data presented at ESMO 2018

- **Need:** NSCLC accounts for 80-85% of all cases of lung cancer[1]
- **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 combo[5]

- 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

[1]Jemal A et al., Cancer statistics, 2007, CA Cancer J Clin 2007;57:43-66; [2]Paz-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; [3]Herbst 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); [4]Cisplatin/Etoposide or Carboplatin/Paclitaxel or Cisplatin/Pemetrexed concomitant with Intensity Modulated Radiation Therapy (IMRT); [5]Lan 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 annually[1]

Response Rates:

- Bintrasfusp 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]

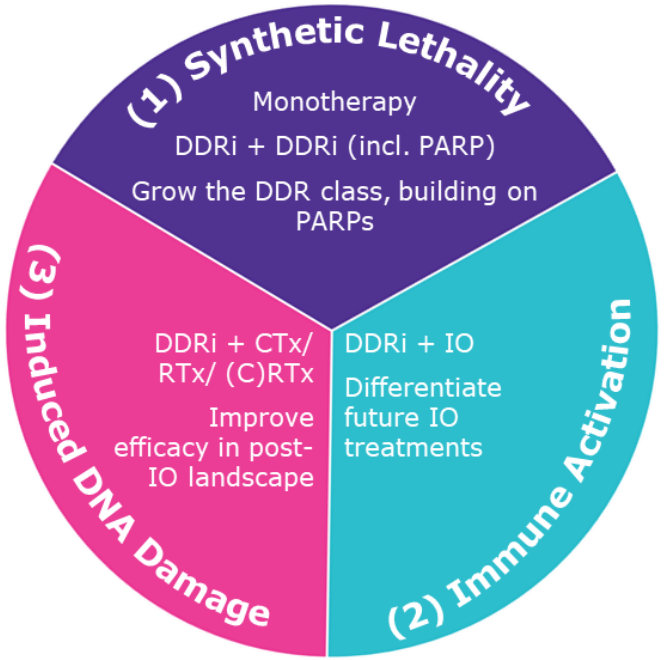
Cervical Cancer 2L study recently posted on ct.gov

†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.

[1]Bauml J, et al. J Clin Oncol. 2017;35:1542–49; [2]Ott PA, et al. Ann Oncol. 2017;28:1036–41; [3]Hollebecque A, et al. J Clin Oncol. 2017;35(Suppl):Abstract 5504; [4]Chung HC, et al. J Clin Oncol. 2018;36(Suppl):Abstract 5522; [5]Ferris RL, et al. N Engl J Med. 2016;375:1856–67; [6]Mehra R, et al. Br J Cancer. 2018;119:153–59; [7]Morris VK, et al. Lancet Oncol. 2017;18:446–53; [8]Lacouture ME, et al. Cancer Immunol Immunother. 2015;64:437–46; [9]Trachtman 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



ATRi

Berzosertib/M6620 (formerly VX-970)
- 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

M4344 (formerly VX-803)

M1774 (formerly VX-400)
- Two oral ATR-inhibitors currently in Ph I
- Provides optionality

DNA-PKi

Peposertib/ M3814
- 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

M9831 (formerly VX984)
- Exclusive license[1] granted to Vertex in 2019 for use in gene-editing applications

ATMi

M4076
- Clinical candidate/ready for Phase I trials, chemical structure first disclosed at AACR 2019

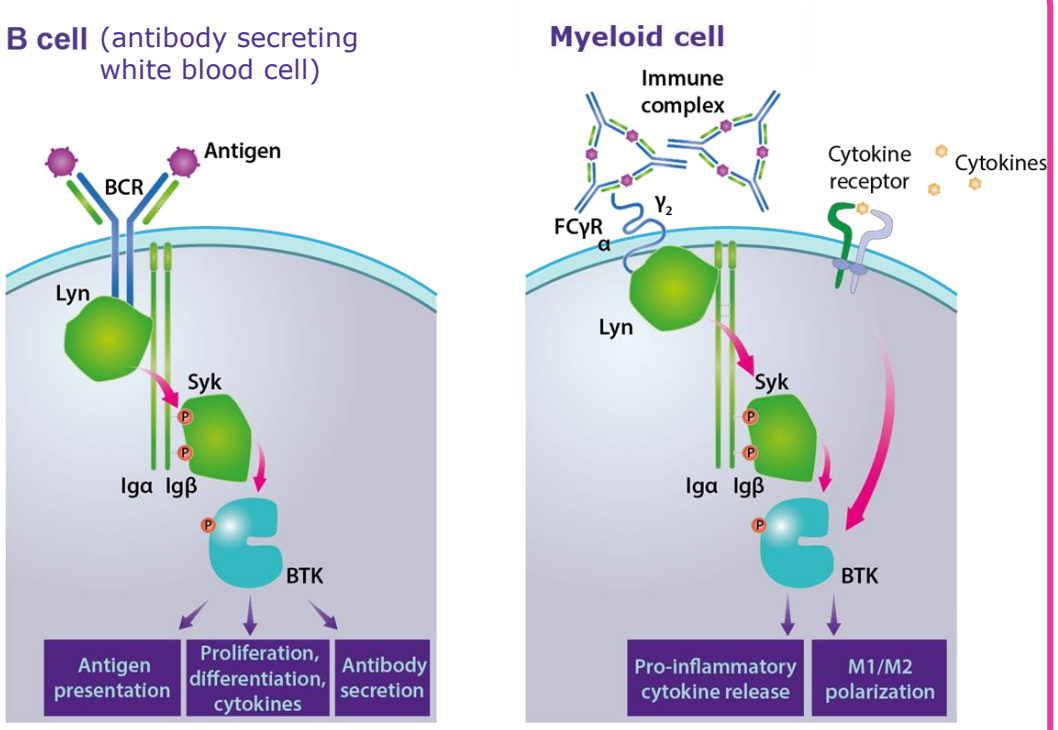
1: incl. upfront payment + milestone/royalties on future sales; Acronyms: ATMi = Ataxia telangiectasia-mutated; ATRi = Ataxia telangiectasia and Rad3-related inhibitors; CRT = Chemoradiotherapy; DDR = DNA Damage Response; DNA-PKi = DNA-dependent Protein Kinase Inhibitor; PARP = poly(ADP-ribose) polymerase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

Evobrutinib
BTK inhibitor with a dual mode of action

Dual Mechanism of Action

- **Bruton's tyrosine kinase inhibitors (BTKi's)** are traditionally used in oncology but are now also **being evaluated in immunology**
- B-cell depletion studies have shown that antibody-independent **B-cell functions play an important role in MS pathogenesis** (development)[1-3]
- An **altered innate immune system contributes to progression in MS**[4,5]
- **Evobrutinib has a dual mode of action**, impacting on B-cells, macrophages and pathways involved in inflammation in MS; this has been confirmed in animal models[6-11]

Involvement of BTK in immune cell function



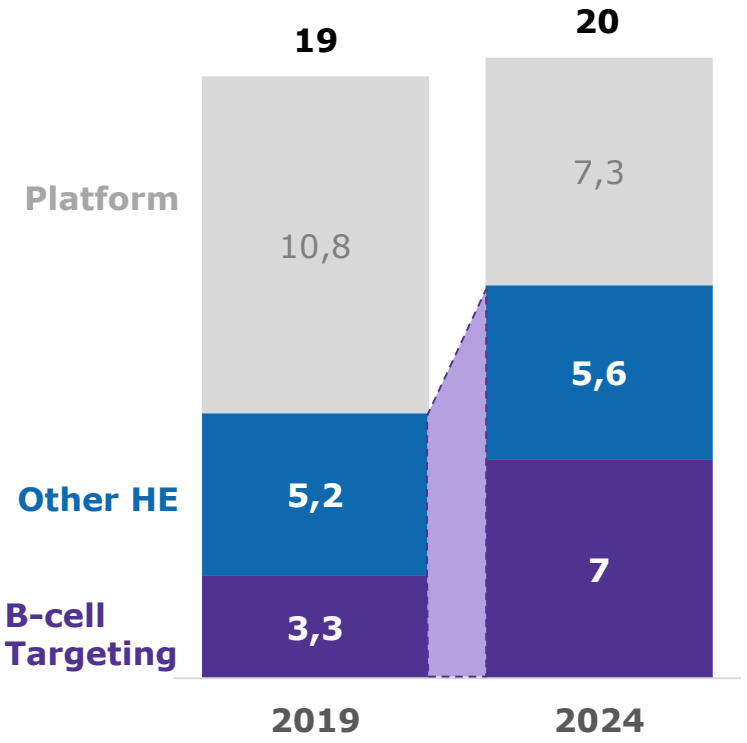
[1] Bar-Or A, et al. Ann Neurol 2010; [2]Fraussen J, et al. Autoimmun Rev 2016; [3]Jelcic I, et al. Cell 2018; [4]Rawji KS, et al. Front Cell Dev Biol 2016; [5]Vogel DY, et al. J Neuroinflammation 2013; [6]Data on file: EMD Serono M2951 Investigator's Brochure July 2015; [7]Haselmayer P, et al. EULAR 2016; [8]Data on file: EMD Serono Internal Study Report Aug 2012; [9]Alankus YB, et al. ECTRIMS 2018; [10]Torke S, et al. ECTRIMS 2018; [11]Boschert U, et al. ECTRIMS 2017

Evobrutinib
Leading in a novel class with significant growth potential

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 approved oral therapy with **efficacy on progression vs an active control**
- **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 pioneered BTKi development** for MS with Evobrutinib, **a highly selective covalent BTKi**[2]
- **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

All timelines are event-driven and may be subject to change

Evobrutinib
Most extensive efficacy and safety data among BTKis in MS

Efficacy and Safety Profile Maintained Long Term (Ph II)

Phase II: 108 weeks OLE data at EAN 2020[1]

- **Only BTKi to have demonstrated mAb-like efficacy on relapses** maintained over 108 weeks with evobrutinb 75 mg BID
- **Best characterized BTKi in MS on safety:** generally well tolerated and characterized in >1200 patients over 2 years of treatment in RMS, RA & SLE

CNS Effect on Progression

Evobrutinib may impact number of progression-relevant mechanisms

- BTK increased in brains of progressive models and MS patients, primarily in microglia[2]
- BTKi shifts macrophage phenotypes from pro- to anti-inflammatory[3]
- BTKi improves remyelination by microglia[4]
- BTKi reduces B cells and CNS leptomeningeal inflammation[5]

Optimal Dose Selection

The largest and most sustained efficacy on ARR was achieved at >95% steady state BTK occupancy, observed in nearly all patients receiving 75 mg BID[1]

Dose selection based on efficacy and BTK occupancy data from the **largest RCT** that tested both QD and BID BTKi

Highly Selective

Evobrutinib is a potent, highly selective, covalent BTKi[6]

Potent impact on B cell activation and macrophage polarization[3,6]

Only impacts a single off-target kinase out of 267 tested (IC_{50} determination)[6]

Covalent BTKi enabling use at lower exposure levels than non-covalent inhibitors

evolutionRMS

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

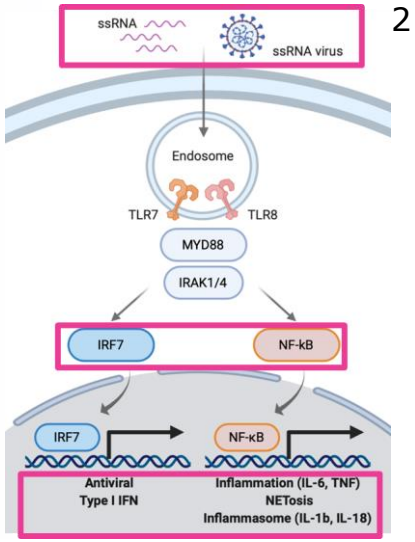
Two randomized, parallel-group, double-blind, active-controlled Phase III studies of oral evobrutinib bid vs oral teriflunomide qd, in patients with RMS, with the objective of evaluating efficacy and safety. *Only BMX was determined to have an IC50 value within 10 fold of the intended target out of 218 tested; 1: Montalban et al. 2020 EAN; 2: Gruber et al. AAN 2020.; 3: Alankus YB et al. ECTRIMS 2018; 4: Aigrot MS et al. AAN 2020; 5: Sol Kim ECTRIMS 2020; 6: Haselmayer et al 2019; Acronyms: ARR = Annual relapse rate; BID = twice daily; BTKi = Bruton's tyrosine kinase inhibitor; CNS = Central Nervous System; mAb = monoclonal antibody; OLE = Open Label Extension; QD = once daily; RA = Rheumatoid arthritis; RCT = Randomized controlled trial; SLE = Systemic lupus erythematosus

All timelines are event-driven and may be subject to change

M5049 (TLR7/8 antagonist)
TLR7/8 are drivers of SLE pathology and possibly of COVID-19

Mechanism of Action[1]

- 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



2

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

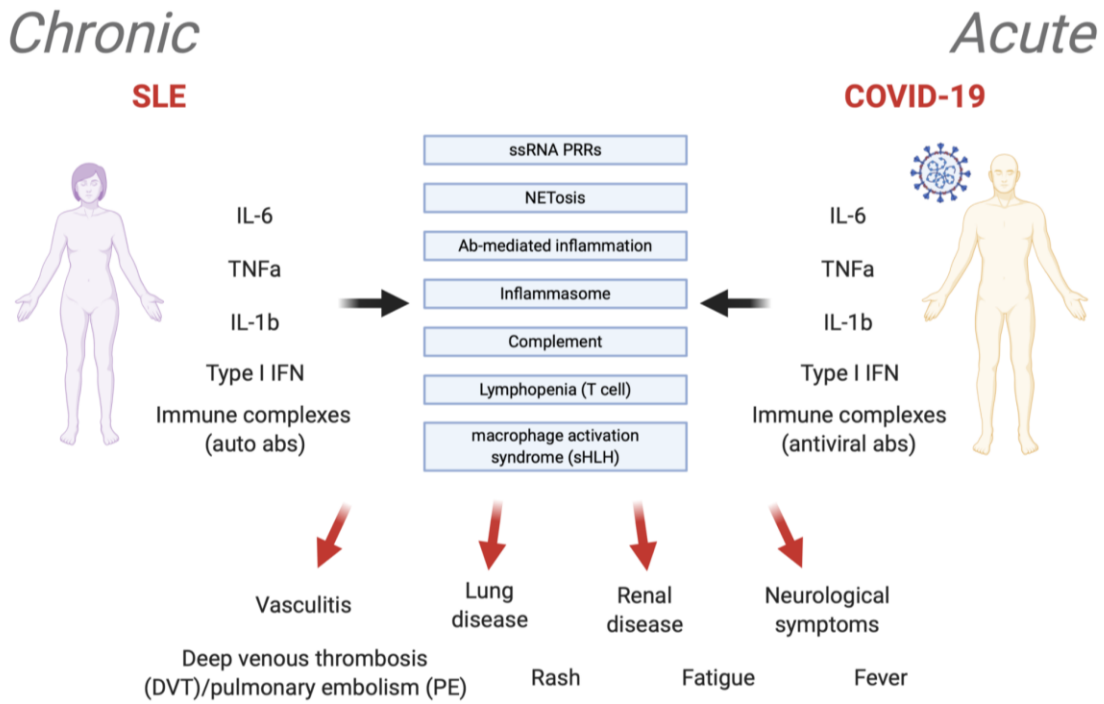
Preliminary Phase I data warrant further investigation as a potential treatment for autoimmune diseases including SLE

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

All timelines are event-driven and may be subject to change

M5049 (TLR7/8 antagonist)
Similarities between SLE and COVID-19

Similarities between SLE and COVID-19[1]



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

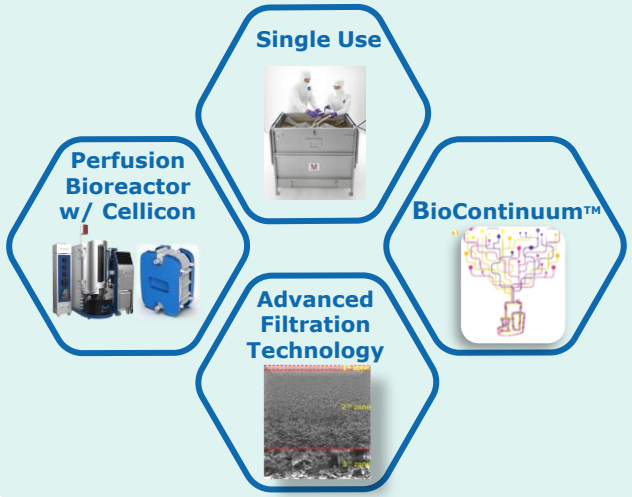
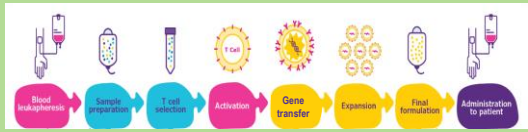
Results:

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

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

All timelines are event-driven and may be subject to change

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

	TRADITIONAL	ALL	NOVEL
Modality			
Revenue driver	Near term	Mid term	Long term
Offering	Products	Services	Products
Portfolio		 ✓ Contract development & manufacturing organization ✓ Contract testing organization ✓ Product characterization	Manufacturing novel therapies  ✓ Templated viral manufacturing consumables and reagents ✓ Autologous manufacturing system

Capitalizing on three key life science trends

1 COMPLEX BIOLOGICS

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

2 DIGITAL UNIVERSE

#1 eCommerce site in Life Science[1]

- **>90%** of Millipore products on eCommerce platform
- **x2** net sales growth of eCommerce vs. non-eCommerce[2]

3 ASIA

Manufacturing/Distribution

Nantong, Wuxi Single use

Commercial expansion

Tier 2 cities

eCommerce partnership

Alibaba Group 阿里巴巴集团

[1]measured by traffic, rated by external service SimilarWeb; [2]by business segment within Life Science

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

unit operations		PALL	ThermoFisher SCIENTIFIC	SARTORIUS
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

Launched 2018

Pellicon®
Ultrafiltration
Cassettes

Durapore®
Filtration

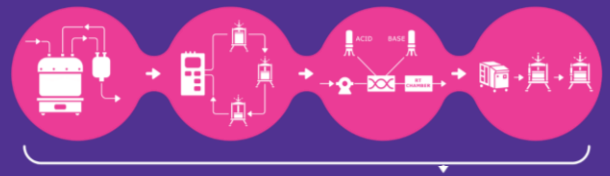
Launched 2018

Millipak®
Final Fill
Filter

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

Tomorrow's process

mAb process intensification 2017 - 2020+

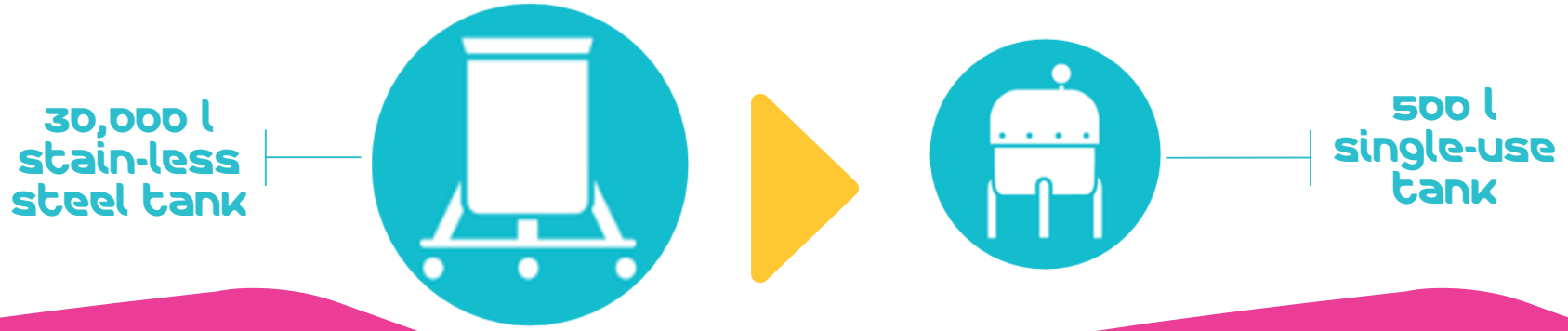


continuous processing >2025

Continuous bioprocessing will …

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

Our single-use technologies drive flexibility in modern bioprocessing



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 m²**

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 m²**

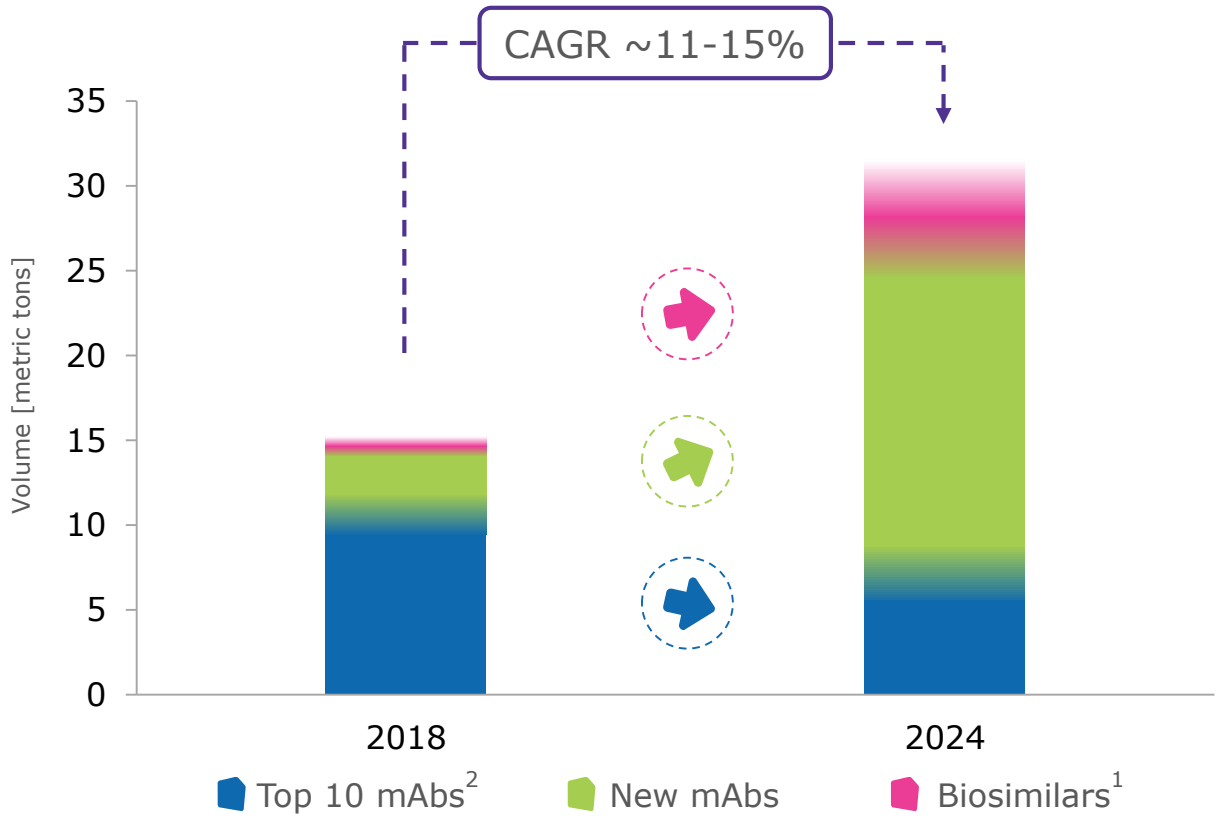
Strong demand for single-use technologies and Process Solutions' broad offering was and will remain a key source of growth for Life Science

*CAPEX = Capital Expenditure

Life Science

Democratization of mAbs market will drive diversification, change, variability

mAb volume projections 2018 to 2024



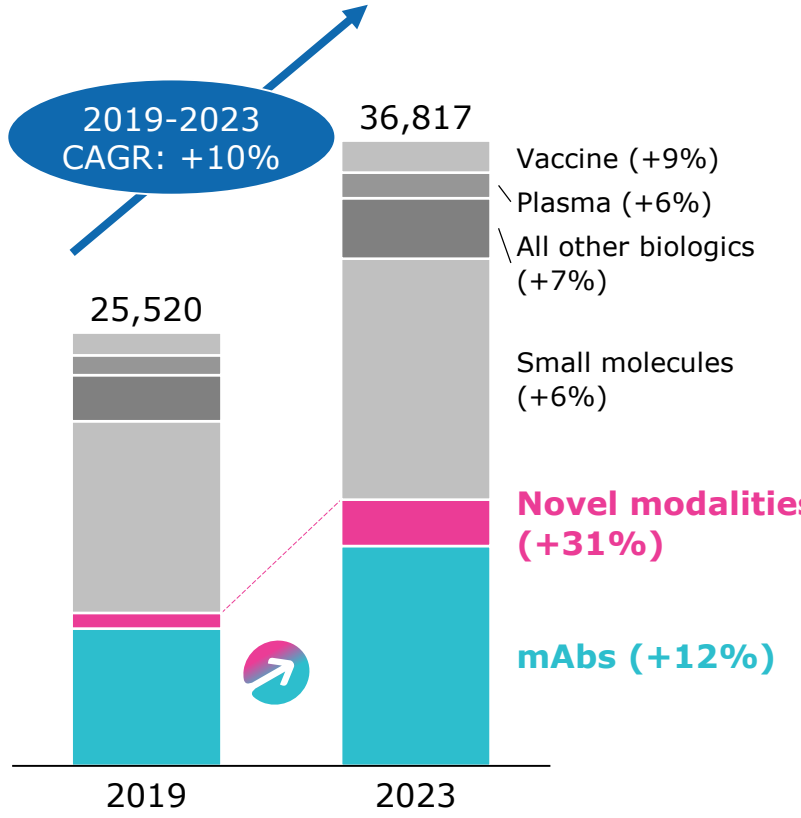
Market development

- 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

[1]Biosimilars scaling factor = 2.8 based off internal estimates and McKinsey analysis; [2]Top 10 mAbs by 2017 volume, includes Enbrel.
Source: EvaluatePharma | Sept 2018; mAbs = Monoclonal antibodies

Proccess Solutions: Growth opportunities beyond mAbs

Growth potential by segment
Accessible market [€m], 2019-2023 CAGR[1]



- **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

[1]Evaluate 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

understand → prove → deliver →

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

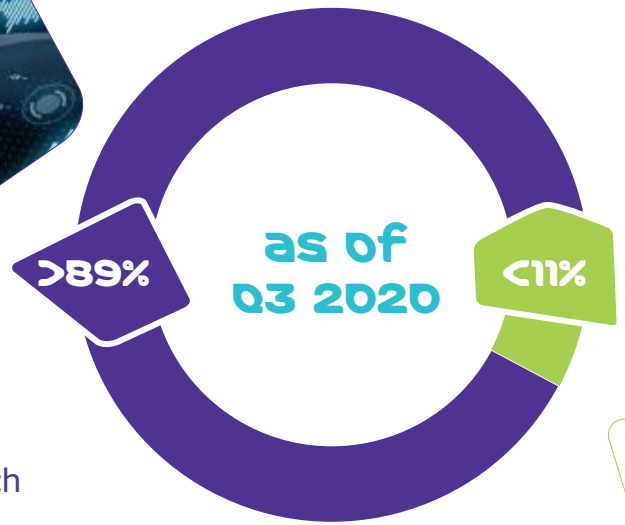
Merck KGaA, Darmstadt, Germany is a supplier of novel products and services with a strong IP portfolio to meet the rapidly growing demand for novel therapies

Abbreviations: CRISPR = Clustered Regularly Interspaced Short Palindromic Repeats; VGT = Virology and Gene Therapy, ZFN = zinc finger nuclease; ADME = absorption, distribution, metabolism, and excretion; GMP = good manufacturing practice

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

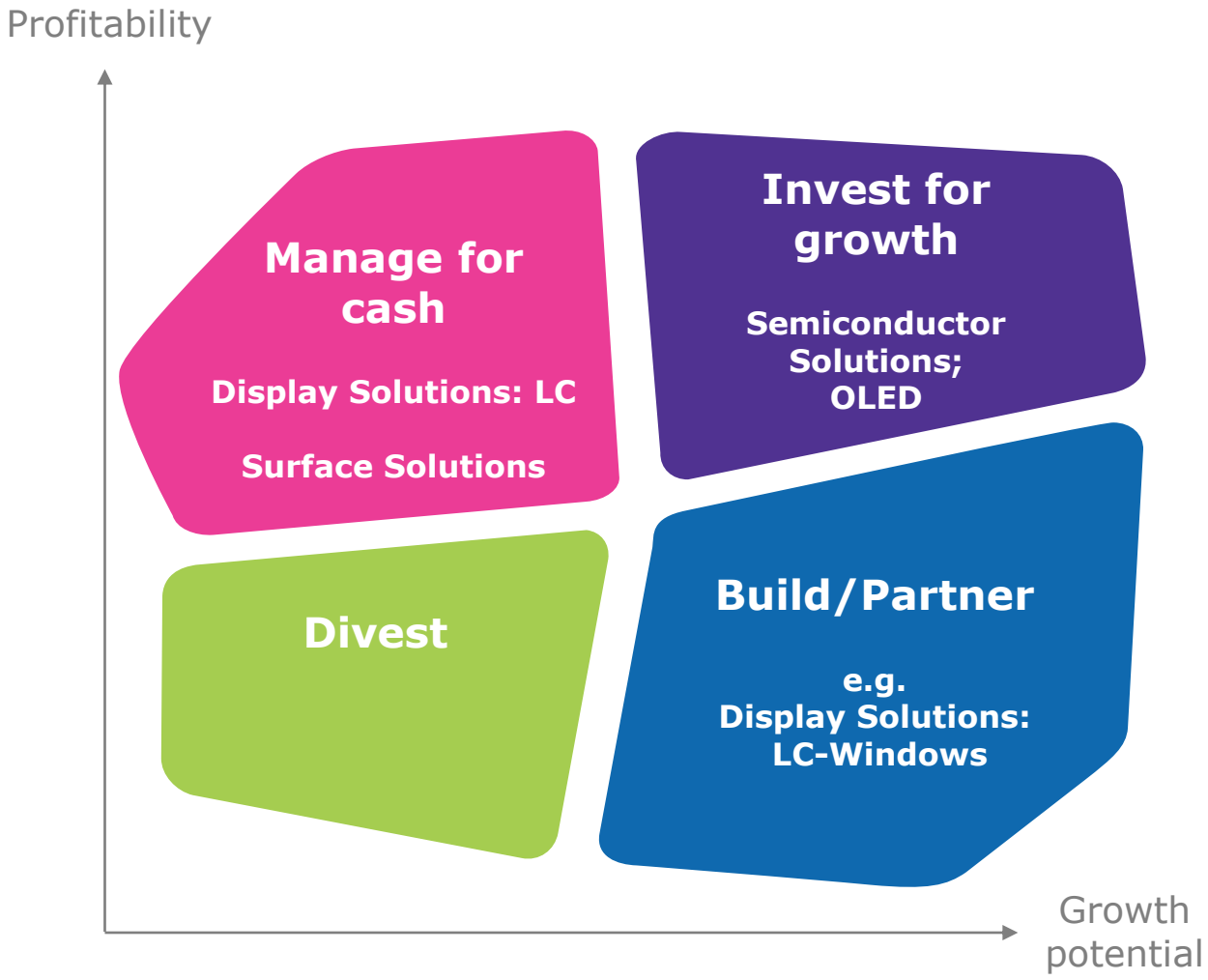
Performance Materials

Three high-tech pillars serving a diverse customer base

Business allocation within Performance Materials	% of sales[1]	Products
 semiconductor solutions	 ~56%	• 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
 display solutions	 ~33%	• 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
 surface solutions	 ~11%	• Effect pigments and functional materials for coatings, plastics, printing and cosmetics • Functional materials for cosmetics & special applications • Functional materials for electronics and energy solutions

[1]based on 9M 2020

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

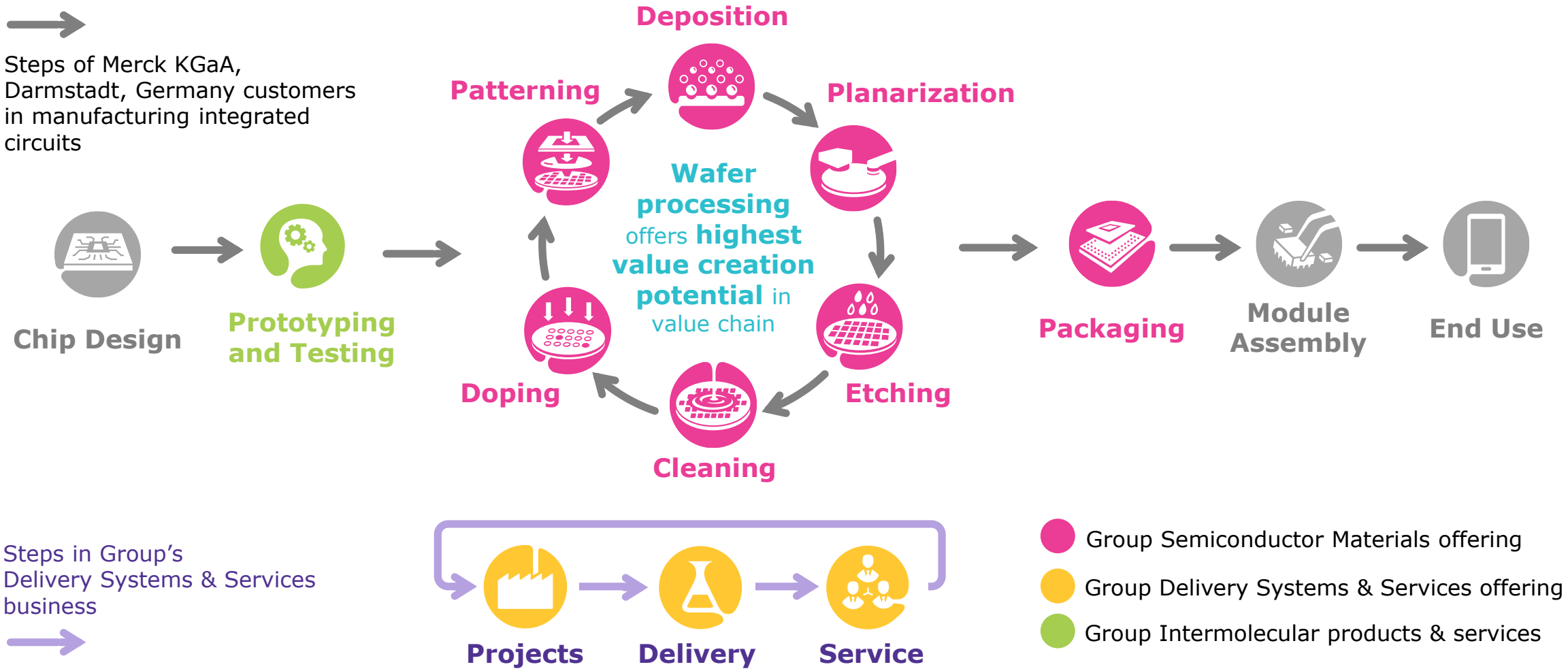
Build or Partner

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

Divest

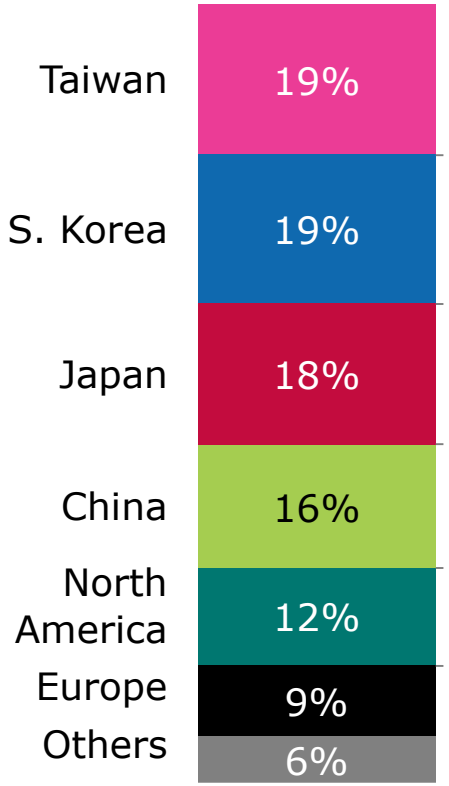
- Regular review for better strategic owner

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



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

2019 wafer capacity by region[1]



Selected customers per region[2]

tsmc, UMC, SAMSUNG ELECTRONICS, SK hynix, KIOXIA, SONY, SMIC, YANGTZE MEMORY, intel, Micron, life.augmented, infineon

Semiconductor Solutions has

over 100 customers

supplying all top 10 chip makers and virtually all of the top 100[3]

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

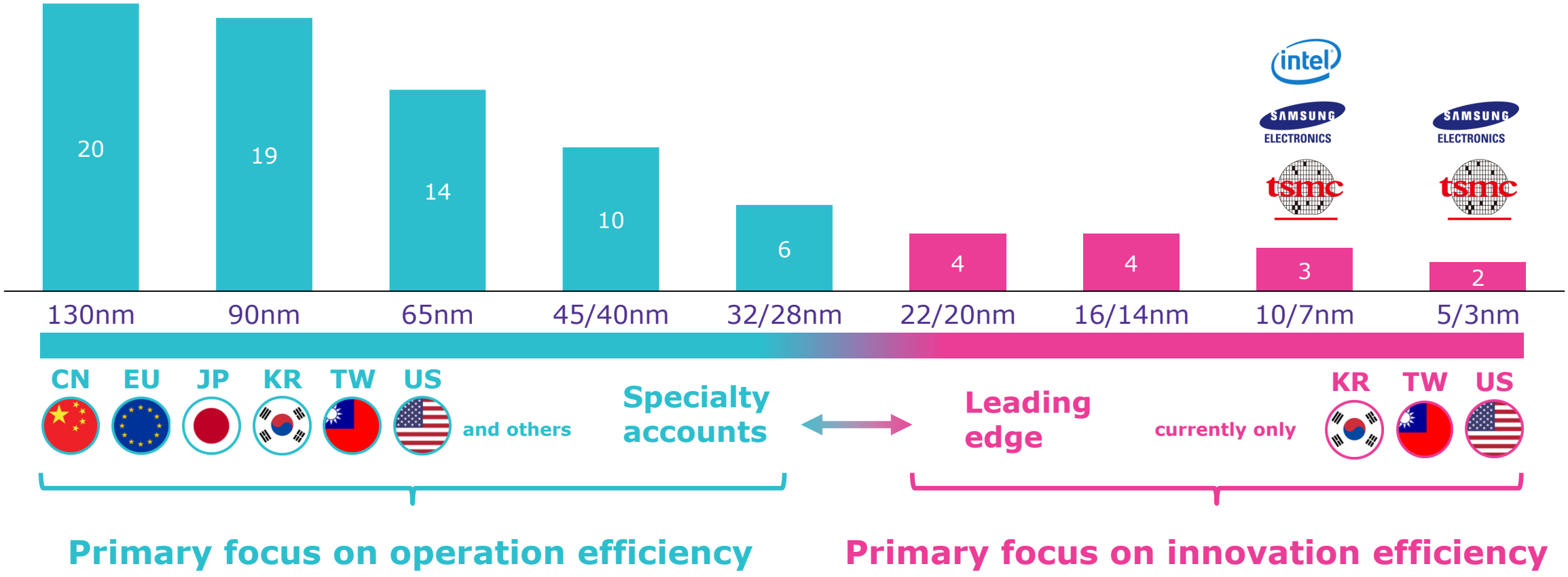
[1]SEMI World Fab Forecast Q3 2020 - Dec 2019 capacity,

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

[3]Based on H1 2020 Sales

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

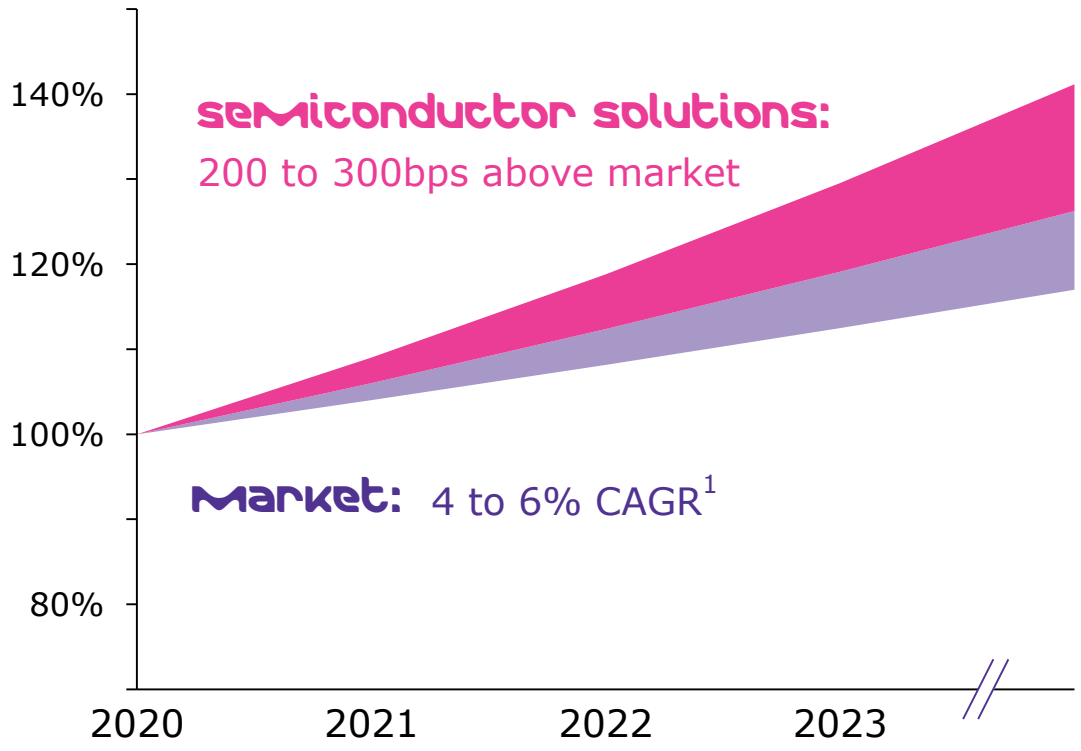
Number of companies currently running volume production per logic chip node[1]



[1]Source: 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%]



[1]Source: 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

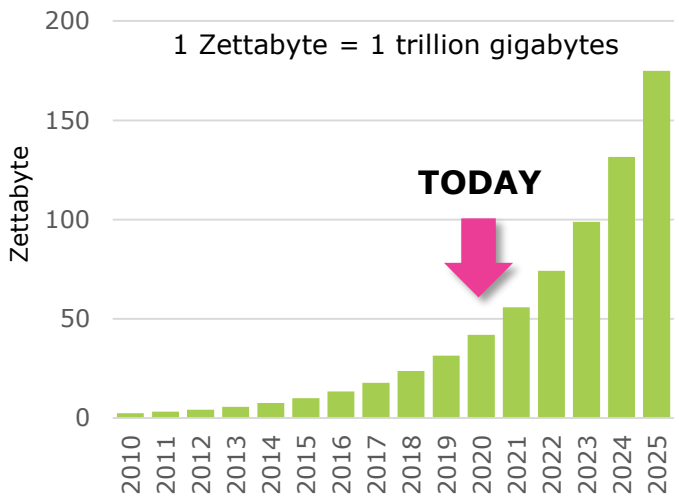
semiconductor solutions

- **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

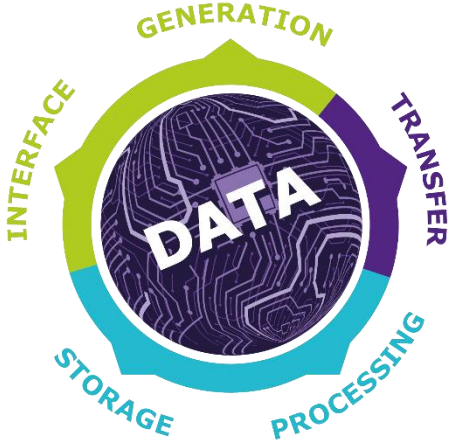
Data created worldwide is growing +30% annually

Size of global data sphere



Source: IDC DataAge 2025 Whitepaper

All segments of data application are affected by global data growth



Technology trends strongly impact relevance of data application segments

Technology market growth - examples

5G Technology[1]
>122% CAGR

Artificial Intelligence[2]
>33% CAGR

IoT Sensors[3]
>24% CAGR

Data Center Services[4]
>13% CAGR

Autonomous Driving[5]
>18% CAGR

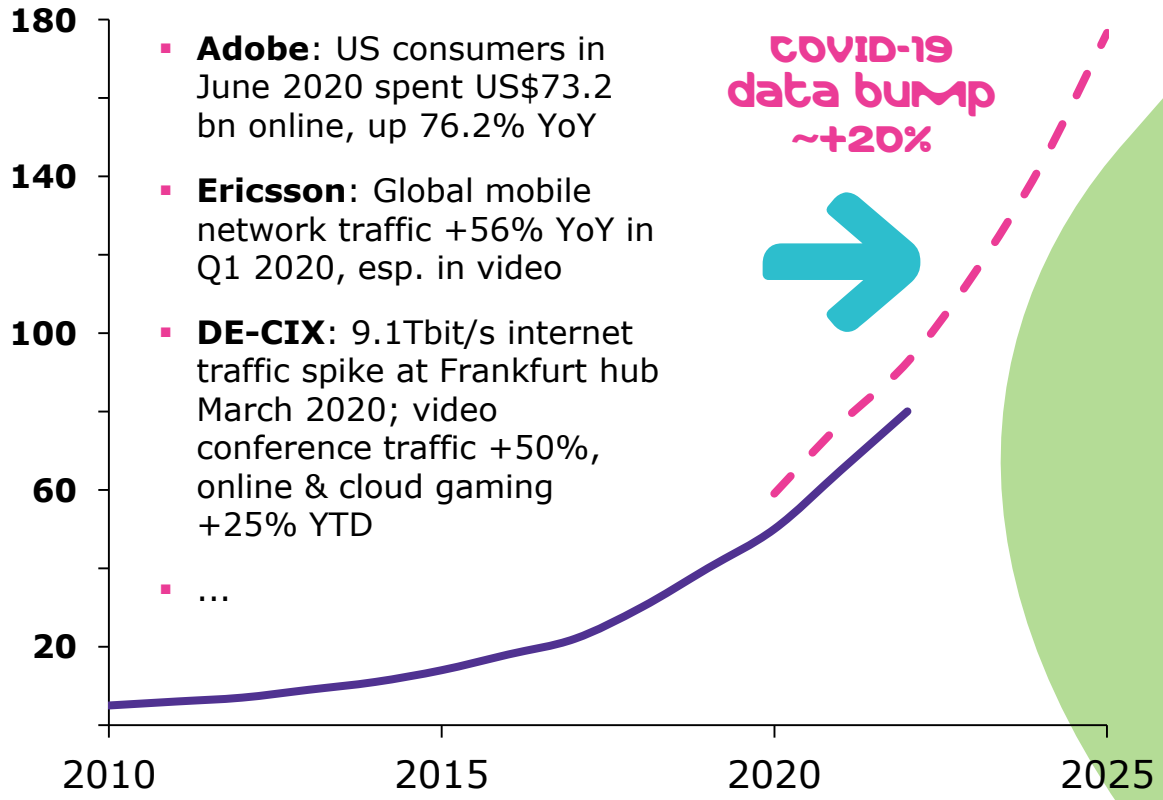
Semiconductor Solutions supports growth trend as part of "**the company behind the companies**, advancing digital living"

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

COVID-19 has vaulted the "digital transformation" by ~5 years[1]

Expected COVID-19 impact on global datasphere[2]

[zetabytes]



- **Adobe**: US consumers in June 2020 spent US$73.2 bn online, up 76.2% YoY
- **Ericsson**: Global mobile network traffic +56% YoY in Q1 2020, esp. in video
- **DE-CIX**: 9.1Tbit/s internet traffic spike at Frankfurt hub March 2020; video conference traffic +50%, online & cloud gaming +25% YTD
- ...

COVID-19 impact on data growth expected to be positive

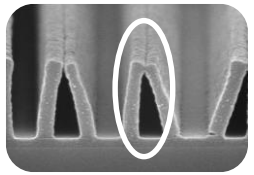
1. Work-from-home/stay-at-home economy
   - Significant increase in video conferences, online shopping, online gaming, streaming
2. Change in consumers' and enterprises' digital behavior expected to be long-lasting
3. Need for more, faster & more reliable data processing, storage and bandwidth
   - Acceleration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

Semiconductor solutions stands ready to support increased demand

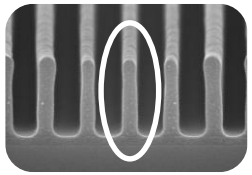
[1]Source: McKinsey May 2020 "The COVID-19 recovery will be digital: A plan for the first 90 days";
[2]Source: Seagate, IDC April 2020, Merck KGaA, Darmstadt, Germany

Expanding the limits of how small you can go

Pattern collapse

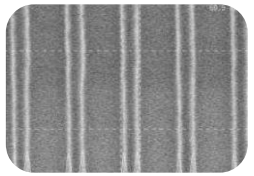


AZ® rinse materials



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

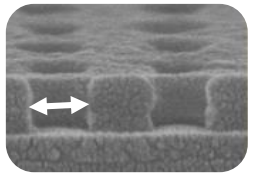
Lithography limitation



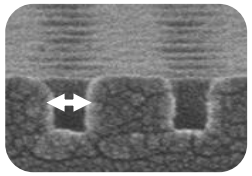
Directed self-assembly (DSA)

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

Wide features



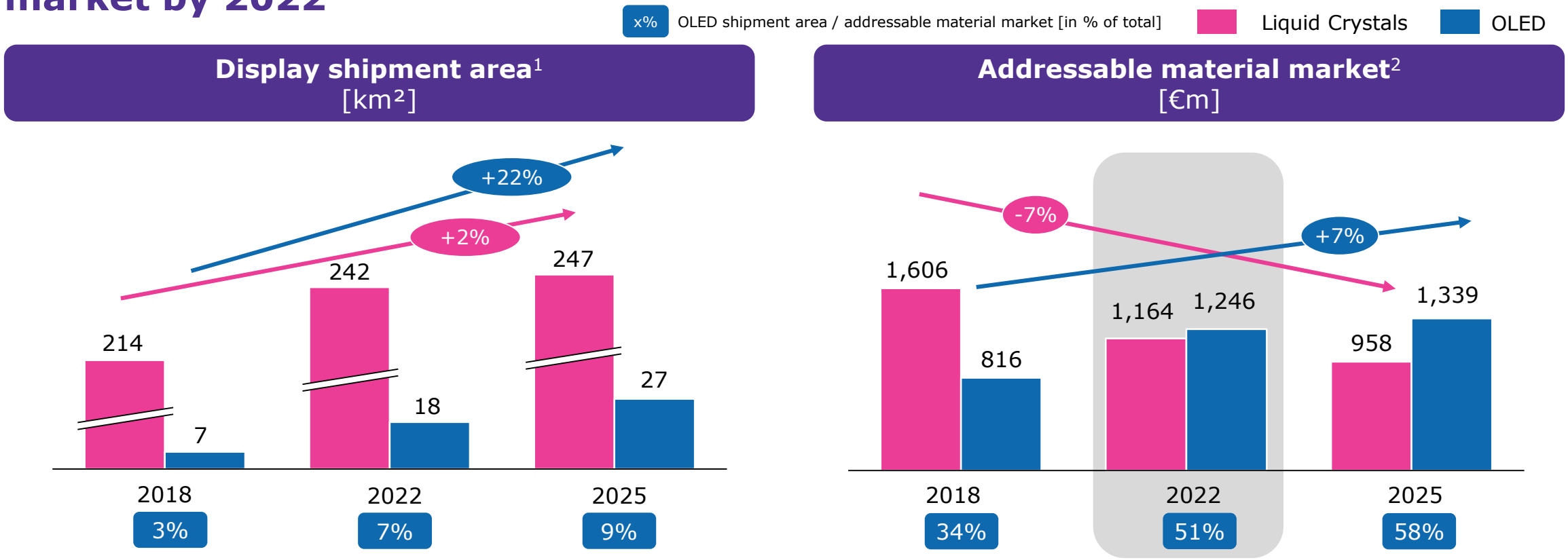
AZ® shrink materials



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

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



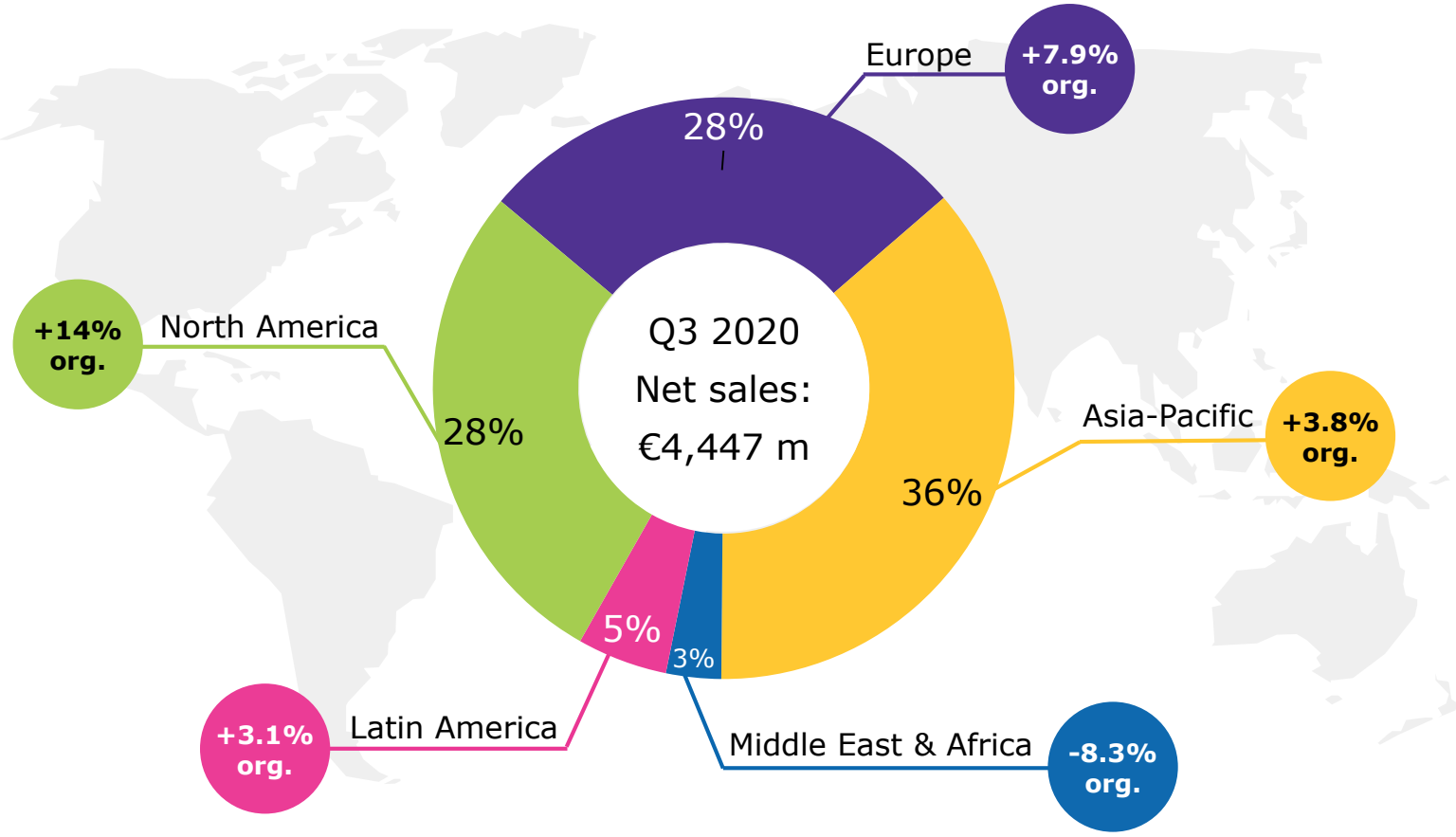
- **Continued growth** across all technologies
- **OLED growing faster than LCD,** but **LCD to command 90+% area share** for foreseeable future

- **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**

[1]OMDSIA; [2]Internal Business Intelligence; Acronyms: LCD = Liquid-Crystal Display, OLED = Organic Light Emitting

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

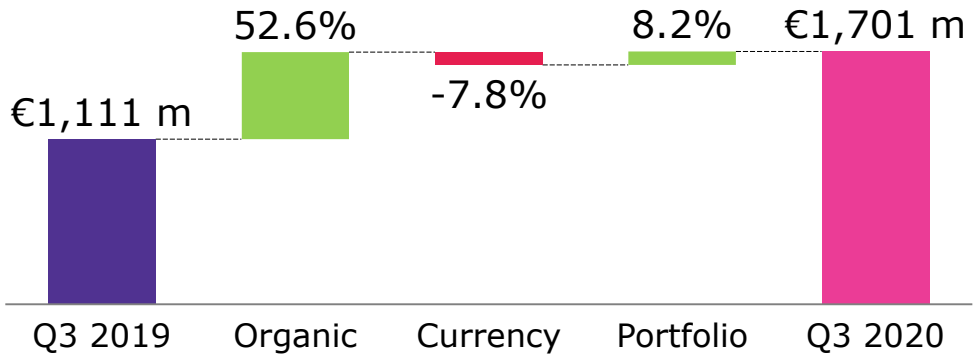
7% organic sales growth driven by swift recovery from COVID-19 in most businesses including "BIG 3" (HC pipeline, Process & Semi Solutions)

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

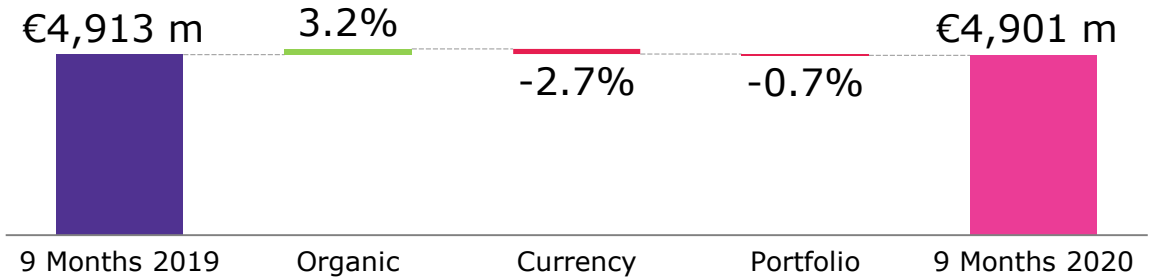
Totals may not add up due to rounding

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

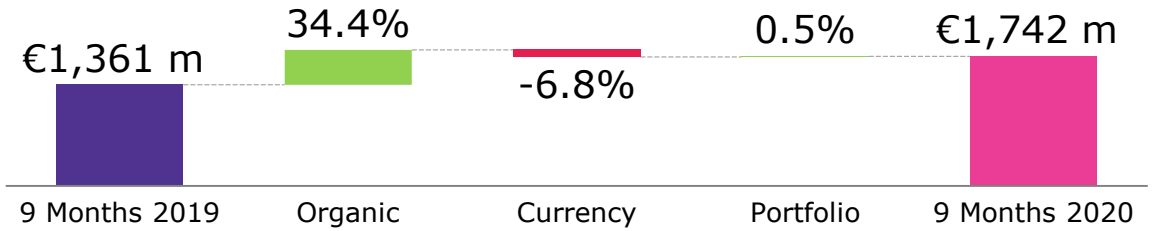
Healthcare P&L

[€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%**

Net sales bridge



EBITDA pre bridge



Comments

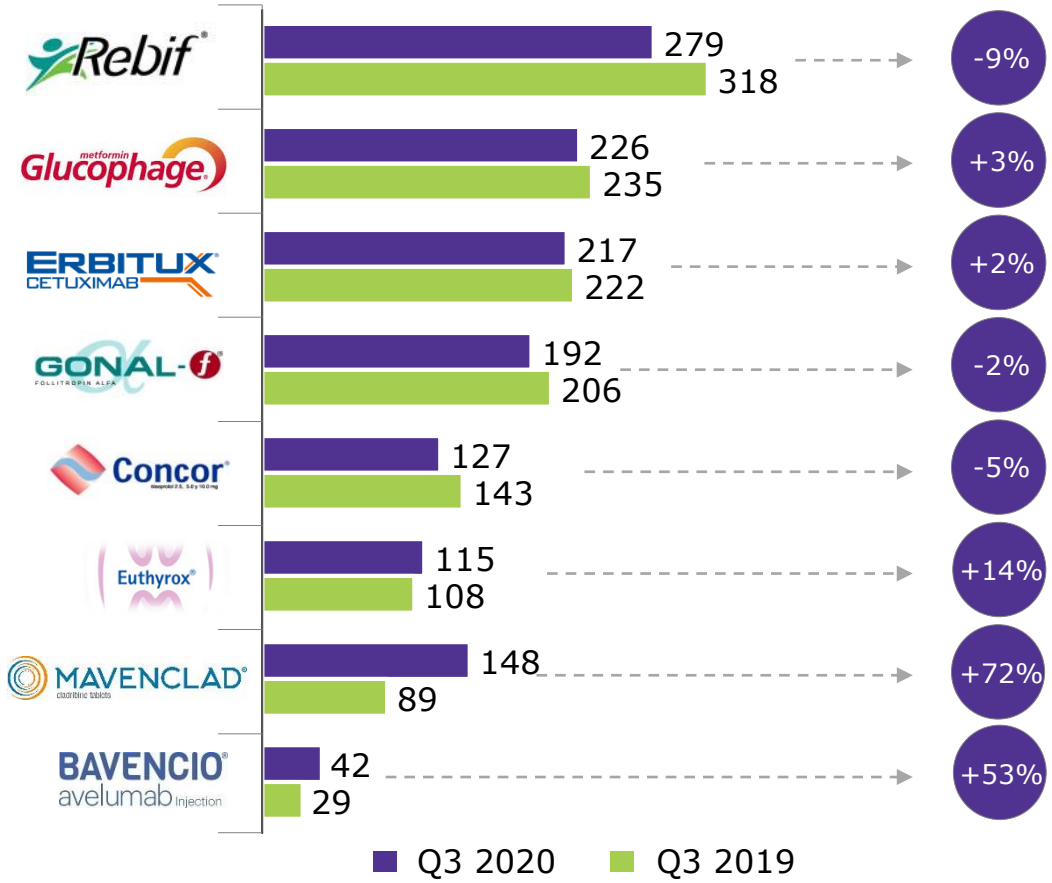
- Mavenclad® swiftly recovered from the dip in Q2, back to expanding dynamic shares in high efficacy and oral class; Rebif® above underlying trajectory with support from fewer switches amid pandemic
- Fertility back to pre COVID-19 levels as of Q3, but picture remains mixed across regions
- Erbitux® 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%)
- 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%

* Marketing and selling expenses

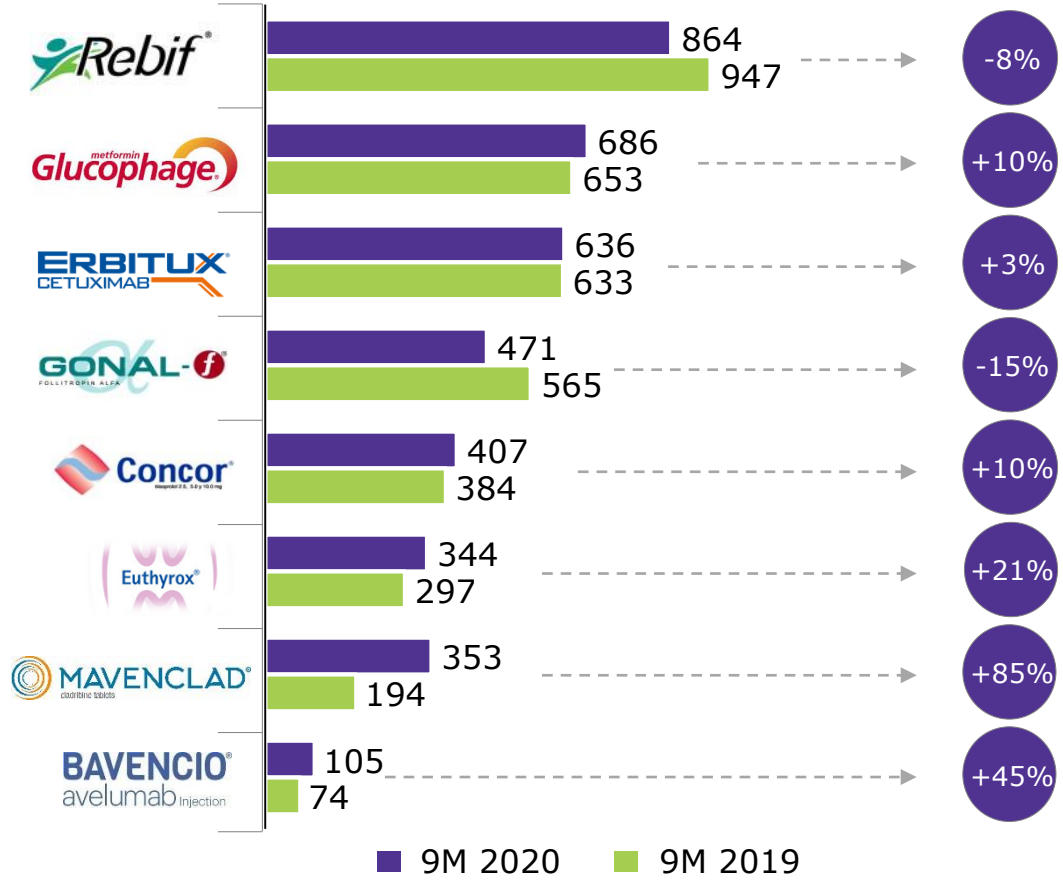
Totals may not add up due to rounding

Healthcare organic growth by franchise/product

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

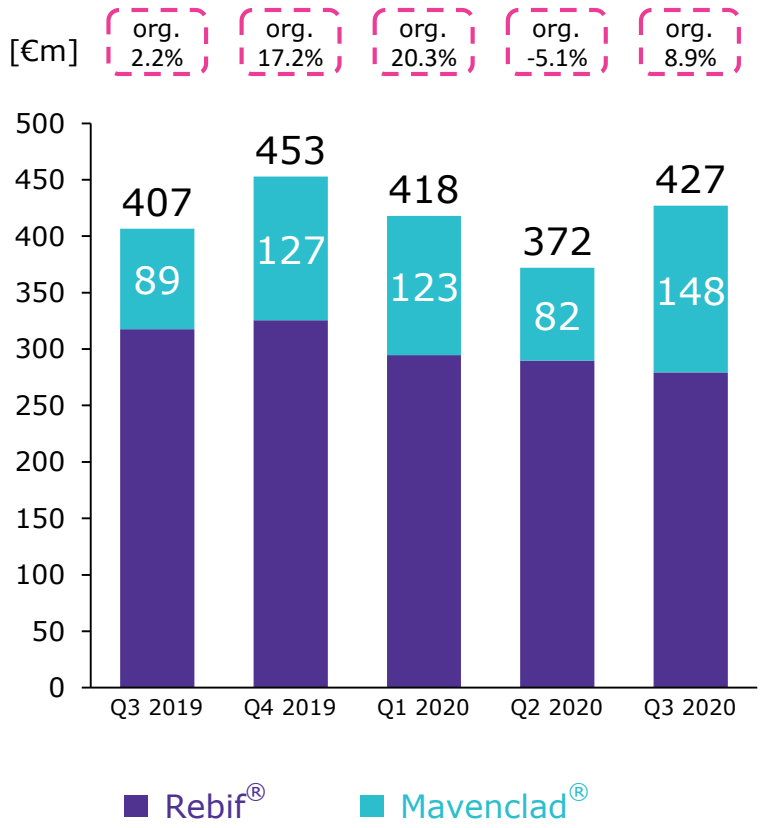


9M 2020 organic sales growth [%] by key product [€m]



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

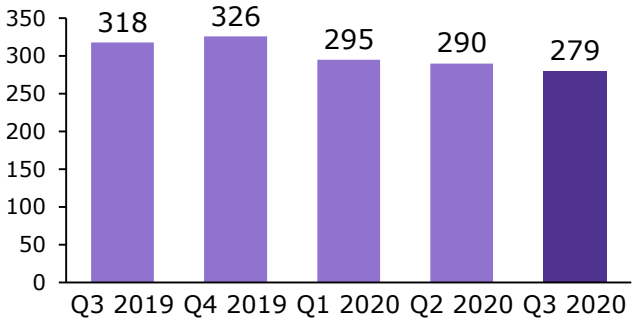
Sales development NDI, [€m]



Mavenclad® TRx[1]

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

Rebif® net sales, [€m]

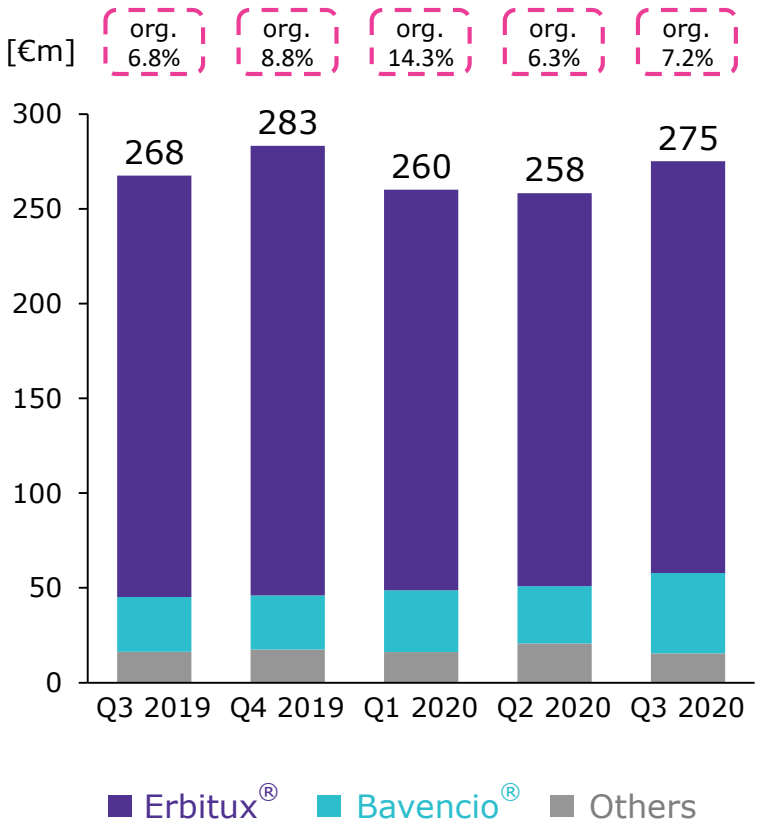


- Rebif® €279 m in Q3 remains above anticipated trajectory with -9% decline supported by lower switches amid pandemic
- FX headwinds of -3.5% largely from the U.S.

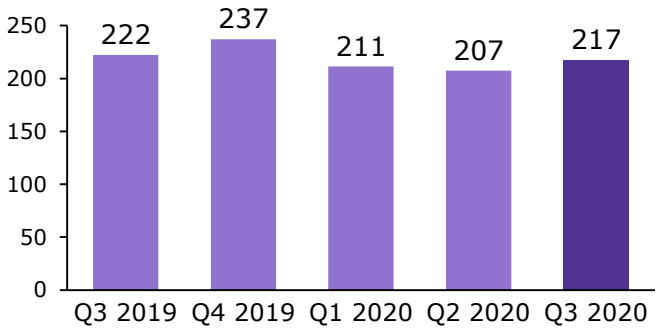
1: IQVIA, NPA, Weekly View, May 2019 to October 9, 2020;
2: October vs March 2020 (IQVIA claims data)

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

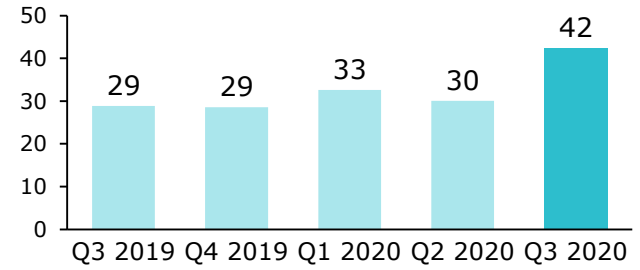
Sales development Oncology, [€m]



Erbitux® net sales, [€m]



Bavencio® net sales, [€m]

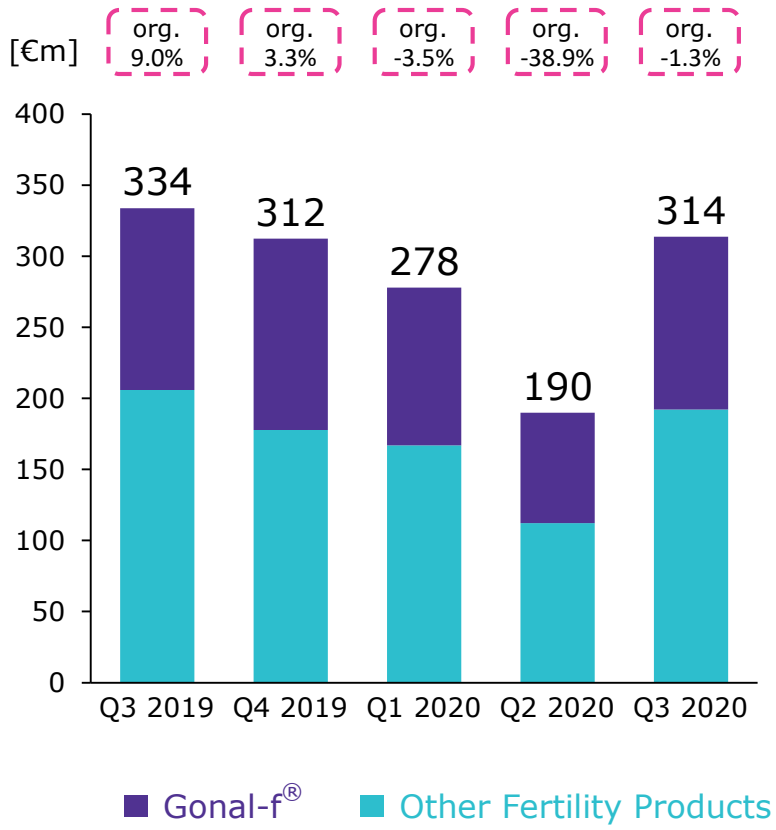


- Absolute sales of €217 m reflect resilient growth of 2% in Q3
- YTD growth at 3.4% driven by solid performance in China and emerging markets
- Overall limited negative impact from COVID-19

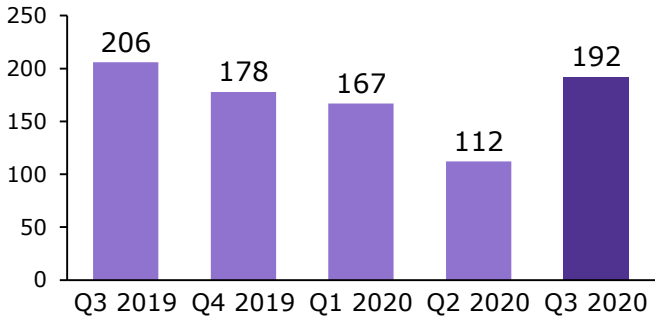
- Bavencio® up 41% sequentially vs. Q2
- UC 1L progressing very well in first three months of U.S. launch; strong foundation for 2021

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

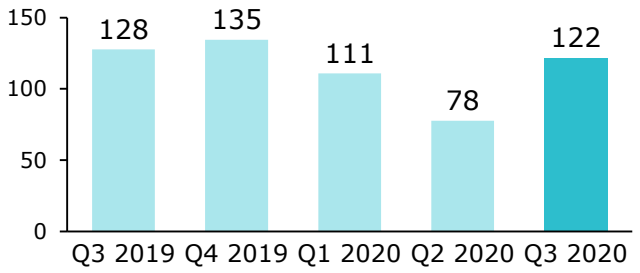
Sales development Fertility, [€m]



Gonal-f® net sales, [€m]



Other Fertility net sales, [€m]

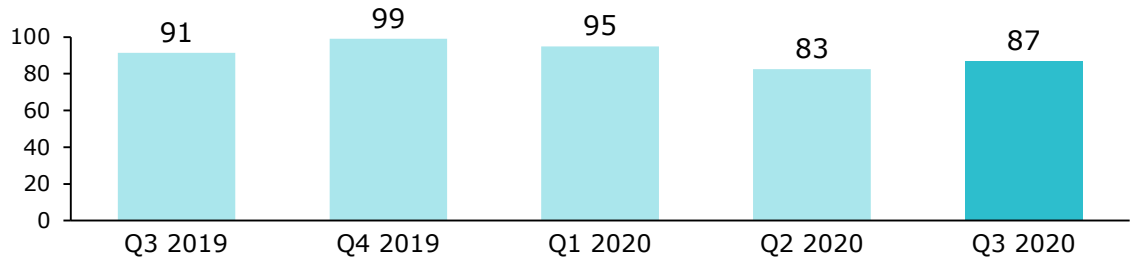


- In Q3 2020 Fertility portfolio broadly in line with particularly strong Q3 2019 sales
- YTD still 15% below 2019 as lost Q2 sales are not recovered based on differentiated picture across regions
- While North America is already growing YTD September, other regions are still catching up

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

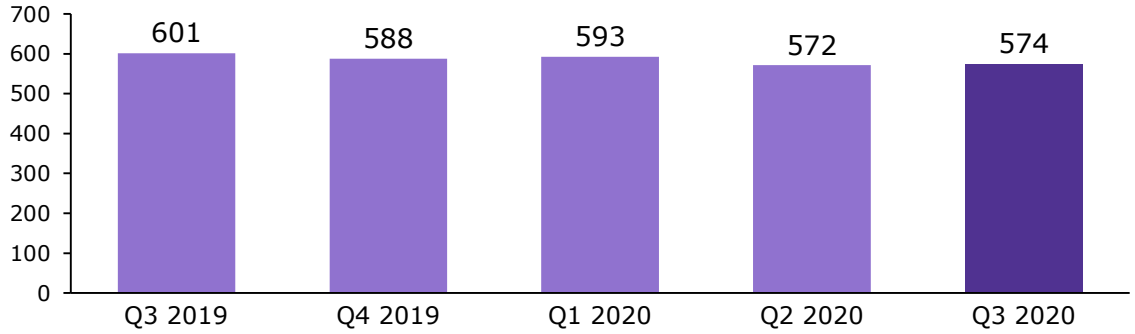
Sales evolution

[€m] Endocrinology



Organic
-0.2% org.

[€m] General Medicine*



Organic
+1.5% 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

- Concor® saw anticipated impact from VBP[1] in China
- Rest of portfolio more that offsets this leading to 1.5% organic growth in Q3

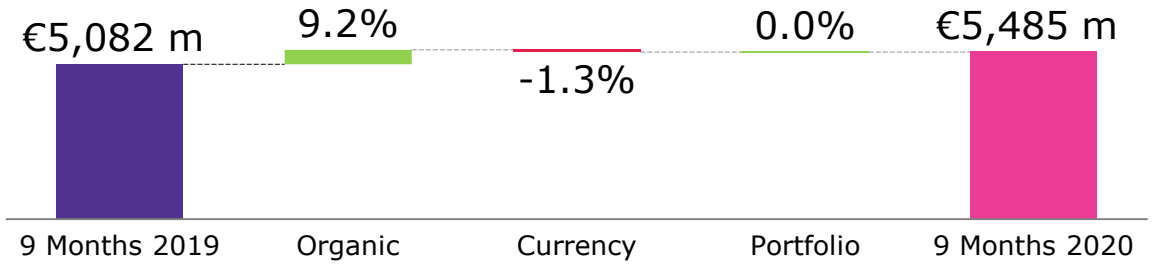
[1] Volume Based Procurement
*includes CardioMetabolic Care & General Medicine and Others

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

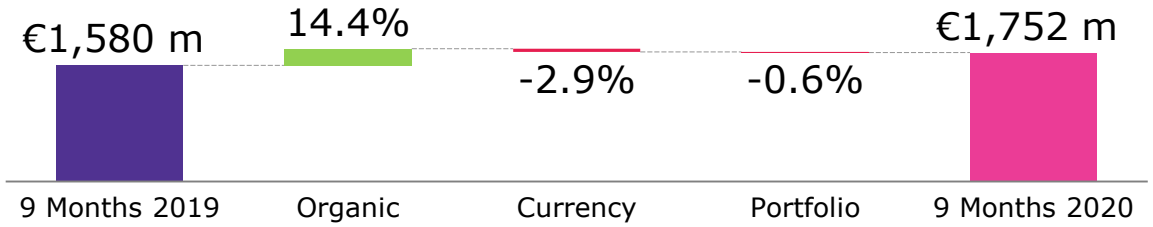
Life Science P&L

[€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%**

Net sales bridge



EBITDA pre bridge



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 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%

* Marketing and selling expenses

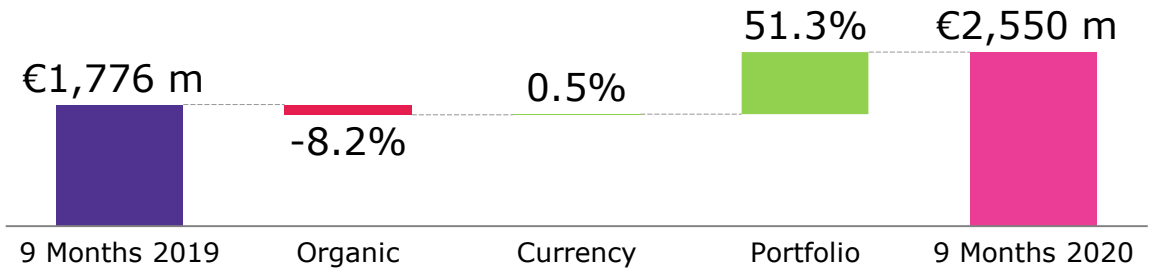
Totals may not add up due to rounding

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

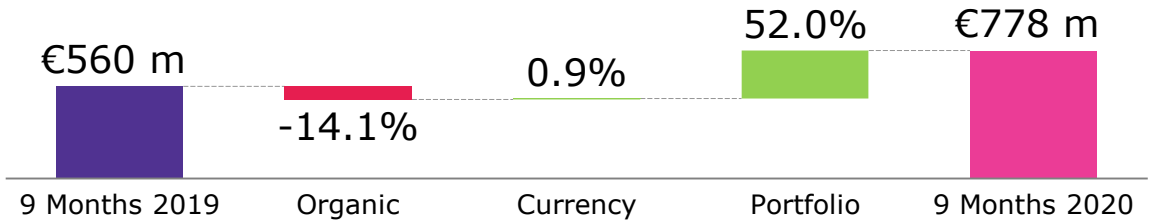
Performance Materials P&L

[€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%**

Net sales bridge



EBITDA pre bridge



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 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

* Marketing and selling expenses

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

*Long Term Incentive Plan

Totals may not add up due to rounding

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

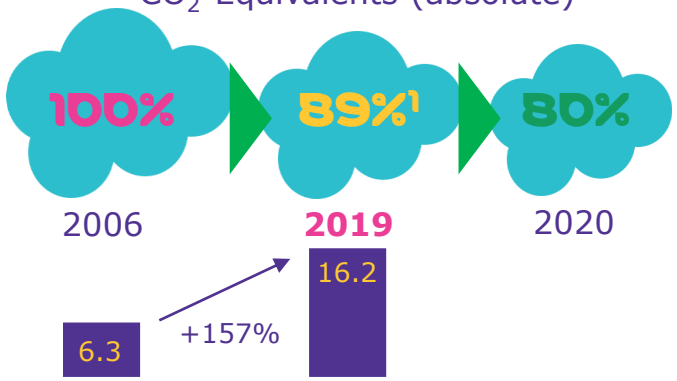
Environmental Targets until 2020

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 CO_2 equiv.
- We still confirm our goal for 2020 expecting positive impact from latest initiatives, e.g. process optimizations and change to renewable energy

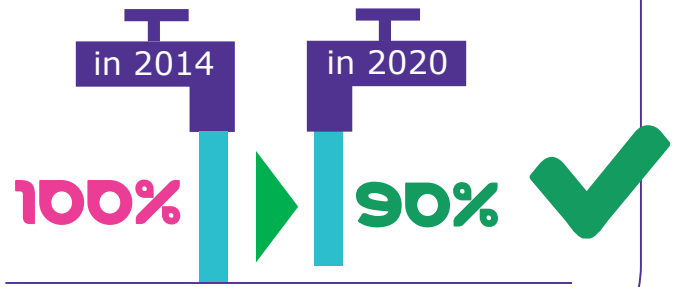
CO_2-Equivalents (absolute)



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



2019: -21%

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

Company’s Waste Score

[1]The figures exclude Versum Materials since the integration process is still underway. Based on the figures Versum Materials reported for the previous two years (not calculated in accordance with our metrics), we expect this to add roughly 1.3 million metric tons of CO_2eq per year to our carbon footprint.

Sustainability Rankings
External stakeholders valuate 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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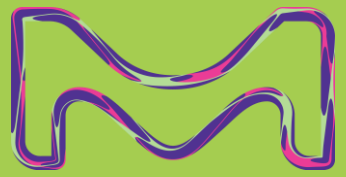

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