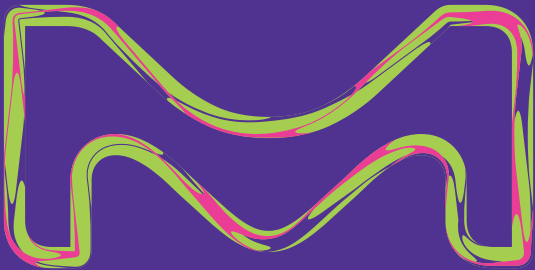




MERCK KGAA, DARMSTADT, GERMANY – Q4/FY 2017 ROADSHOW

Investor Relations

March 2018





Disclaimer

Publication of Merck KGaA, Darmstadt, Germany. In the United States and Canada the group of companies affiliated with Merck KGaA, Darmstadt, Germany operates under individual business names (EMD Serono, Millipore Sigma, EMD Performance Materials). To reflect such fact and to avoid any misconceptions of the reader of the publication certain logos, terms and business descriptions of the publication have been substituted or additional descriptions have been added. This version of the publication, therefore, slightly deviates from the otherwise identical version of the publication provided outside the United States and Canada.

Disclaimer

Cautionary Note Regarding Forward-Looking Statements and financial indicators

This communication may include “forward-looking statements.” Statements that include words such as “anticipate,” “expect,” “should,” “would,” “intend,” “plan,” “project,” “seek,” “believe,” “will,” and other words of similar meaning in connection with future events or future operating or financial performance are often used to identify forward-looking statements. All statements in this communication, other than those relating to historical information or current conditions, are forward-looking statements. We intend these forward-looking statements to be covered by the safe harbor provisions for forward-looking statements in the Private Securities Litigation Reform Act of 1995. These forward-looking statements are subject to a number of risks and uncertainties, many of which are beyond control of Merck KGaA, Darmstadt, Germany, which could cause actual results to differ materially from such statements.

Risks and uncertainties include, but are not limited to: the risks of more restrictive regulatory requirements regarding drug pricing, reimbursement and approval; the risk of stricter regulations for the manufacture, testing and marketing of products; the risk of destabilization of political systems and the establishment of trade barriers; the risk of a changing marketing environment for multiple sclerosis products in the European Union; the risk of greater competitive pressure due to biosimilars; the risks of research and development; the risks of discontinuing development projects and regulatory approval of developed medicines; the risk of a temporary ban on products/production facilities or of non-registration of products due to non-compliance with quality standards; the risk of an import ban on products to the United States due to an FDA warning letter; the risks of dependency on suppliers; risks due to product-related crime and espionage; risks in relation to the use of financial instruments; liquidity risks; counterparty risks; market risks; risks of impairment on balance sheet items; risks from pension obligations; risks from product-related and patent law disputes; risks from antitrust law proceedings; risks from drug pricing by the divested Generics Group; risks in human resources; risks from e-crime and cyber attacks; risks due to failure of business-critical information technology applications or to failure of data center capacity; environmental and safety risks; unanticipated contract or regulatory issues; a potential downgrade in the rating of the indebtedness of Merck KGaA, Darmstadt, Germany; downward pressure on the common stock price of Merck KGaA, Darmstadt, Germany and its impact on goodwill impairment evaluations, as well as the impact of future regulatory or legislative actions.

The foregoing review of important factors should not be construed as exhaustive and should be read in conjunction with the other cautionary statements that are included elsewhere, including the Report on Risks and Opportunities Section of the most recent annual report and quarterly report of Merck KGaA, Darmstadt, Germany. Any forward-looking statements made in this communication are qualified in their entirety by these cautionary statements, and there can be no assurance that the actual results or developments anticipated by us will be realized or, even if substantially realized, that they will have the expected consequences to, or effects on, us or our business or operations. Except to the extent required by applicable law, we undertake no obligation to update publicly or revise any forward-looking statement, whether as a result of new information, future developments or otherwise.

This presentation contains certain financial indicators such as EBITDA pre exceptionals, net financial debt and earnings per share pre exceptionals, which are not defined by International Financial Reporting Standards (IFRS). These financial indicators should not be taken into account in order to assess the performance of Merck KGaA, Darmstadt, Germany in isolation or used as an alternative to the financial indicators presented in the consolidated financial statements and determined in accordance with IFRS. The figures presented in this statement have been rounded. This may lead to individual values not adding up to the totals presented.

Agenda

- 01 Business overview**
- 02 Transforming the company**
- 03 Healthcare – Funding for success**
- 04 Life Science – Focusing on profitable growth**
- 05 Performance Materials – Maintaining leadership and innovation**
- 06 Executive summary and guidance**



01

BUSINESS OVERVIEW

Group

Portfolio of three high-tech businesses



Healthcare

Leading in specialty pharma markets

- Biologics and small-molecules
- Research focus: Oncology, Immunology & Immuno-Oncology
- Over-the-counter medicine



Life Science

Leading life science company

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



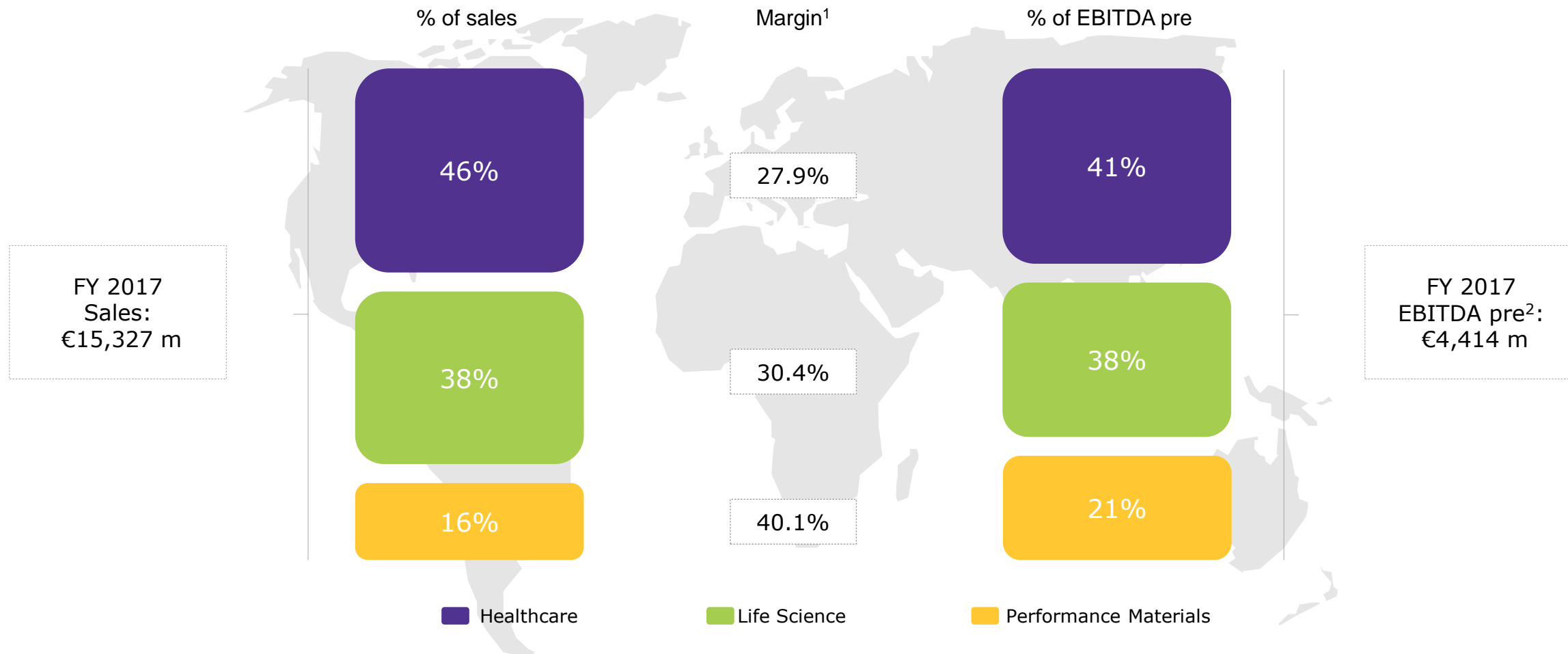
Performance Materials

Market leader in specialty materials

- Innovative display materials
- Effect pigments and functional materials
- High-tech materials for electronics

Group

Strong businesses with attractive margins

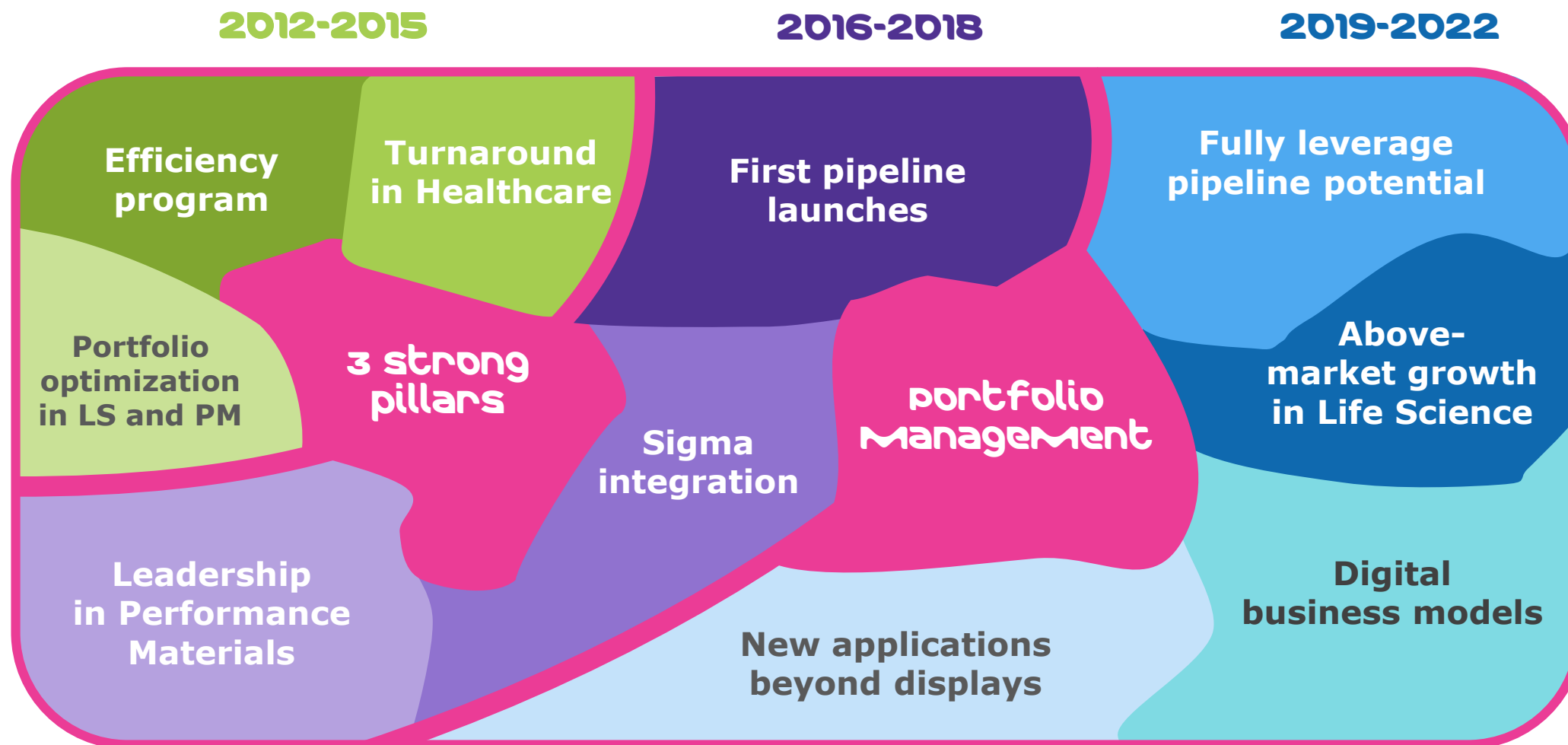


¹EBITDA pre margin in % of net sales; ²Including Corporate/Others (-€301 m)



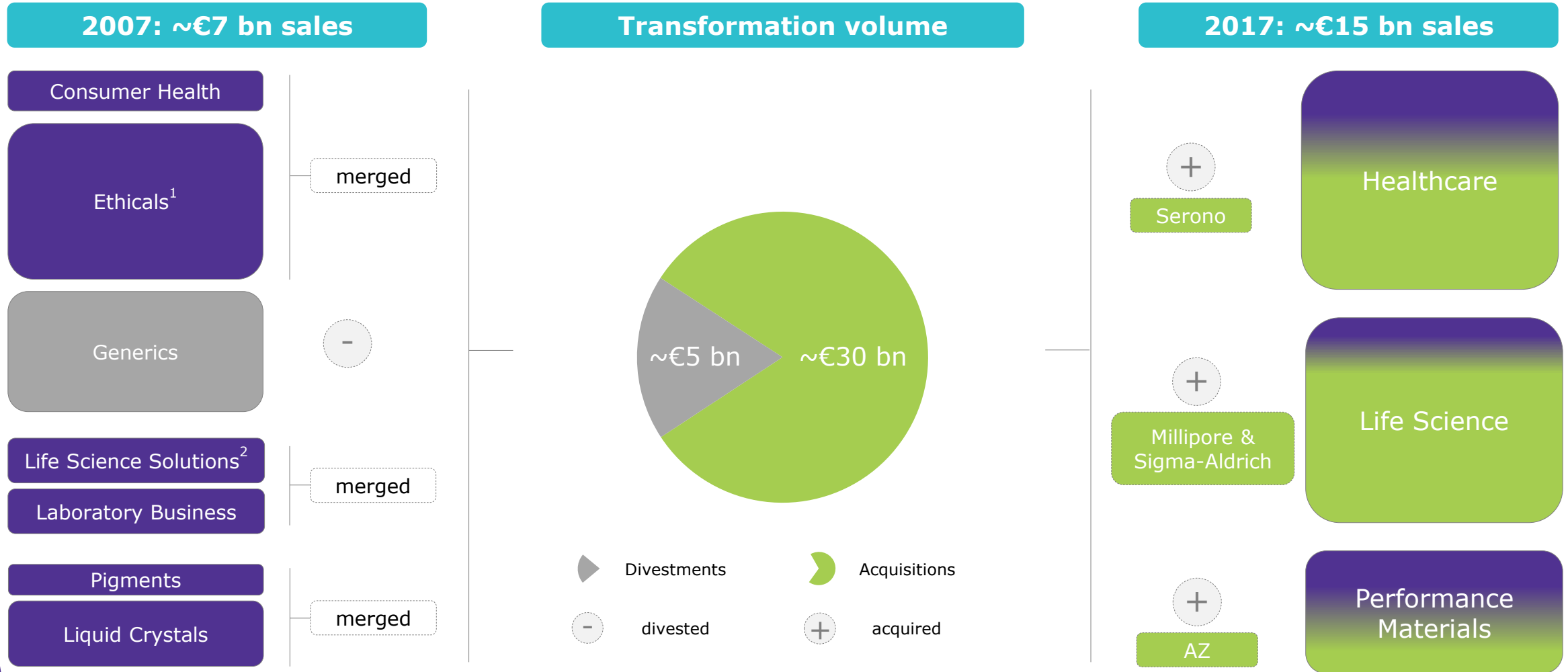
02 TRANSFORMING THE COMPANY

Group Strategic roadmap 2016-2022



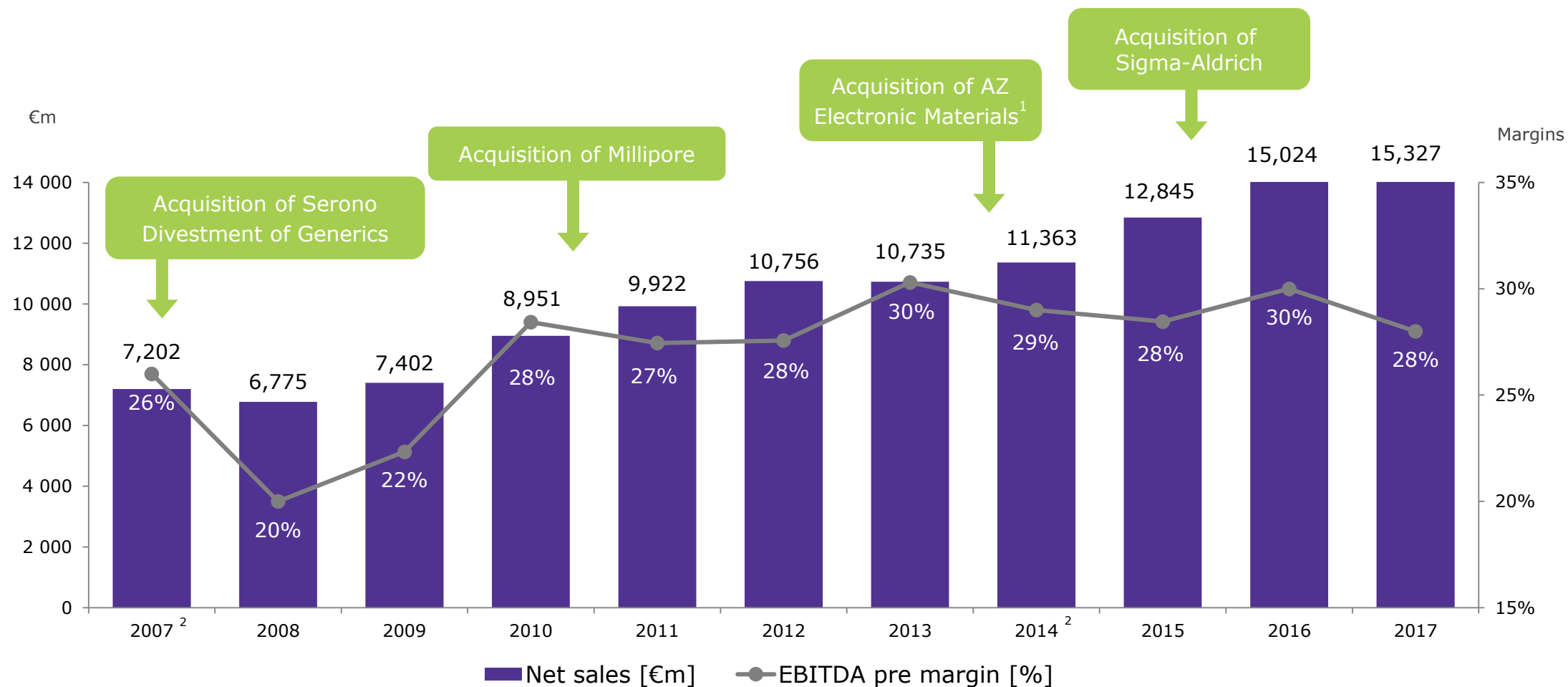
Group

We have added scale and strengthened the attractiveness of our portfolio



Group

Profitability improved fundamentally



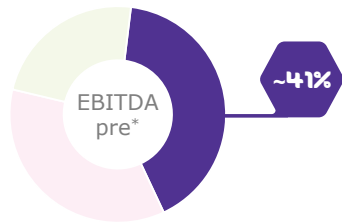
¹Included since 2 May 2014; ²2007 and 2014 EBITDA pre margin adjusted for comparability

Group

Clear set of priority goals to be realized by 2018



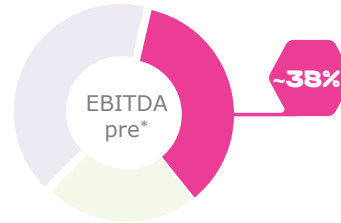
Healthcare



- Maximize growth of existing franchises
- Deliver pipeline: one product launch or indication p.a. from 2017



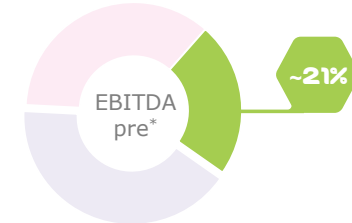
Life science



- Focus on seamless integration and deliver cost synergies
- Leverage strategic capabilities for value creation



Performance Materials



- Drive innovation and technology leadership across all businesses
- Innovate in applications also beyond displays

**MERCK KGaA,
Darmstadt,
Germany**

- Deleverage to <2x net debt / EBITDA pre in 2018
- No large acquisitions (>€500 m) until end of 2018 (unless financed by divestments)
- Dividend policy that ensures a sustainable and resilient development

Regular portfolio review and optimization remains key

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

Regular portfolio review and active capital allocation will continue

**DNA and
track
record**

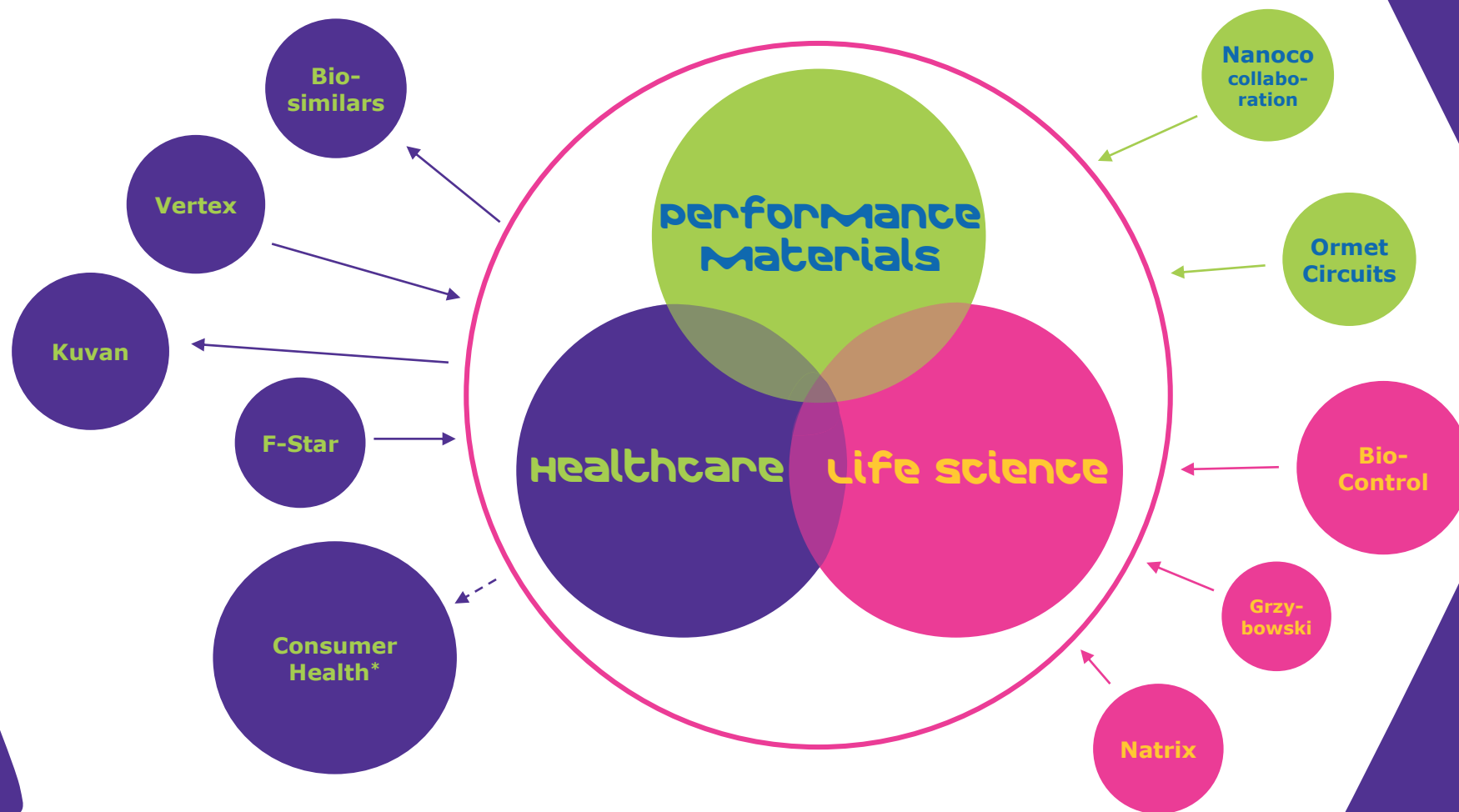
**clear
criteria**

- Supporting mid-term strategy and strengthening core business
- Growing in attractive markets
- Proven track record: strong ability to win
- Compelling financials:
 - $IRR > WACC$
 - EPS pre accretive
 - Maintain investment-grade credit rating

Disciplined approach to portfolio management will persist

Group

Stronger portfolio through active management

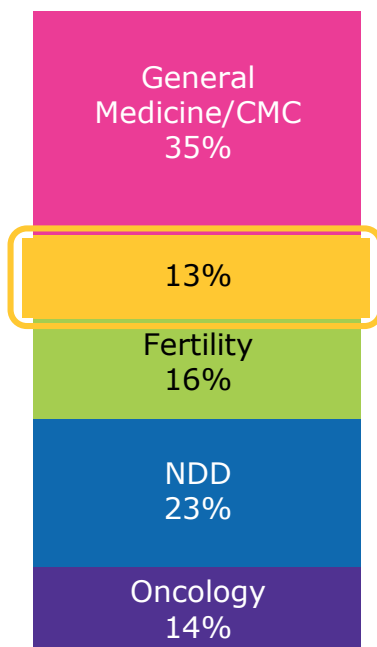


profitable growth and value creation

- Well-balanced approach to organic and inorganic growth
- Strengthened all three businesses
- Increased resilience of Group

Preparing strategic options for Consumer Health

Healthcare - Net sales 2017



CH

- ▶ Consumer Health entering next phase
- ▶ Accelerating successful future development
- ▶ Strategic options include potential full or partial sale or strategic partnerships

high-quality brands

- Well-recognized consumer brands in attractive categories
- Differentiated and compelling consumer brand positioning

diversified presence

- Well-balanced presence in >40 markets
- Strong footprint in emerging markets: >50% of sales from growth markets

high-growth Markets

- Global €100 bn OTC* market seen growing ~5% until 2025
- Strong demand drivers: demographics, emerging markets, self-care demand

attractive financials

- Sales ~€911 m in 2017: org. CAGR 2013-2017 ~6%
- ~3,400 employees globally

Accelerating strategy; fully capturing market opportunities; strong business with leading brands in attractive OTC categories



HEALTHCARE

Funding for success

Healthcare

Healthcare is set to deliver on promising pipeline candidates

Deliver

on organic growth

Focus

on pipeline



Stable existing business



Solid pipeline of oncology, immuno-oncology and immunology molecules



Competitive R&D funding in our focus areas



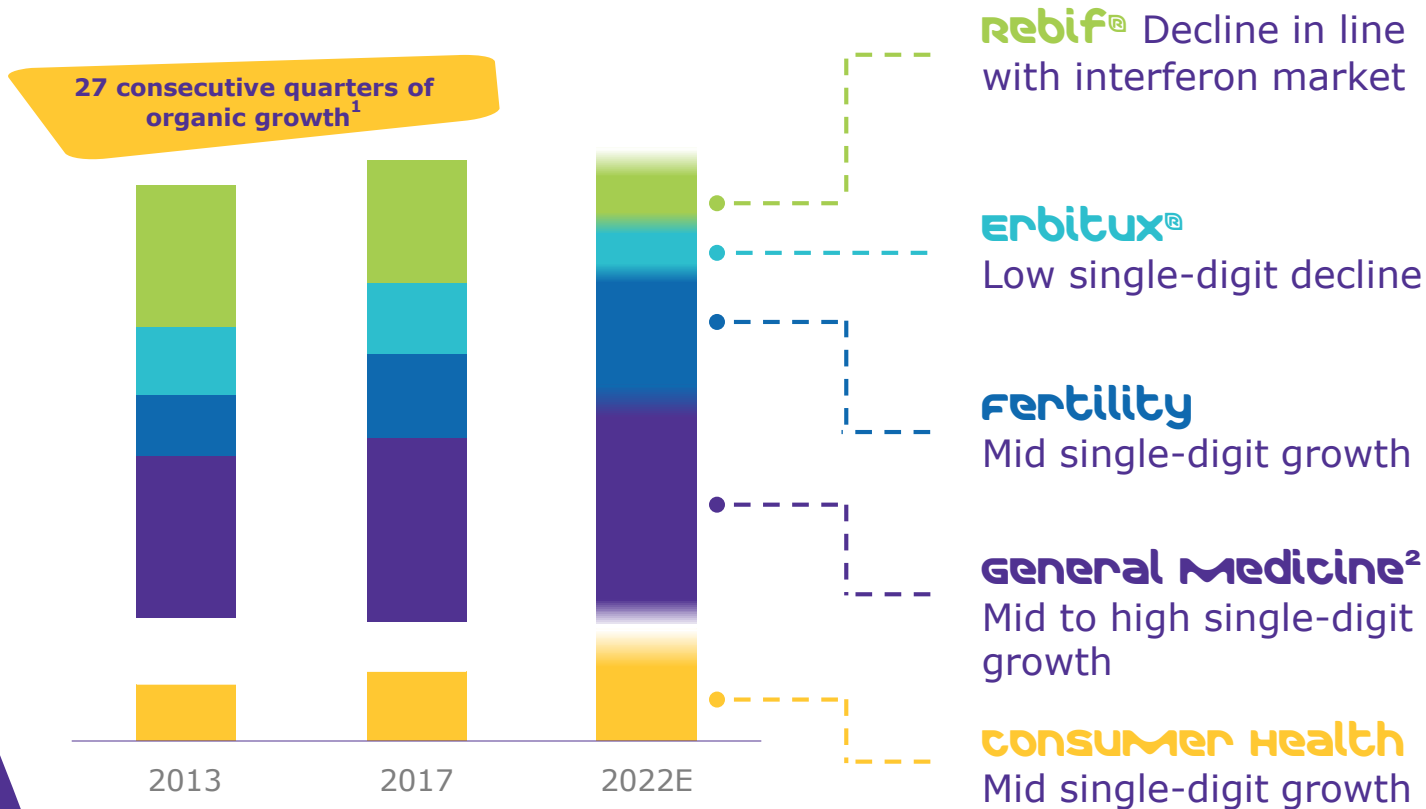
Cost discipline and efficient execution



Healthcare

Ambition to keep core business sales organically stable until 2022

Healthcare core business net sales until 2022

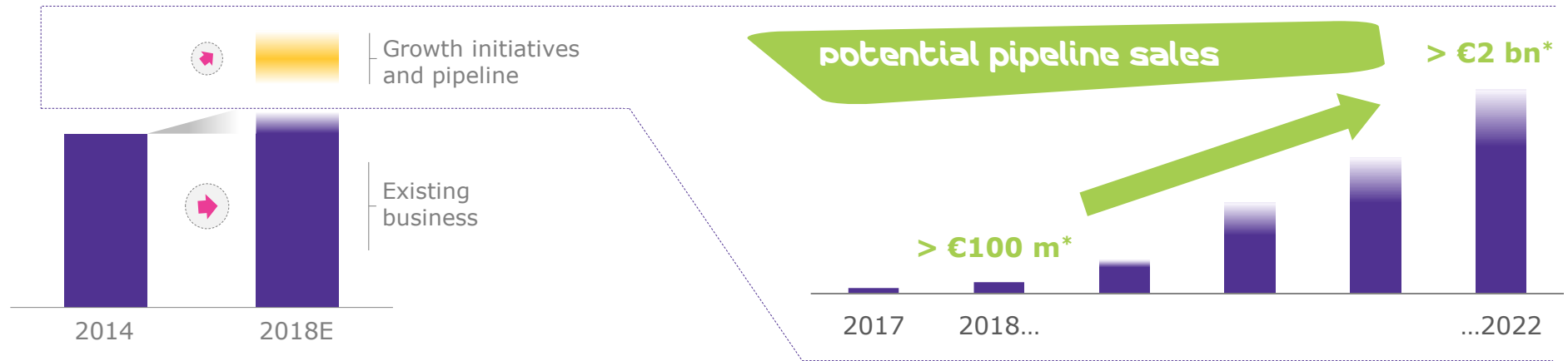


- Maintaining solid track record of patient retention
- Integration into joint franchise strategy with Mavenclad®
- Driving emerging markets growth
- Mitigate price and competitive pressure in EU by clear Erbitux® franchise positioning
- Drug demand driven by emerging markets growth and demographics
- Differentiation versus competition
- Emerging markets demand growth enhanced by new launches, e.g. GlucophageXR® China
- Repatriation measures
- Continuously build emerging markets presence
- Invest in key strategic brands

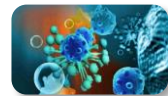
Healthcare

Well on track to deliver the pipeline

Deliver the pipeline



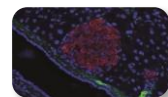
Key investments



Avelumab



BTK – inhibitor



TGF-beta trap

progress 2017

✓ **2 Launches**
Bavencio, Mavenclad

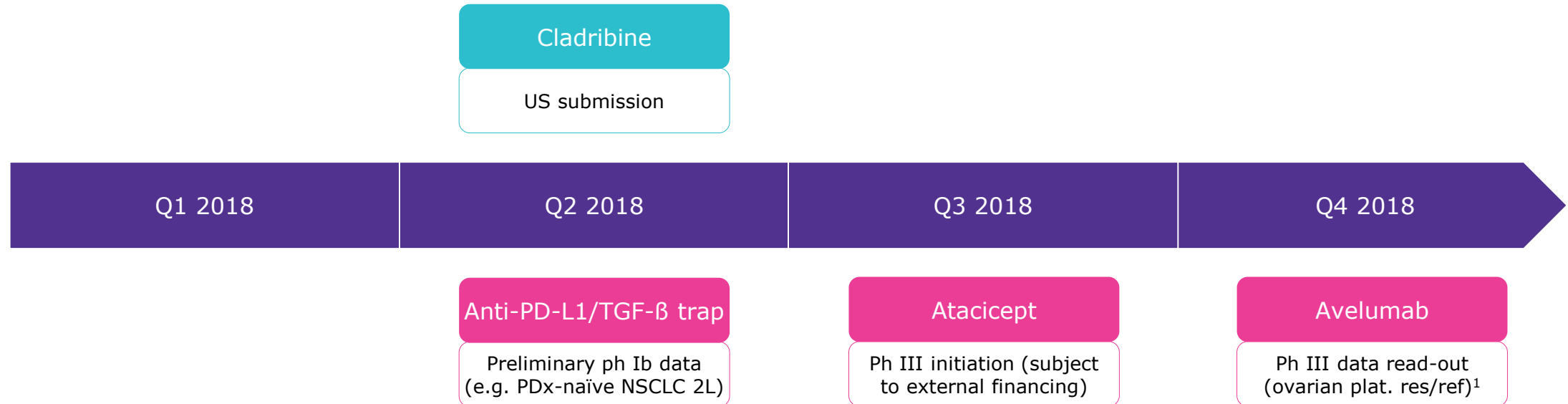
✓ **Breakthrough**
Avelumab (RCC 1L)

✓ **7 approvals**
MCC (US, EU, JP), mUC (US), MS (EU, CAN, AUS)

✓ **FOCUS & PROGRESS**
Investments/Divestments, major phase shifts

Healthcare

Upcoming catalysts





LIFE SCIENCE

Focus on profitable growth

Life Science

Serving customers across the life science industry

RESEARCH



- Academic and government institutions
- Biopharma R&D
- Industry R&D

PROCESS



- Pharmaceutical companies
- Small biotech
- Contract manufacturing organizations

APPLIED

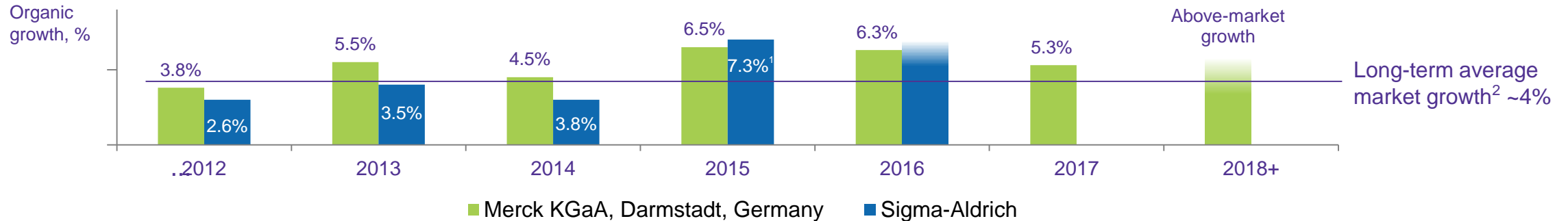


- Diagnostic manufacturers
- Clinical testing labs
- Food & Beverage manufacturers

Life Science

Above-market growth to be enhanced by top-line synergies

Merck KGaA, Darmstadt, Germany and Sigma-Aldrich organic growth rates versus market growth



Sources of market outperformance

1

Portfolio composition

- Exposure to biopharma
- Highest share of consumables
- Broad product offering

2

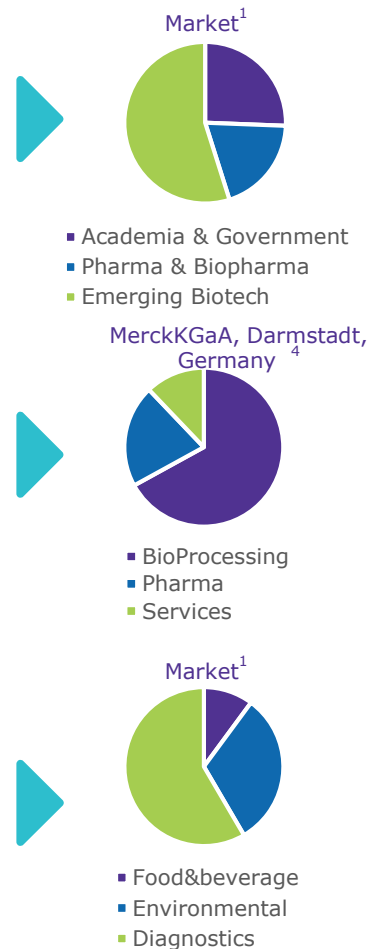
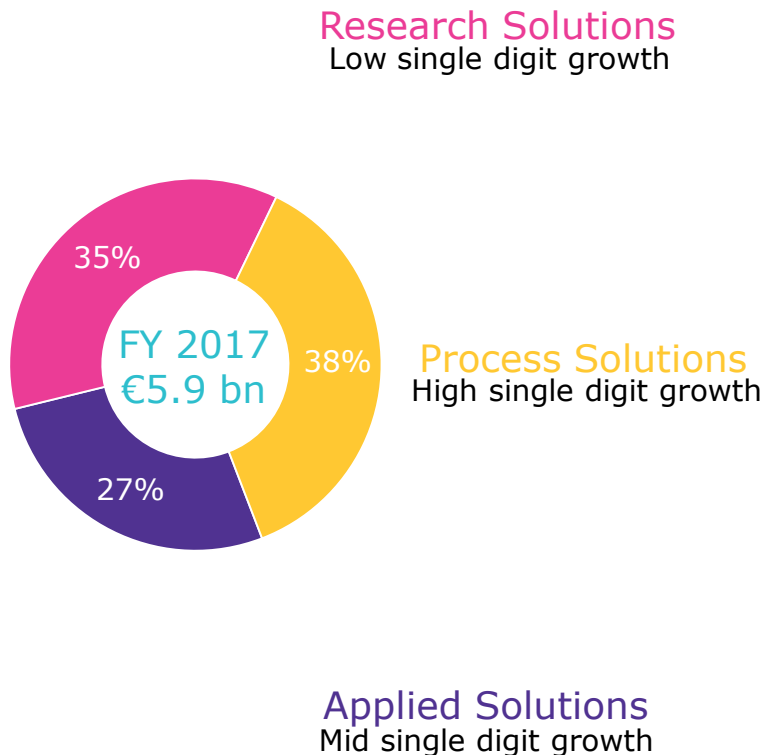
Top-line synergies

- Best in class eCommerce
- Excellent service capabilities
- Global reach

Life Science

Business is on track to deliver above-market organic growth

Life Science



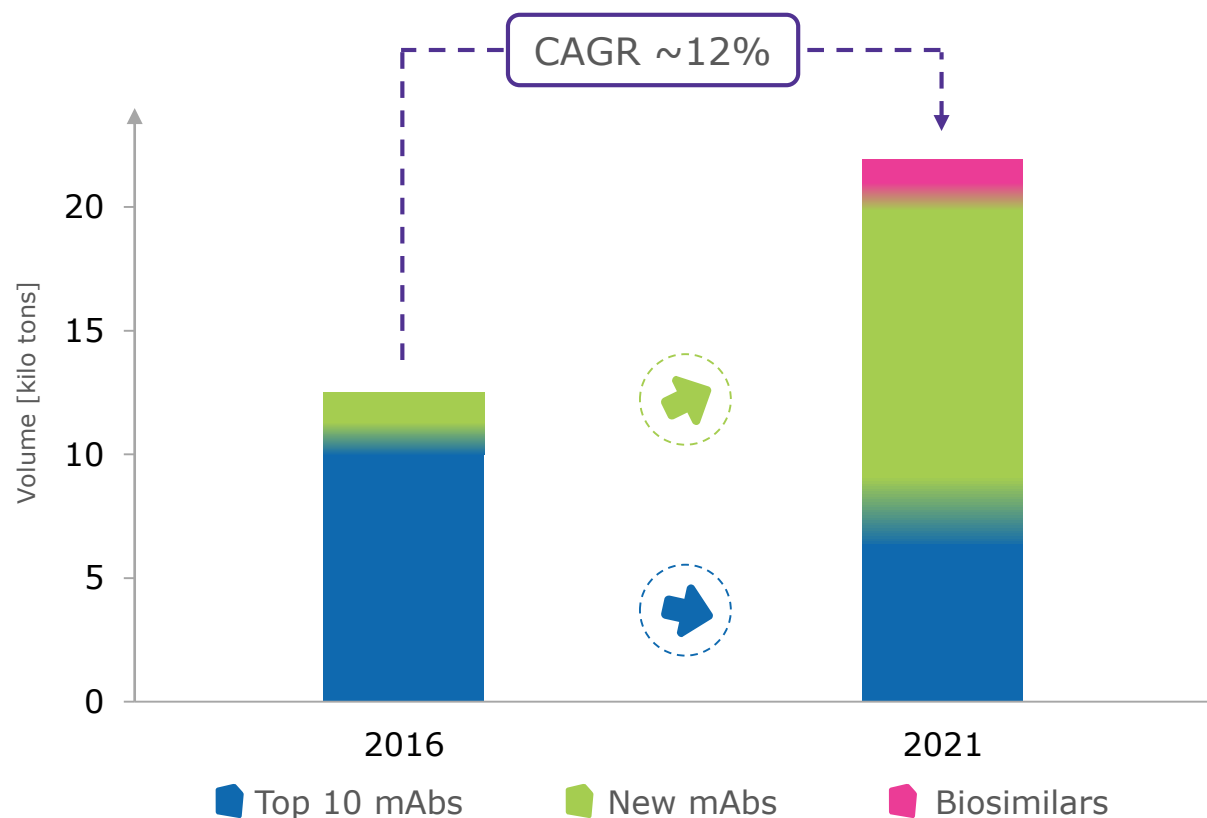
Long-term growth drivers

- **Research activity:** >3,000 projects in research pipelines², rising number of experiments and newly emerging therapies/technologies backs healthy growth in biotech and CROs³
 - **Public and private funding:** availability, access and predictability drive demand from academia and emerging biotech customers
 - **Regulation:** rising requirements foster long-term customer partnerships
-
- **Biologics:** mAbs production⁵ growing by ~12% p.a. for 2016-2021 driven by new molecules and biosimilars
 - **Diversification:** contribution by top 10 molecules will decline to ~30% until 2021 from 80% today⁶
 - **Noval modalities:** innovation in complex-to-deliver therapies, e.g. gene and cell therapy, will drive demand for single-use, end-to-end and new technology solutions
-
- **Regulation:** testing volumes overall are rising globally rise in quality standards and increased 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

¹Source: Merck KGaA, Darmstadt, Germany Factbook; ²Source: PhRMA; ³CRO = Contract Research Organization; ⁴Indicative only; ⁵mAbs = monoclonal antibodies; ⁶Source: EvaluatePharma April 2017

Democratization of mAbs market will drive diversification, change, variability

mAb volume projections 2016 to 2021



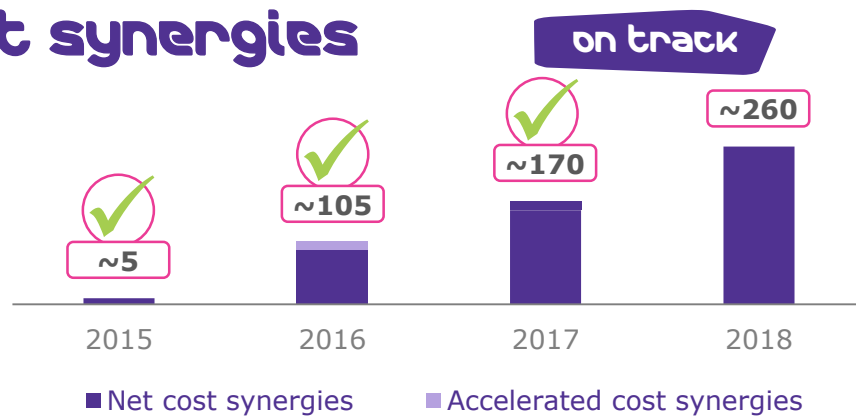
Market development

- Overall mAbs market will grow ~12% CAGR
- Top 10 originator mAbs represent ~80% of market volume
- In 2021 ~90% of the volume will be shared between Top 35 mAbs
- Biosimilars will gain share, but remain a minority mid-term

Integration of Sigma and synergy generation progressing well

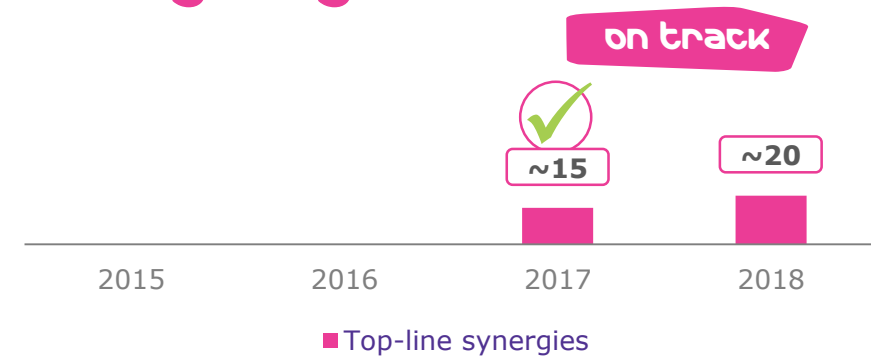
on track to deliver planned synergies of ~ €280 M until 2018

cost synergies



- **Network consolidation and operational transformation ongoing**
 - Consolidated 10 manufacturing and distribution sites
 - Announced consolidation of 5 further sites
- **Combination of customer service centers and offshoring of transactional tasks**

topline synergies

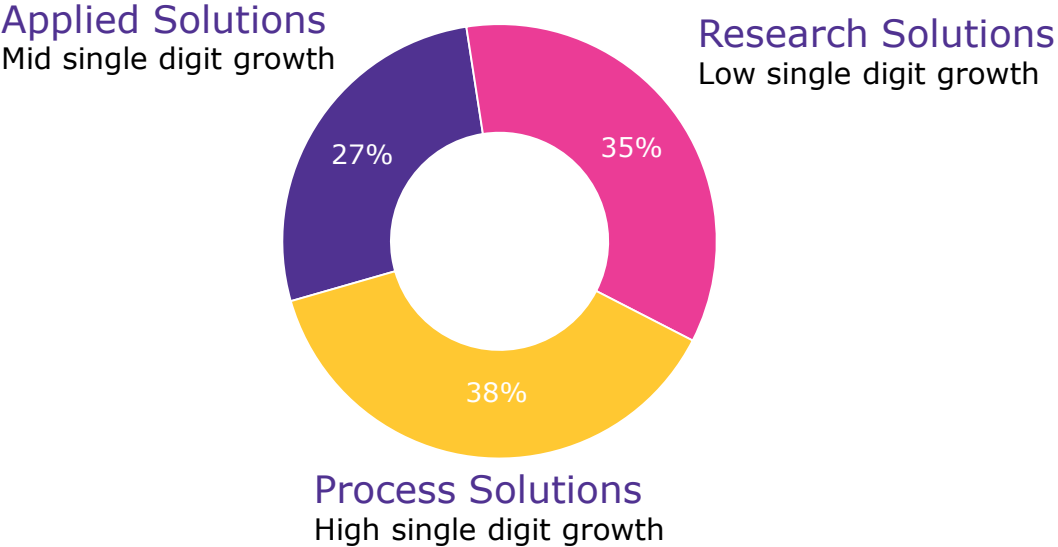


- **Continued integration of sigmaaldrich.com**
 - ~80% of relevant products in U.S. and EU are available online
 - >1/3 of Merck KGaA, Darmstadt, Germany eCommerce orders now contain products from both legacy companies
- **Complete offering in Process Solutions**

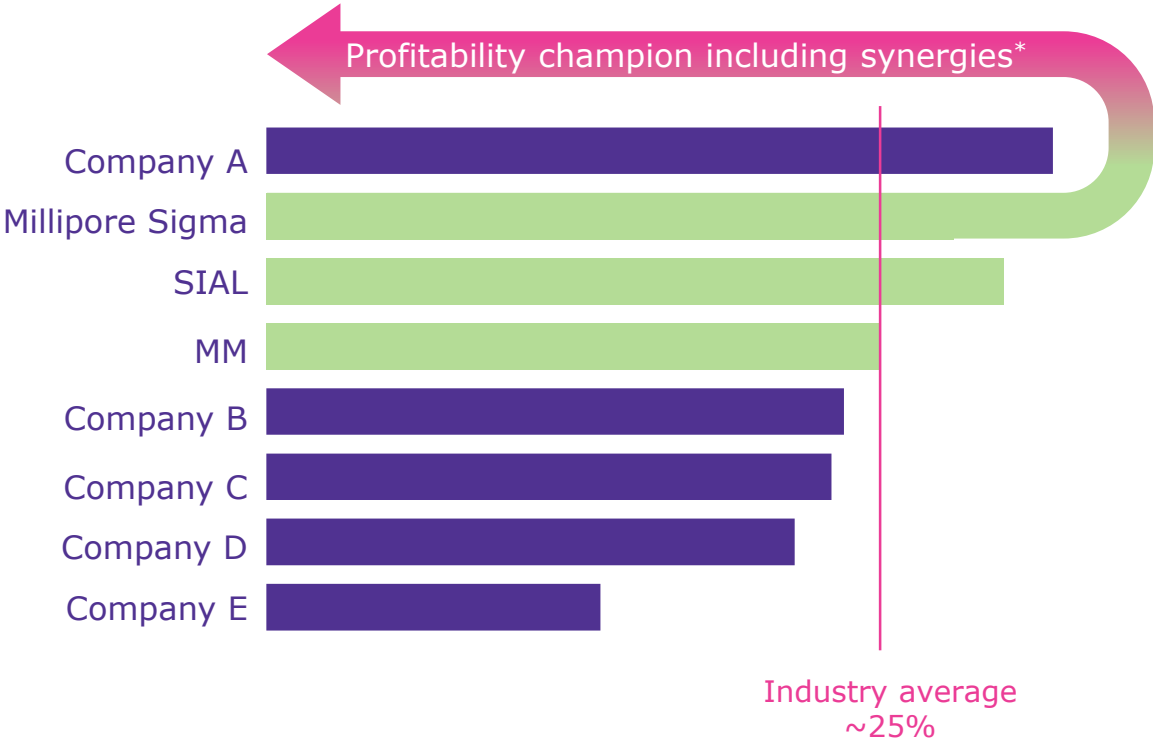
Life Science

We aim to be the profitability champion of the sector

Sales breakdown as of FY 2017



Above industry margin levels



Life Science is well set for sustainable growth and profitability







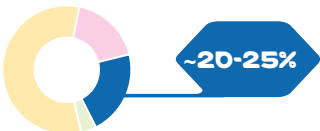







05

PERFORMANCE MATERIALS

Maintaining leadership and innovation

Performance Materials

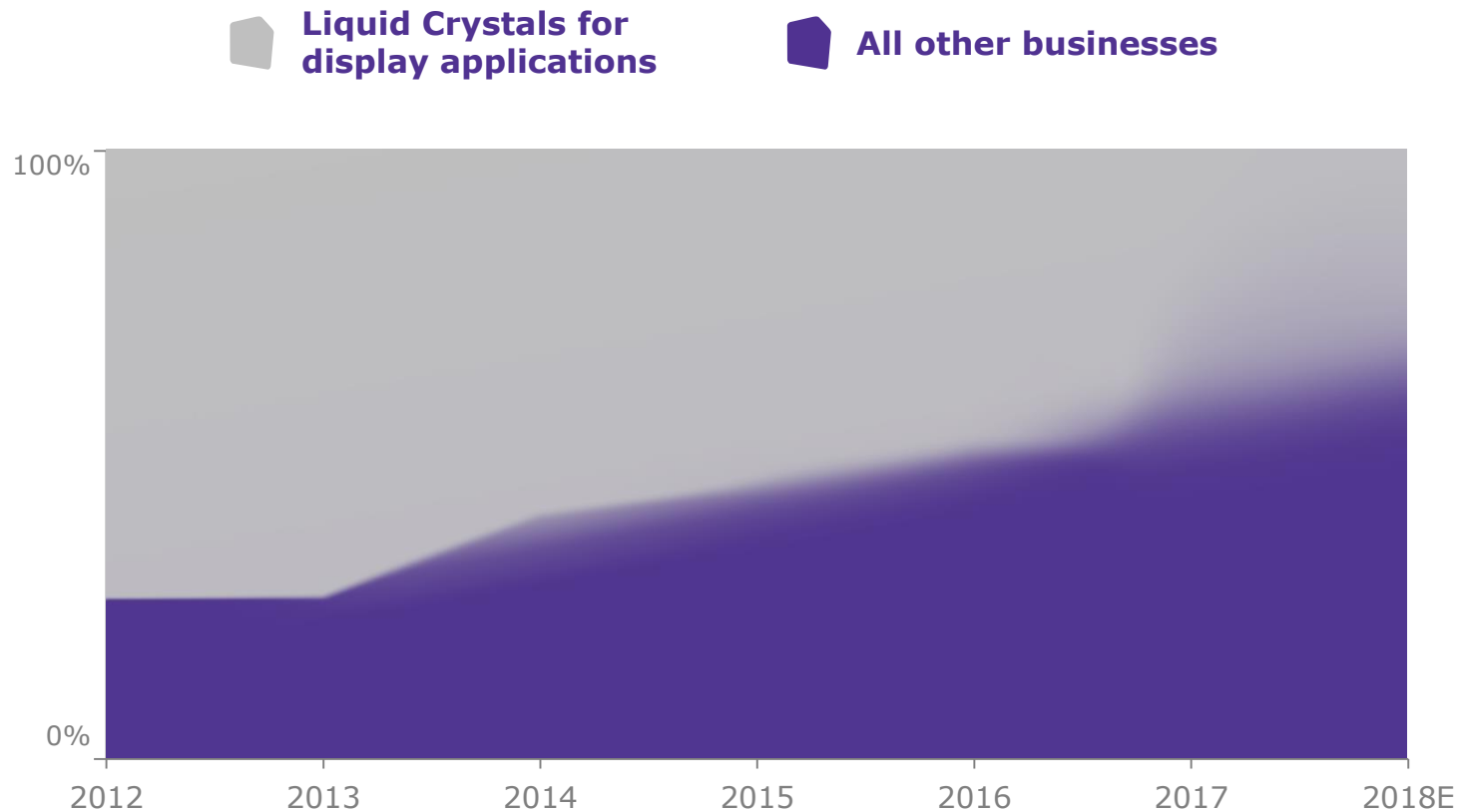
The four pillars are set for future profitable growth

Business unit	% sales	Products	Mid-term growth trend
 Display Materials		<ul style="list-style-type: none"> Liquid crystals (LC) and photoresists for TVs, smartphones and tablet computers Other display and non-display applications (e.g. LC Windows) 	
 Integrated Circuit Materials		<ul style="list-style-type: none"> Dielectrics, colloidal silica, lithography materials, yield enhancers, edge-bead removers Polyimide raw materials and printing materials 	
 Pigments and Functional Materials		<ul style="list-style-type: none"> Effect pigments and functional materials for coatings, plastics, printing and cosmetics Functional materials for cosmetics & special applications 	
 Advanced Technologies		<ul style="list-style-type: none"> Organic and inorganic light emitting diodes Functional materials for electronics and energy solutions 	

Well-founded medium-term low single-digit growth profile

Four-pillar-strategy drives Performance Materials to a higher level of diversification

Sales share of Liquid Crystals for displays versus all other businesses



Diversification of Performance Materials increased due to

- AZ acquisition in 2014
- LC market shares returning to more normal levels
- Higher growth of non-LC businesses

Market share normalization will have financial implications

sales:

- ~ €200 – 300 m Liquid Crystals sales decline, depending on market share assumptions
- Started end of 2016; expected to last up to end of 2018

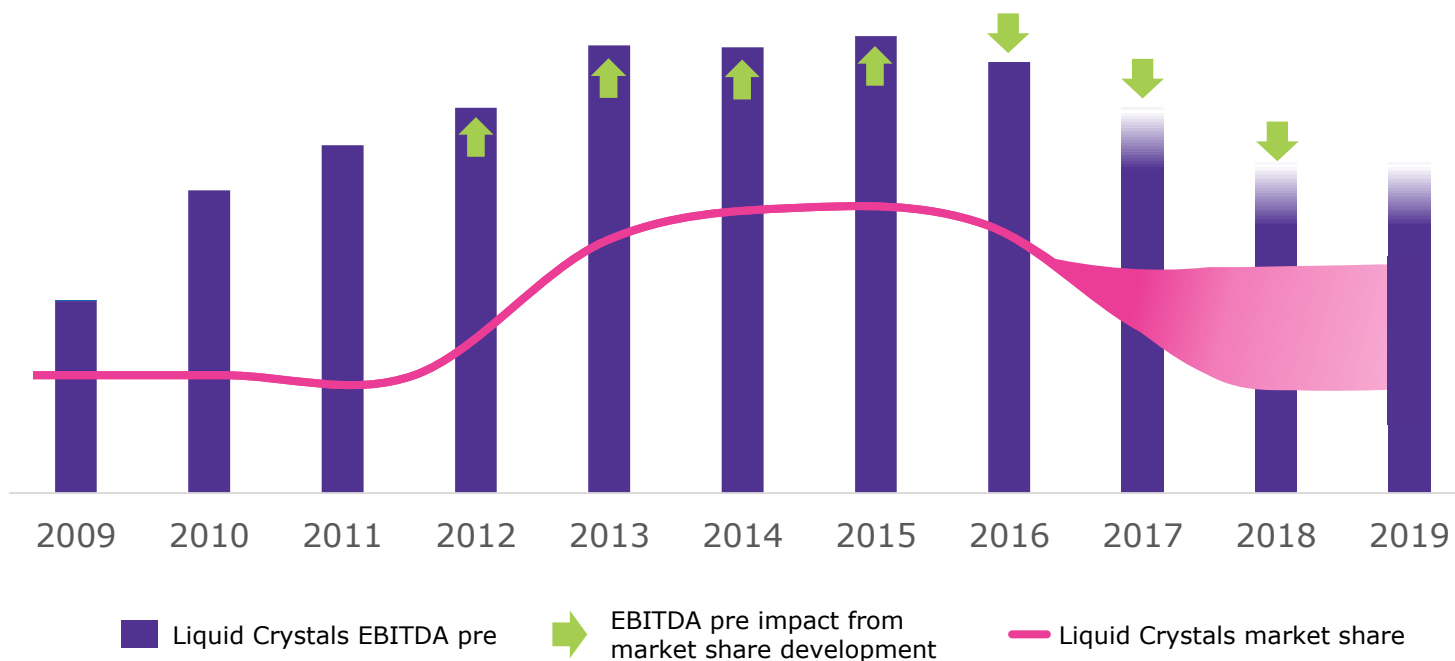
profitability :

- Volume growth temporarily below typical price decline
- Lower volume growth limits operational efficiencies
- Lower share of business with highest profitability causes negative mix

Earnings:

- Significant EBITDA pre impact

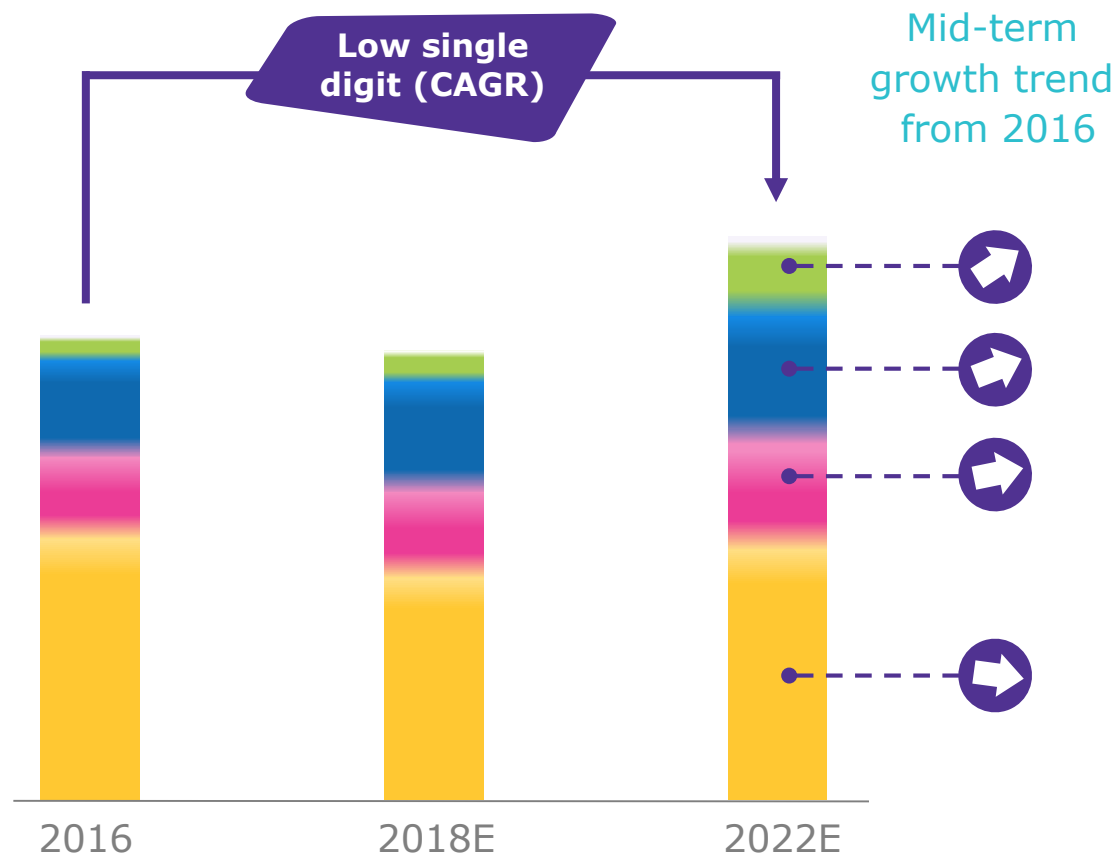
Liquid Crystals: Organic EBITDA pre and market share illustration



Strong sales and EBITDA pre contribution from 2012-2015 to reverse from 2017 onwards

Performance Materials on track to achieve solid growth path

Performance Materials mid-term sales development and drivers



Advanced Technologies

Enhance and exploit leading position in OLED

Integrated Circuit Materials

Outpace market growth with specialty materials assisting miniaturization

Pigments & Functional Materials

Expansion into larger functional material markets

Display Materials

- Assumed market share stabilization after 2018
- Area demand and capacity growth of ~4%
- New modes mitigating price declines (SA-VA, UB-Plus,...)
- Liquid Crystals initiatives beyond displays to contribute from 2018 onwards (windows, antennas, light guiding)



06 EXECUTIVE SUMMARY AND GUIDANCE

Group

We are well on track to deliver on our promises



Group

Net debt reduced by >€2 bn¹
Strict financial discipline supports rating



Healthcare

Core business growing
2 Bavencio indications & Mavenclad launched



Life Science

Sigma-Aldrich synergies raised and well on track
Organic growth above market



Performance Materials

Market challenges well managed
New technologies in test phase

**Important
Milestones
reached
to deliver
on our
promises**

FY 2015

FY 2017

2018

Merck's KGaA, Darmstadt, Germany qualitative full-year 2018 guidance

Net sales: **Moderate organic growth; moderate FX headwinds***

EBITDA pre: **Slight organic decline; -4 to -6% YoY headwinds from FX**



EBITDA-supporting factors

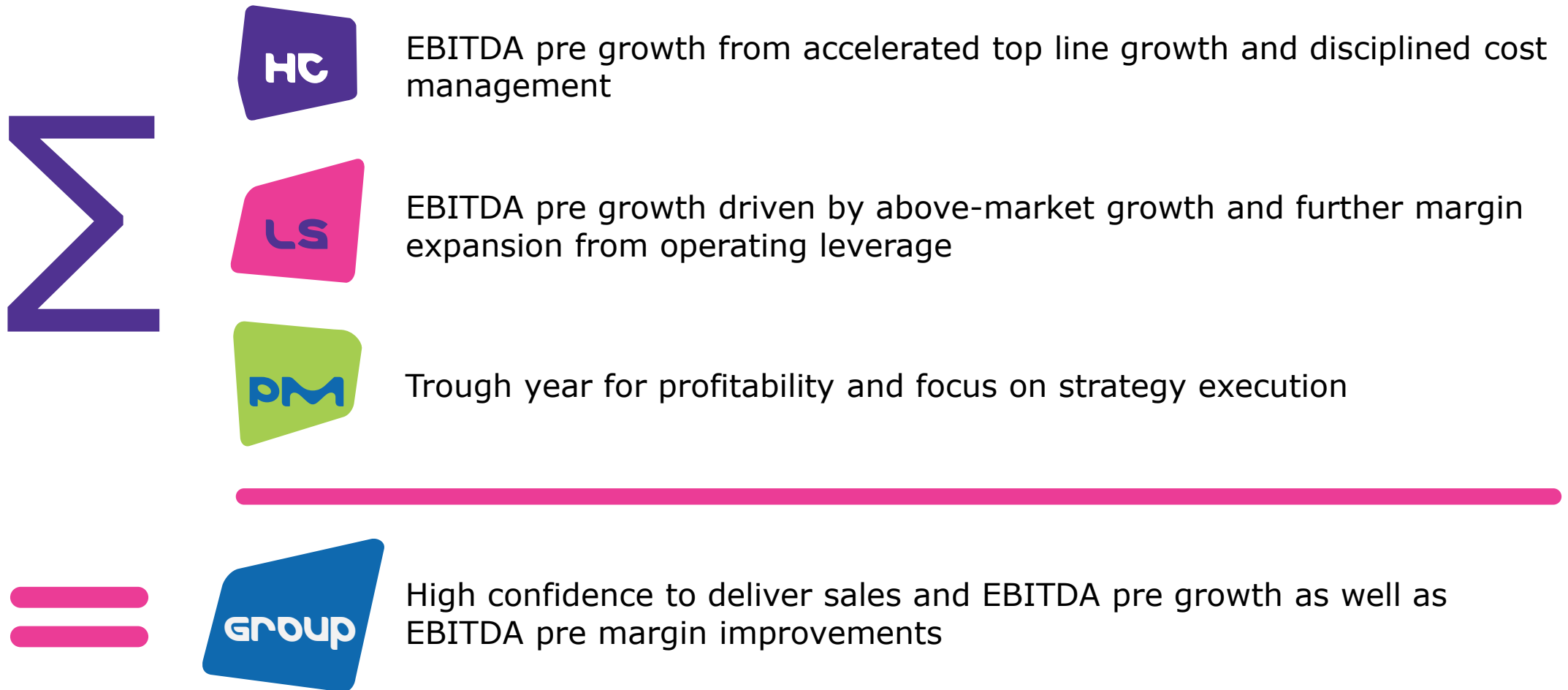
- Organic net sales growth by Healthcare and Life Science
- Sigma-Aldrich incremental cost and revenue synergies
~+€95 m YoY
- Biosimilars divestment frees up R&D budget
(2017: mid to high double-digit million R&D costs)
- First full-year sales contribution from newly launched pipeline products Mavenclad® and Bavencio®



EBITDA-reducing factors

- Underlying R&D costs in Healthcare are budgeted above 2017, but actual development will be subject to clinical data outcome of priority projects and prioritization decisions
- Healthcare margins negatively impacted by product mix (esp. Rebif)
- 2017 special gains of ~€200 m will not recur
- Performance Materials sales and earnings continuously affected by decline in Liquid Crystals
- First launch preparations for Mavenclad® U.S., driving M&S costs
- At current rates, FX remains a strong headwind, esp. in H1 2018

Merck KGaA, Darmstadt, Germany to return to profitable growth track from 2019 onwards



Strong confidence and commitment for future growth

1

We offer a unique and promising portfolio with leading market positions and high innovation potential

2

We are highly profitable, invest strongly in our future potential and will generate sustainable profitable growth from 2019 onwards

3

We are financially rock solid and therefore able to finance our future organic growth

4

We will continue to deliver on our promises and communicate transparently



Appendix

01 **Guidance details**

02 **Healthcare**

03 **Life Science**

04 **Performance Materials**

05 **Financial details**



01

GUIDANCE DETAILS

2018 business sector guidance (including Consumer Health)



Healthcare

Net sales

- Moderate organic growth: ongoing organic Rebif decline offset by growth in other franchises
- Full-year contributions from 2017 launches

EBITDA pre

- Slight organic % YoY decline
- Adverse FX impact
- Higher R&D, subject to pipeline decisions
- Higher M&S investments, for launch preparations



Life Science

Net sales

- Organic growth slightly above market; driven by Process Solutions

EBITDA pre

- Organic % YoY growth with similar dynamics as in prior year (2017)
- Adverse FX impact
- Full realization of expected synergies



Performance Materials

Net sales

- Slight to moderate organic decline
- Volume increases in all businesses
- Ongoing Liquid Crystals market share decline

EBITDA pre

- Organic % YoY decline in the mid teens
- Adverse FX impact
- Decline from LC cannot be compensated by ICM and Pigments

Additional financial guidance 2018

Further financial details

Corporate & Other EBITDA pre	~ -€320 – -360m
Interest result	~ -€230 – -240 m
Effective tax rate	~ 24% to 26%
Capex on PPE	~ €900 – 950 m
Hedging/USD assumption	2018 hedge ratio ~50-60% at EUR/USD ~ 1.19 to 1.20
2018 Ø EUR/USD assumption	~ 1.18 – 1.22 ¹

Group

We have clear financial priorities



Focus on **cash flow**
and **deleveraging**



Ongoing cost discipline



**Efficient capital
allocation**

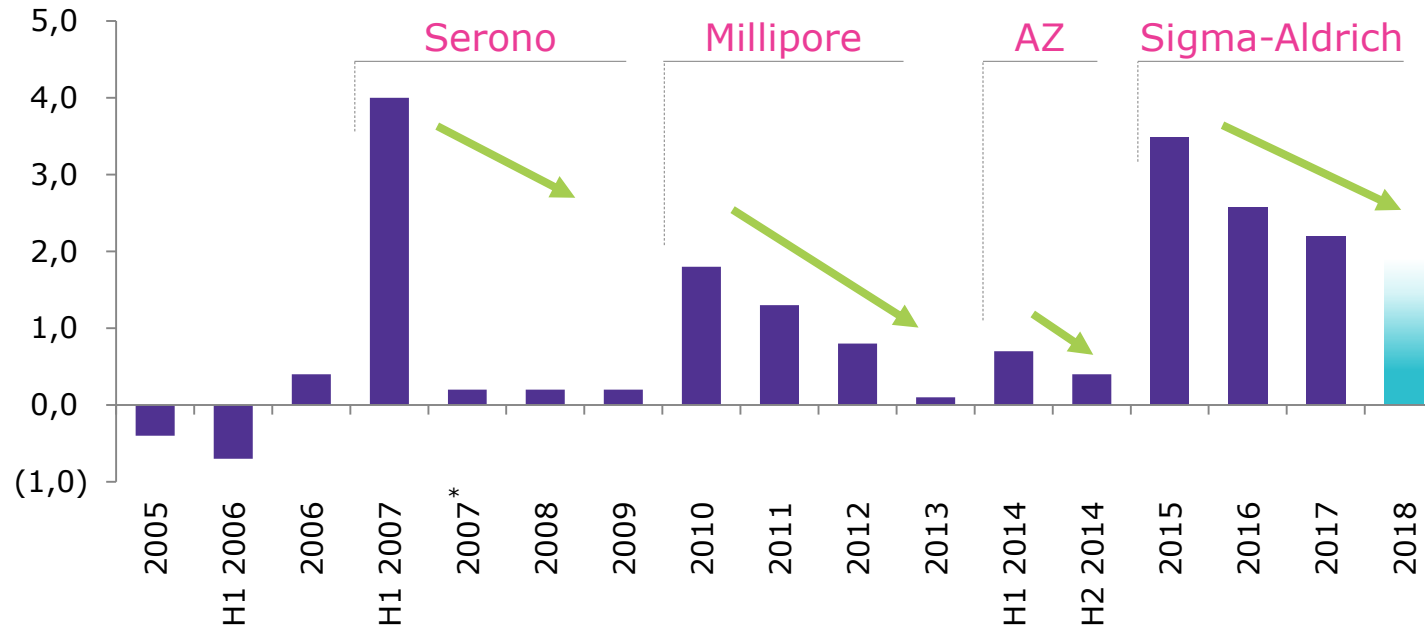
- **Strong cash flow** will be used to drive down gearing to <2x net debt / EBITDA pre in 2018
- **Larger acquisitions (>€500 m) ruled out** for 2018 (or financed by divestments)
- **Dividend policy** that ensures a sustainable and resilient development
- **Synergy generation** is utmost priority
- **Cost discipline** continues in all business sectors
- **Further efficiency gains** from ongoing improvement and harmonization of processes and systems
- **All our businesses** have growth potential
- **Decisions on growth investments** are based on sound business cases and robust clinical data

Near-term financial priorities will secure our profitable growth path

Group

We remain focused on deleveraging

Net debt excl. pensions / EBITDA pre



- We have a strong track record of disciplined deleveraging after large acquisitions
- We stay focused on deleveraging to gain financial flexibility

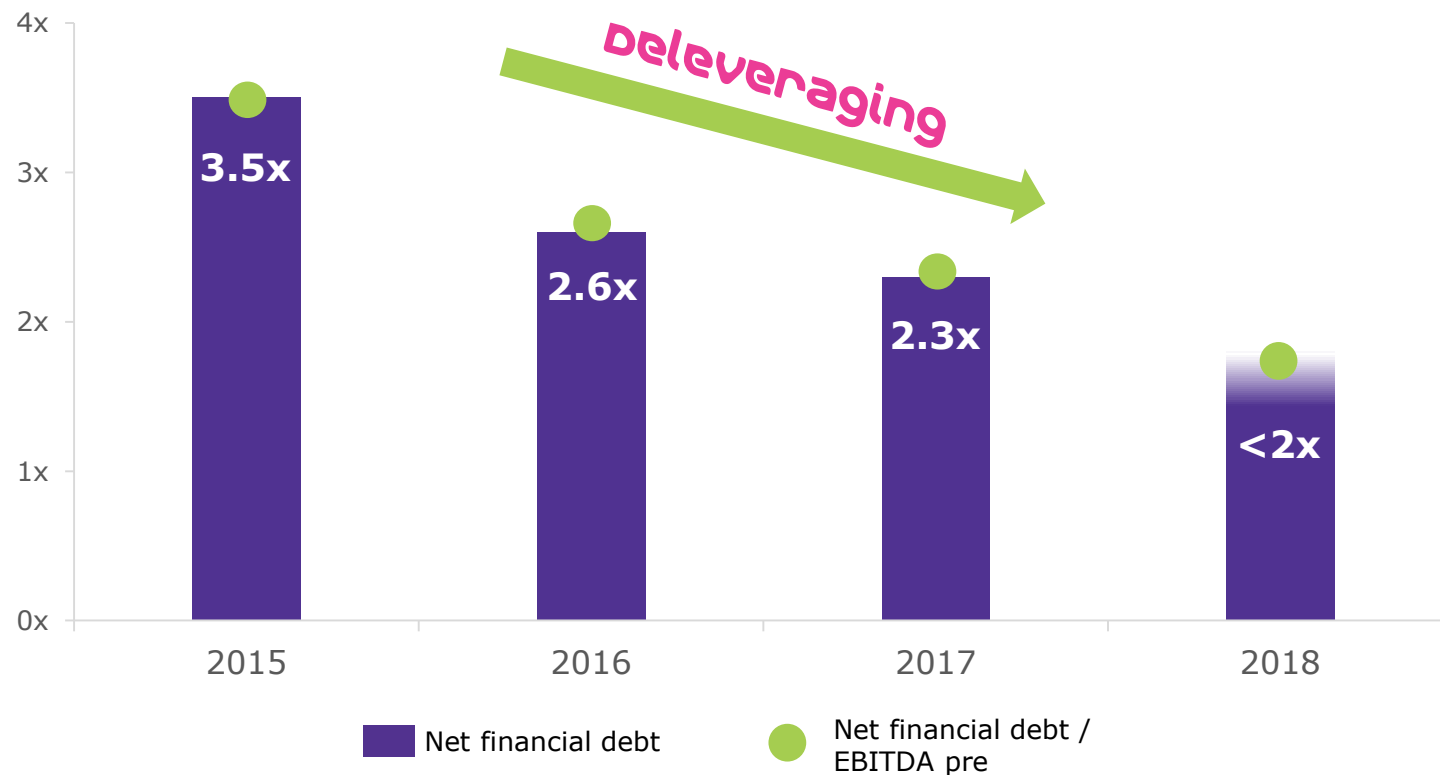
Merck KGaA,
Darmstadt,
Germany

- **Deleverage to <2x net debt / EBITDA pre in 2018**
- **No large acquisitions (>€500 m) until end of 2018 (unless financed by divestments)**
- **Dividend policy that ensures a sustainable and resilient development**

Strong focus on cash generation to ensure swift deleveraging

Net financial debt* and leverage development

[Net financial debt/
EBITDA pre]



Focus on deleveraging

- Commitment to swift deleveraging to ensure a strong investment grade credit rating and financial flexibility
- Strong cash flow will be used to drive down leverage to expected <2x net debt/EBITDA pre in 2018
- Larger acquisitions (>€500 m) ruled out for 2018 (or financed by divestments)

FX sensitivity per business sector



Sales

- Global presence
- ~35% of sales in Europe

Costs

- High Swiss franc cost base due to manufacturing sites
- R&D hub and notable sales force in U.S.

Net Sales currency exposure¹



FX impact on EBITDA pre²



Sales

- Balanced regional sales split between EU, NA and RoW

Costs

- Extensive manufacturing and research footprint in the U.S.
- Global customer proximity requires broad-based sales force

Net Sales currency exposure¹



FX impact on EBITDA pre²



Sales

- ~80% of sales in Asia-Pacific
- Industry is USD-driven

Costs

- Main production sites in Germany
- Several R&D and mixing facilities in Asia

Net Sales currency exposure¹

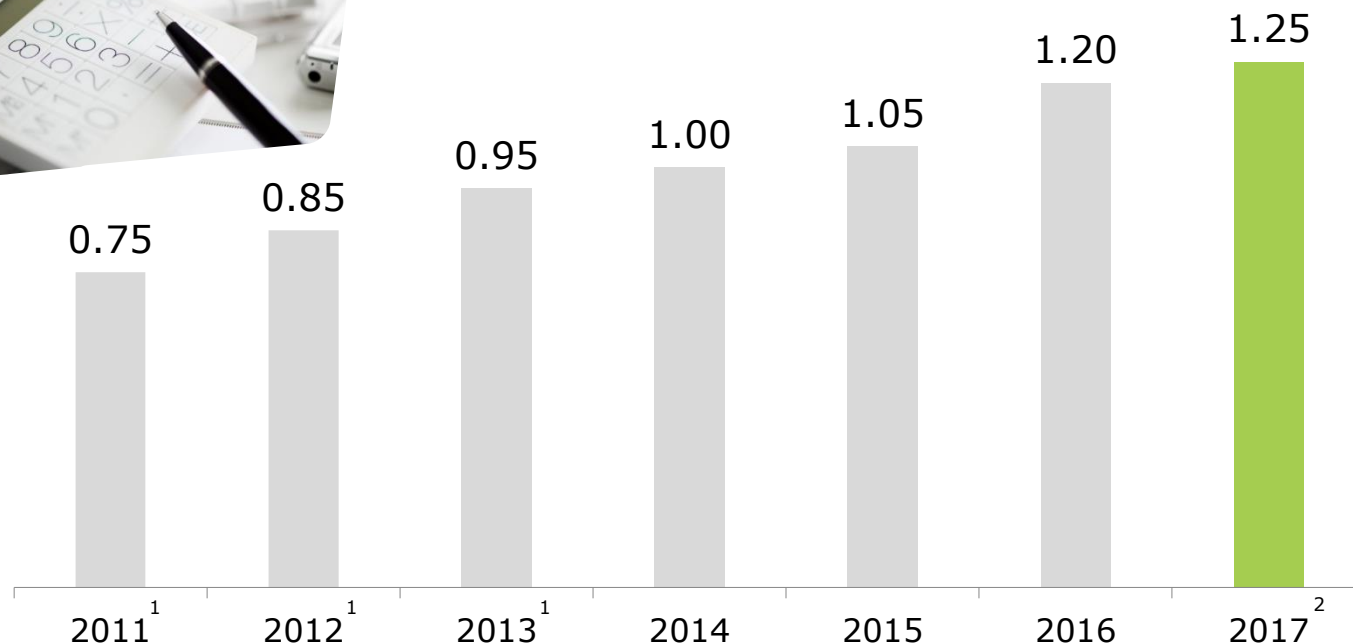


FX impact on EBITDA pre²



Dividend growth sustained

Dividend¹ development 2011-2017



2017 dividend

- Dividend of €1.25 (+4% YoY) per share proposed² for 2017
- 20.3% of EPS pre
- Sustainable dividend growth
- Dividend yield³ of 1.4%

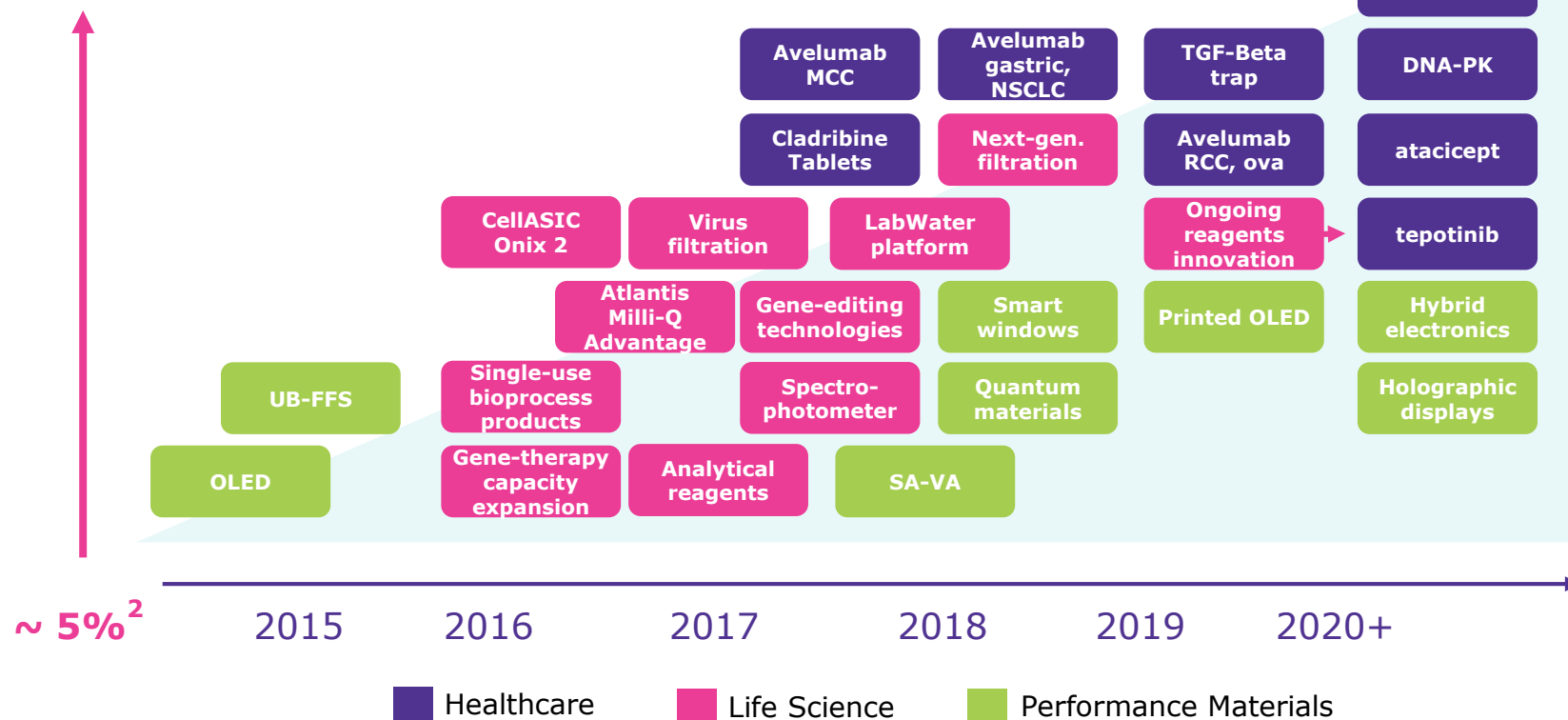
¹Adjusted for share split, which has been effective since June 30, 2014; ²Final decision is subject to Annual General Meeting approval;

³Calculated with 2017 year-end share price of 89.75€ per share

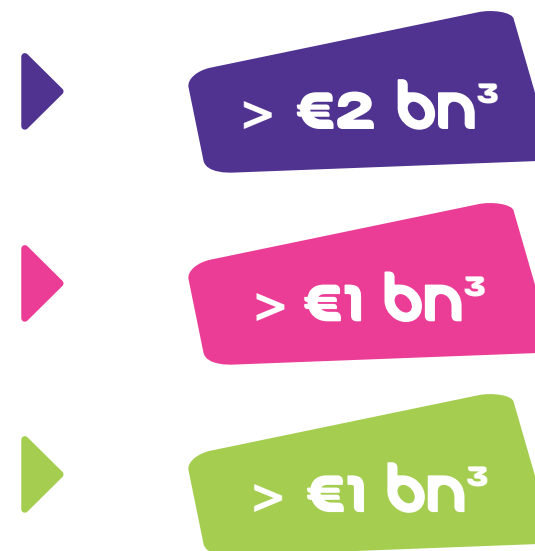
Our strong innovation capabilities will drive growth

New product launch cadence¹ by business sector

~ 20%²



New product sales³ potential 2022



Our rich pipeline will strongly drive sales

¹Illustration: timelines may change as product introductions are subject to customer adoption and implementation; pharma pipeline products are under clinical investigation and there is no guarantee any product will be approved in the sought-after indication; ²Share of total Group net sales from new products launched over the past 5 years, risk-adjusted; ³risk-adjusted



02 HEALTHCARE

Portfolio management: Differentiating across diverse business models

General Medicine portfolio



- Limited risk with high cash generation
- Sustainable steady growth fueled by Emerging Markets



Biologicals portfolio



- Moderate risk and reward profile
- Economies of scale due to state-of-the-art production capabilities
- Emerging Markets gain importance



Oncology & Immunology innovation portfolio



- High reward at high risk
- Innovation key success factor – high R&D spend
- Promising pipeline projects



Mid-term, all parts of the portfolio need to earn their cost of capital

The road to maximizing Healthcare's existing franchises is clear

	Continue to drive mCRC* share by increasing patient testing and expanding head and neck coverage
	Ongoing 3x3 growth strategy implementation to strengthen sales and marketing activities delivering above-market organic sales growth
	Capitalize on strong efficacy and new smart devices to maximize differentiation and defend franchise
	Build on No.1 position and ART* channel access with embryo diagnostics and other innovative technologies
	Harness strengths of existing business and build a new focus area driven by innovative devices and services for patients
	Build on existing track record in emerging markets, drive brand and lifecycle management and expand business including asset repatriation



Clinical pipeline

February 15, 2018

Phase I	Phase II	Phase III	Registration
<p>M2698 p70S6K & Akt inhibitor Solid tumors</p> <p>M3814 DNA-PK inhibitor Solid tumors</p> <p>M9831 (VX-984) DNA-PK inhibitor Solid tumors</p> <p>M6620 (VX-970) ATR inhibitor Solid tumors</p> <p>M4344 (VX-803) ATR inhibitor Solid tumors</p> <p>M3541 ATM inhibitor Solid tumors</p> <p>M8891 MetAP2 inhibitor Solid tumors</p> <p>M7583 BTK inhibitor Hematological malignancies</p>	<p>avelumab anti-PD-L1 mAb Solid tumors</p> <p>avelumab anti-PD-L1 mAb Hematological malignancies</p> <p>M9241 (NHS-IL12)² Cancer immunotherapy Solid tumors</p> <p>M7824 anti-PD-L1/TGFbeta trap Solid tumors</p> <p>M4112 Cancer immunotherapy Solid tumors</p> <p>M1095 (ALX-0761)³ anti-IL-17 A/F nanobody Psoriasis</p> <p>M6495 anti-ADAMTS-5 nanobody Osteoarthritis</p> <p>M5717 PeEF2 inhibitor Malaria</p>	<p>tepotinib c-Met kinase inhibitor Non-small cell lung cancer</p> <p>tepotinib c-Met kinase inhibitor Hepatocellular cancer</p> <p>avelumab - anti-PD-L1 mAb Merkel cell cancer 1L¹</p> <p>sprifermin fibroblast growth factor 18 Osteoarthritis</p> <p>atacept anti-Blys/anti-APRIL fusion protein Systemic lupus erythematosus</p> <p>atacept anti-Blys/anti-APRIL fusion protein IgA nephropathy</p> <p>abrituzumab anti-CD51 mAb Systemic sclerosis with interstitial lung disease</p> <p>evobrutinib BTK inhibitor Rheumatoid arthritis</p> <p>evobrutinib BTK inhibitor Systemic lupus erythematosus</p> <p>evobrutinib BTK inhibitor Multiple sclerosis</p>	<p>avelumab - anti-PD-L1 mAb Non-small cell lung cancer 1L¹</p> <p>avelumab - anti-PD-L1 mAb Gastric cancer 1L-M^{1M}</p> <p>avelumab - anti-PD-L1 mAb Ovarian cancer platinum resistant/refractory</p> <p>avelumab - anti-PD-L1 mAb Ovarian cancer 1L¹</p> <p>avelumab - anti-PD-L1 mAb Urothelial cancer 1L-M^{1M}</p> <p>avelumab - anti-PD-L1 mAb Renal cell cancer 1L¹</p> <p>avelumab - anti-PD-L1 mAb Locally advanced head and neck cancer</p> <p>cladribine tablets lymphocyte targeting agent Relapsing multiple sclerosis⁴</p>

- Oncology
- Immuno-Oncology
- Immunology
- Neurology
- General Medicine

¹ First Line treatment; ^{1M} First Line maintenance treatment.

² Sponsored by the National Cancer Institute (USA).

³ As announced on March 30 2017, in an agreement with Avillion, anti-IL-17 A/F nanobody will be developed by Avillion for plaque psoriasis and commercialized by Merck KGaA, Darmstadt, Germany.

⁴ As announced on August 25 2017, the European Commission has granted marketing authorization for cladribine tablets for the treatment of highly active relapsing multiple sclerosis in the 28 countries of the European Union in addition to Norway, Liechtenstein and Iceland.

Strategy anchored on four foundational pillars

1	Avelumab	<ol style="list-style-type: none">1. Monotherapy as a basis for combinations2. Establish immunogenic priming in combination or sequence with CT/RT¹3. Proprietary novel combinations4. Establish value of unique molecular characteristics (ADCC)	<ol style="list-style-type: none">1. MCC, UC 2L, NSCLC 1L/2L,2. Maintenance in UC 1L, gastric 1L, ovarian 1L3. Avelumab + Inlyta (RCC 1L), plus 5 phase 1 combinations4. DLBCL, NSCLC 1L (high intensity), unique combinations leveraging ADCC
2	IO bi-functionals	Engineer or access platforms where biology is best addressed by a bi-functional approach	<ul style="list-style-type: none">• anti-PD-L1/TGF-beta trap• anti-PD-L1/anti-LAG-3• NHS-IL 12
3	DNA Damage Response (DDR)	Establish leadership in DDR and leverage synergies across portfolio (immuno-oncology plus emerging platforms)	<ul style="list-style-type: none">• DNA-PK-i• ATR-i• ATM-i
4	Emerging Platforms	Invest in complementary discovery areas	<ul style="list-style-type: none">• Antibody-Drug-Conjugates (ADC, e.g. partnership with Mersana/Sutro)• Oncogenic signaling• Bi-functional fusion proteins• Bi-specific antibodies

External Innovation

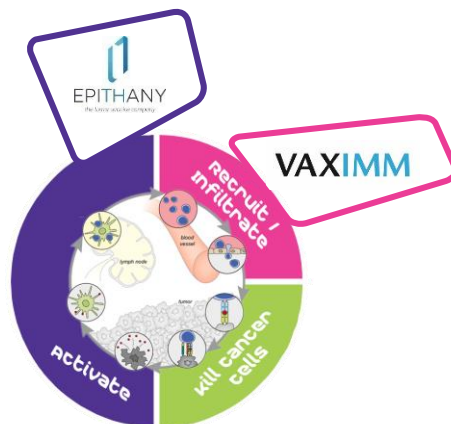
2017 deal activity aligned with strategic pillars

1

Clinical collaborations for avelumab combinations

expand across the immunity cycle

- **EpiThany:** EP-101 STEMVAC vaccine (breast cancer)
- **Vaximm:** Oral T-cell immunotherapy (glioblastoma, colorectal cancer)

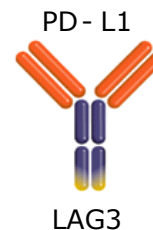


2



Leading bi-specific platform

- **Option deal**
- **Bi-specific antibodies** (promising lead asset **Anti-LAG3/ PD-L1**)
- FS118 shows superior activity pre-clinically (**expected in clinic 2018**)
- Potential in PDx-refractory setting
- Four additional mAb2 programs



3



strengthen DDR platform

- **Acquisition (license) deal**
- **Leadership** in DDR-i
- Combination of Vertex' Oncology and Merck's KGaA, Darmstadt, Germany DNA-PK inhibitor programs

Vertex

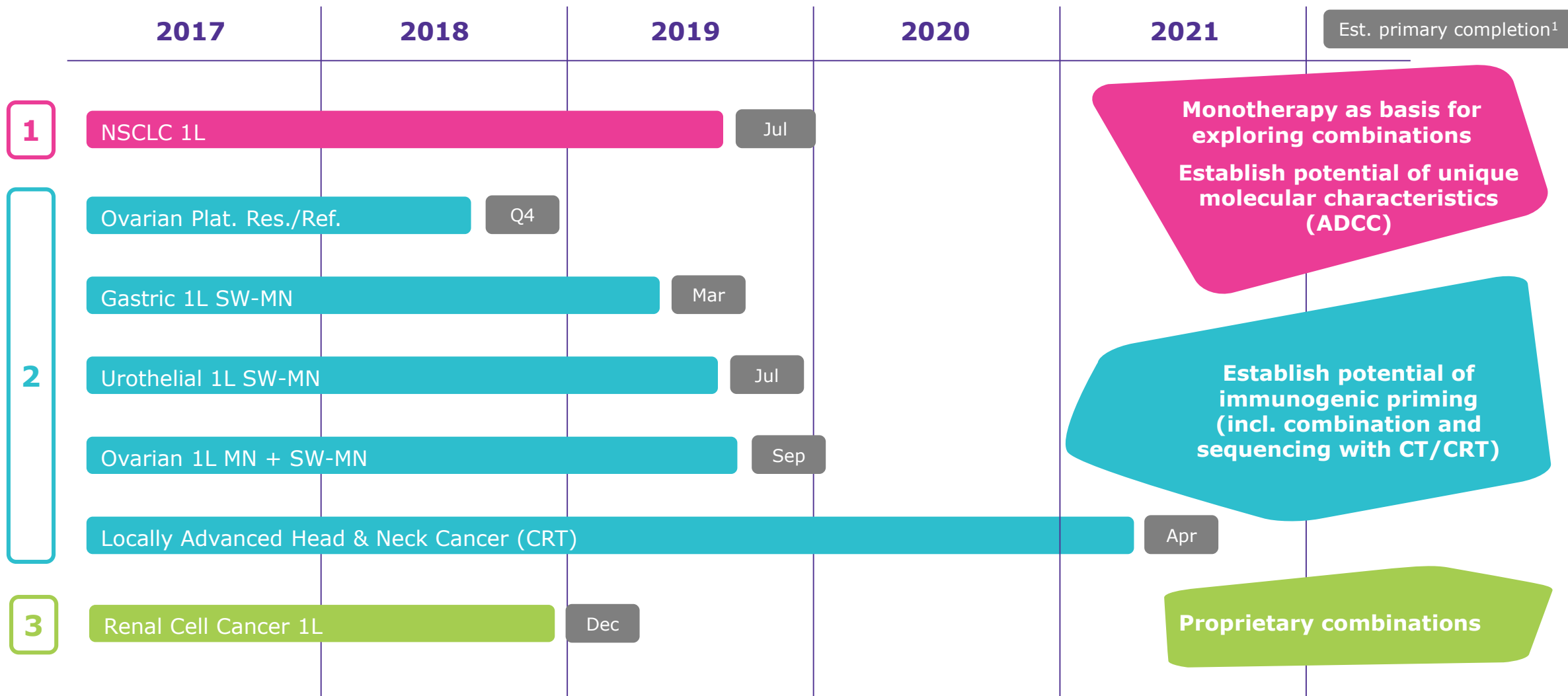
- Two **ATR-inhibitors**
- One **DNA-PK inhibitors**
- Two pre-clinical programs

MERCK KGaA, Darmstadt, Germany

- DNA-PK inhibitor
- **ATM-inhibitor** (preclinical)

1 Avelumab

Seven ongoing pivotal studies with differentiation potential



¹ Estimated primary completion date according to Clinicaltrials.gov as of March 01, 2018

Acronyms: NSCLC: Non Small Cell Lung Cancer | CT: Chemotherapy | CRT: Chemoradiotherapy | Plat. Res./Ref.: Platinum Resistant/Refractory | MN: Maintenance | SW: Switch

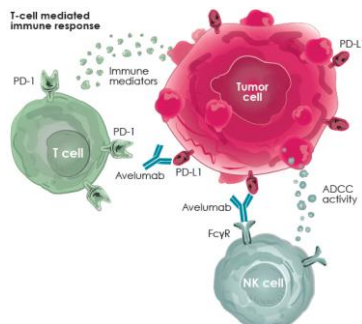
1

Avelumab

NSCLC 1L: Assessing potential efficacy upside in mono-therapy¹

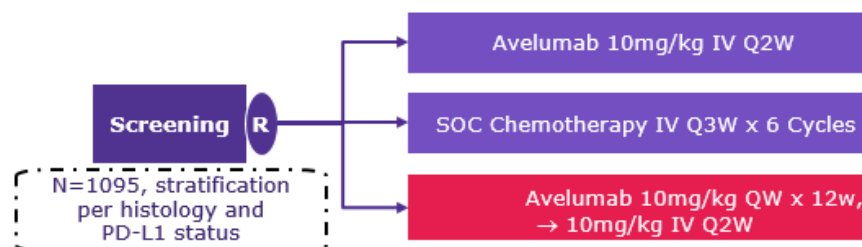
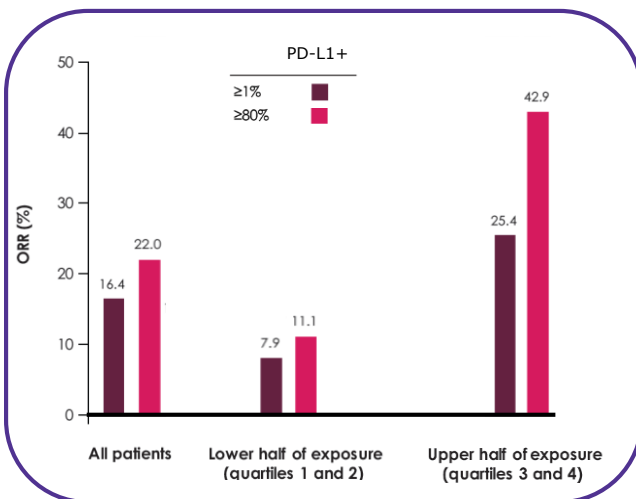
NSCLC 2L+: exposure response

NSCLC 1L: testing hypothesis of higher efficacy/intensity correlation



Hypothesis : higher drug intensity may result in greater efficacy (potentially driven by ADCC)

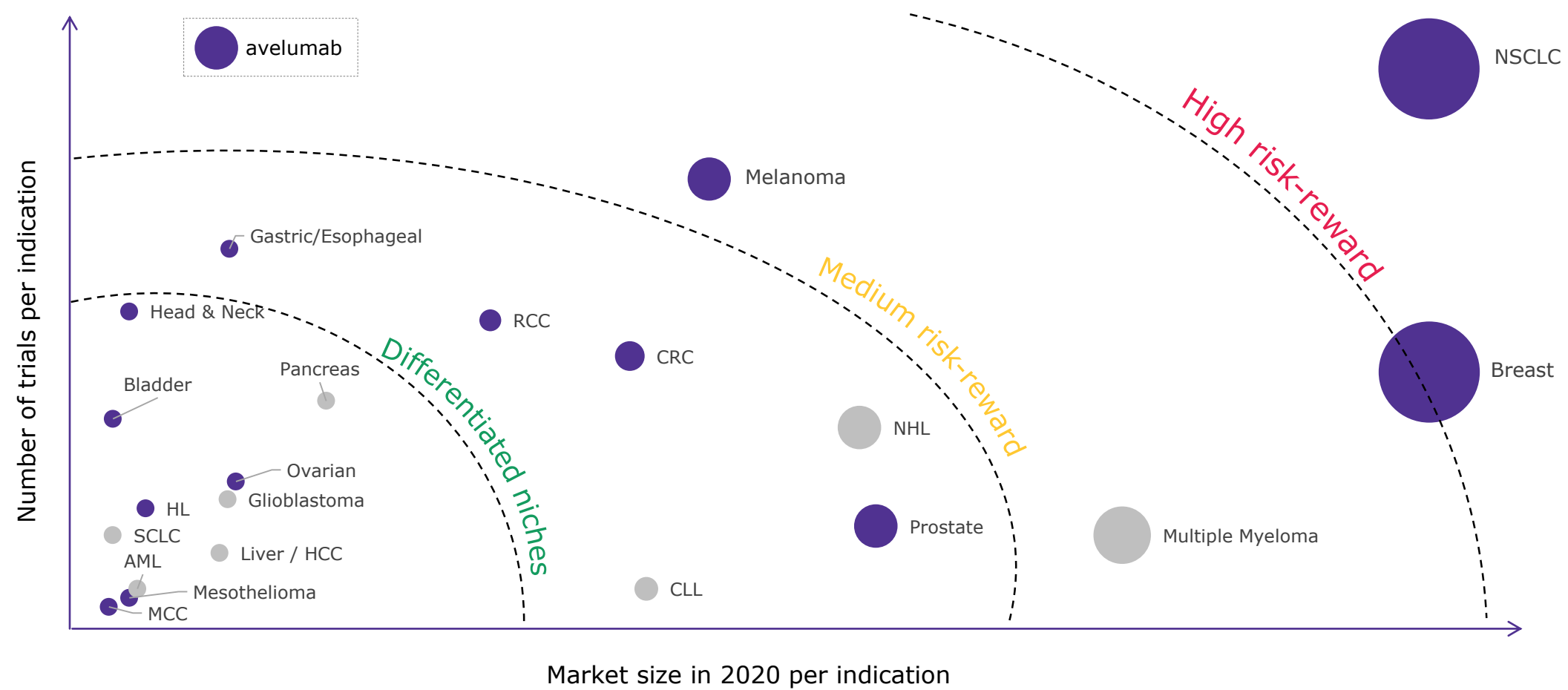
- Potential association between **higher ORR** and **higher avelumab exposure**
- ORR highest in patients with both higher avelumab **exposure** and tumors with higher levels of **PD-L1 expression**
- **NSCLC 1L phase III trial amended** to leverage high-intensity hypothesis (est. primary completion Apr 2019)



- **Primary endpoints:** PFS & OS @ high PD-L1-expression
- **Secondary endpoints:** PFS & OS @ moderate and low PD-L1-expression (BOR, DOR, Safety, QoL)
- **Hierarchical ordered hypothesis**

1 Avelumab

Avelumab plays predominantly in attractive and differentiated niches





Avelumab

Differentiation strategy varies according to chosen target indication and market

1

**Unsaturated
and / or niche
indications**

- Ambition to lead in niche indications (e.g. Merkel cell) or markets (e.g. Asia for gastric)
- Quick to market strategy (e.g. BTM designation for MCC)
- Small, but less crowded markets and sales potential with notable impact for us
- Strategic strength of Healthcare in niche markets

2

**Saturated
and / or major
indications**

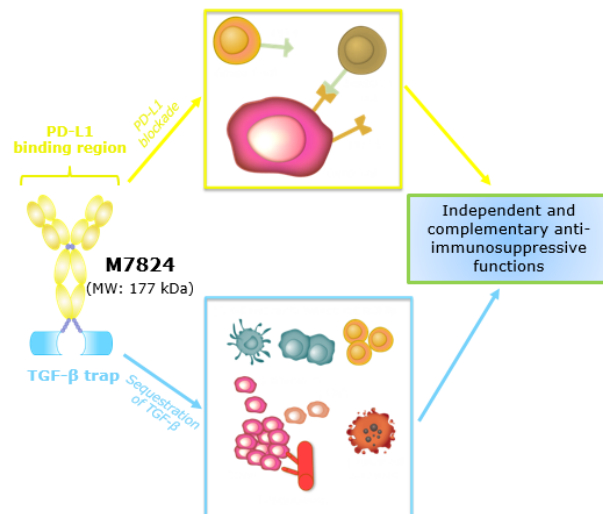
- Learn from experience of incumbents/early movers in major indications (e.g. NSCLC, Bladder)
- Potential for combinations given breadth of combined development pipelines
- Differentiate in trial design and explore application of further biomarkers



2

Anti-PD-L1/TGF- β trap

Dose escalation completed, showing first signs of clinical activity¹



- **Innovative first-in-class bifunctional fusion protein** designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF- β signaling)
- **Manageable safety profile** (patients with heavily pretreated advanced solid tumors)
- **Saturated peripheral PD-L1 and sequestered all released plasma TGF- β 1, - β 2, and - β 3¹**

Patients with metastatic or locally advanced solid tumors for which no standard effective therapy exists or standard therapy has failed (N = 19)

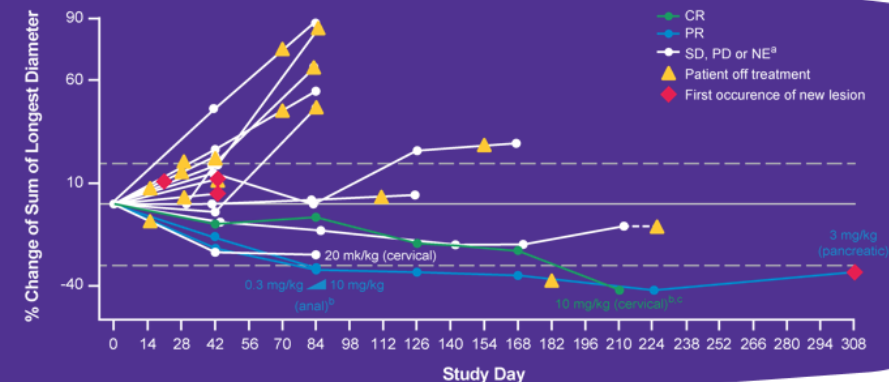
Dose Q2W, mg/kg	n
0.3 ∇ 10	3
1	3
3	3
10	3
20	7

Primary endpoints

- TEAEs
- DLTs
- Treatment-related AEs

Secondary endpoints

- PK
- M7824 immunogenicity
- BOR

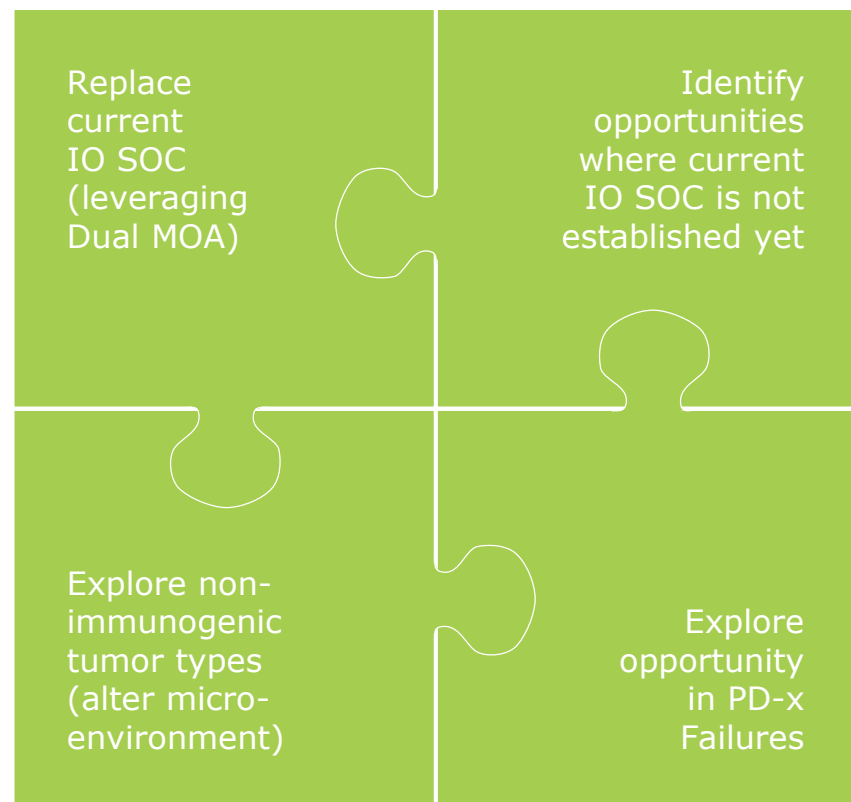


2

Anti-PD-L1/TGF- β trap

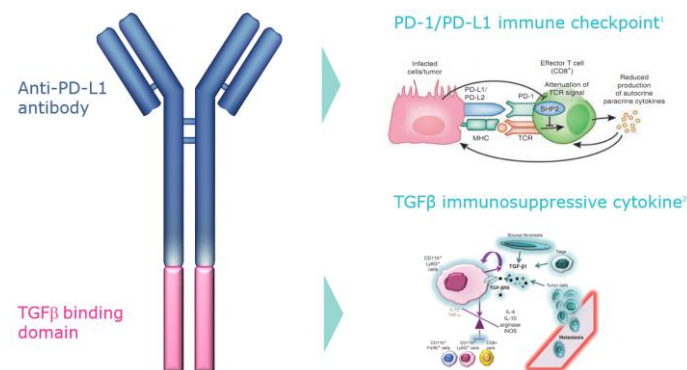
PD-L1–TGF-beta indicates potential to move beyond checkpoint inhibitors

Four focus areas for exploration



Status and next steps

- Novel, first-in-class bifunctional immunotherapy
- Bifunctional mode should result in broader application vs. respective mono-functional agents
- Great potential when combined with Standard of Care, immunotherapy and internal pipeline drug candidates
- Dose level finding of Phase I completed
- Recruiting into Ib expansion cohorts started in Q3 2016



2 Anti-PD-L1/TGF-β trap Cohort data will enable decision per indication/category

Dose escalation completed¹

14 cohorts in recruitment

Defined criteria allow timely decision

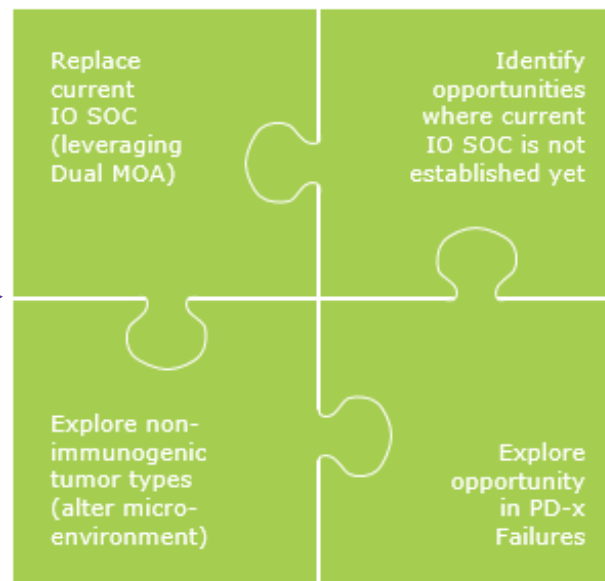
Preliminary results from a phase 1 trial of M7824 (MSB0011359C), a bifunctional fusion protein targeting PD-L1 and TGF-β, in advanced solid tumors

J. L. Gulley¹, C. R. Heery², J. Schlom³, R. A. Madan³, L. Cao¹, E. Lamping⁴, J. L. Marte¹, L. M. Cordes⁵, O. Christensen⁶, C. Helwig⁷, J. Strauss¹

¹National Cancer Institute at the National Institutes of Health, Bethesda, MD; ²Laboratory of Tumor Immunology and Biology, National Cancer Institute at the National Institutes of Health, Bethesda, MD; ³National Cancer Institute, Bethesda, MD; ⁴Gastrointestinal Malignancies Branch, National Cancer Institute, NIH, Bethesda, MD; ⁵National Institutes of Health, Bethesda, MD; ⁶EMD Serono, Billerica, MA; ⁷Merck KGaA, Darmstadt, Germany

ASCO ANNUAL MEETING 17 #ASCO17

- **Ongoing confirmed CR** (cervical, 10 mg/kg)
- **Durable confirmed PR** (pancreatic, 3 mg/kg)
- **Unconfirmed PR** (anal, 0.3 mg/kg 10 mg/kg)
- **Near-PR** (cervical, 20 mg/kg)
- **Prolonged SD** (pancreatic, 3 mg/kg)
- **Prolonged SD** (carcinoid, 1 mg/kg)



Expand cohort and/or explore single-arm path-to-registration

Expand cohorts to confirm signal and/or follow with randomized comparative trial

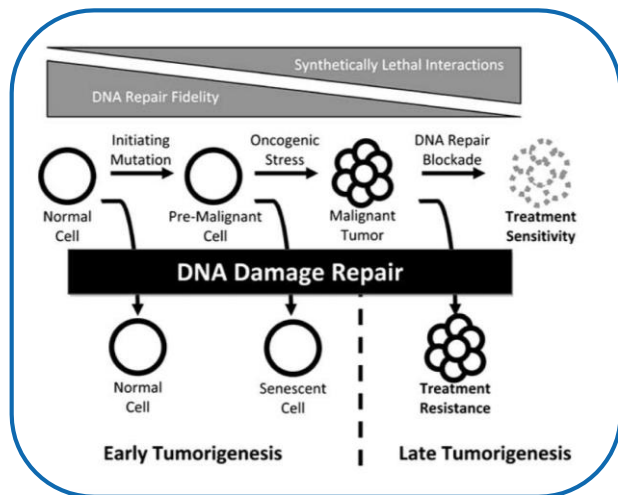
Explore biomarker driven pan-tumor opportunities

De-prioritize cohort

¹ As presented by J. L. Gulley at ASCO Annual Meeting 2017, June 5, 2017.
Acronyms: CR: complete response | PR: partial response | SD: stable disease

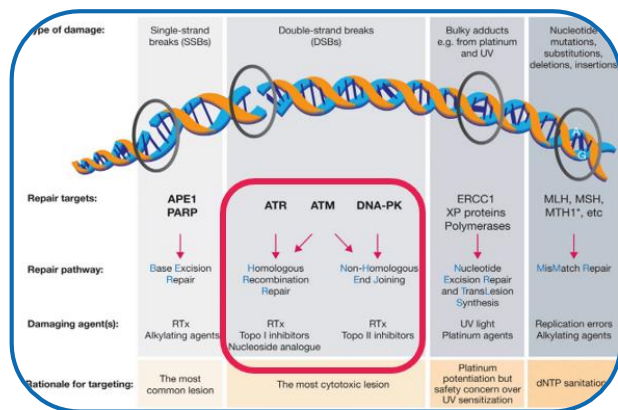
3 DNA damage response (DDR)

Complete portfolio supporting leadership in a potentially disruptive class



Genomic instability: a hallmark of late stage cancers¹

- DNA damage response (DDR) keeps genetic information intact
- In many cancers DDR pathways are defected, leading to greater dependency on remaining functional DDR pathways
- Preferentially inhibiting remaining DDR pathways can result in cancer cell death ("synthetic lethality")



Amplifying cytotoxic effects of conventional and novel cancer treatments potentially bears combination potential

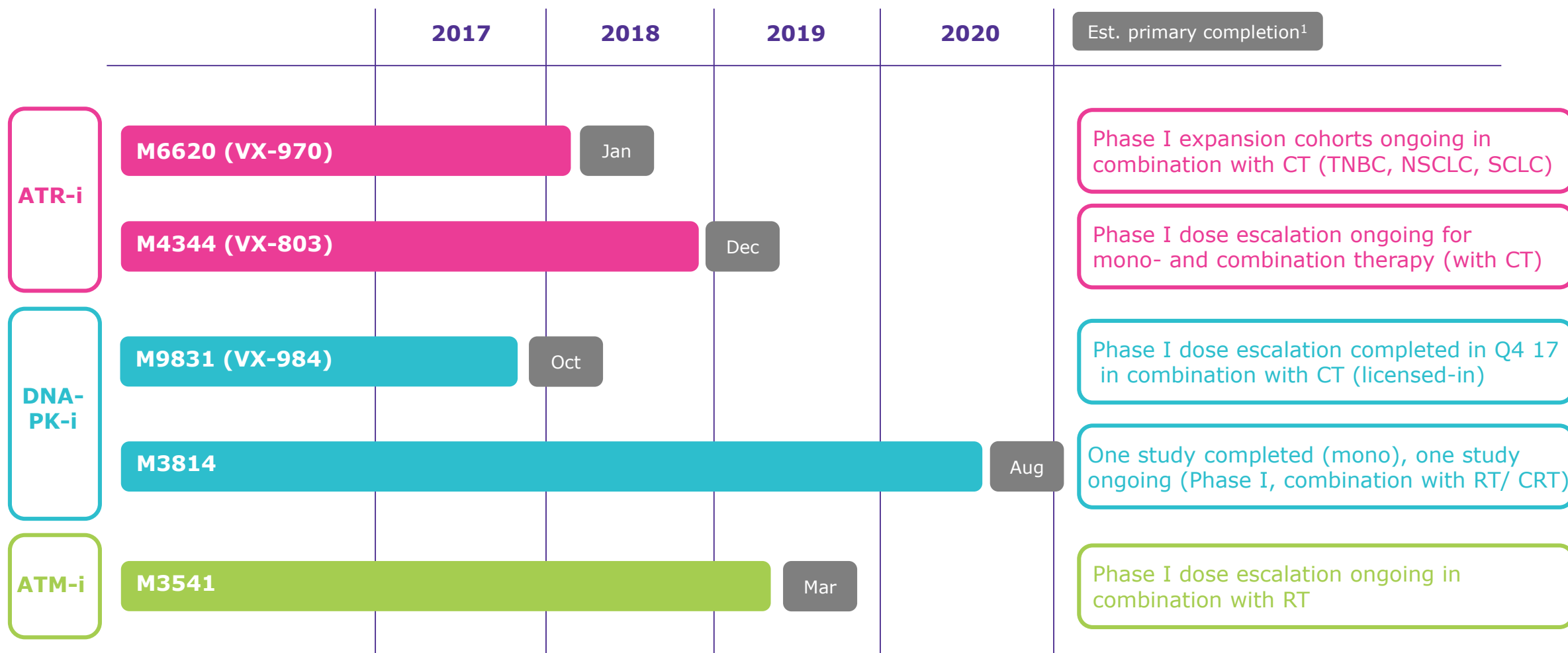
1. Inhibitor portfolio targets all three leading pathways of double stranded breaks – enabling unique synergies
2. ASCO 2017: leading DNA-PK-I (M3814) found safe and tolerable in a phase I study, with limited single-agent activity (20% of patients with stable disease for at least 18 weeks)²

¹ Sources: O'Connor, Molecular Cell, 2015 | Benjamin et al., Current Drug Targets, 2010, 11, 1336-1340

² "A multicenter phase I trial of the DNA-dependent protein kinase (DNA-PK) inhibitor M3814 in patients with solid tumors", Mark van Bussel, ASCO 2017
 Acronyms: ATM: ataxia-telangiectasia mutated | ATR: ataxia telangiectasia and Rad3 | DNA-PK: DNA-dependent protein kinase |

3 DNA damage response (DDR)

Clinical program targets three major DDR pathways, in mono- and combination



¹ Estimated primary completion date according to Clinicaltrials.gov as of February 09, 2018

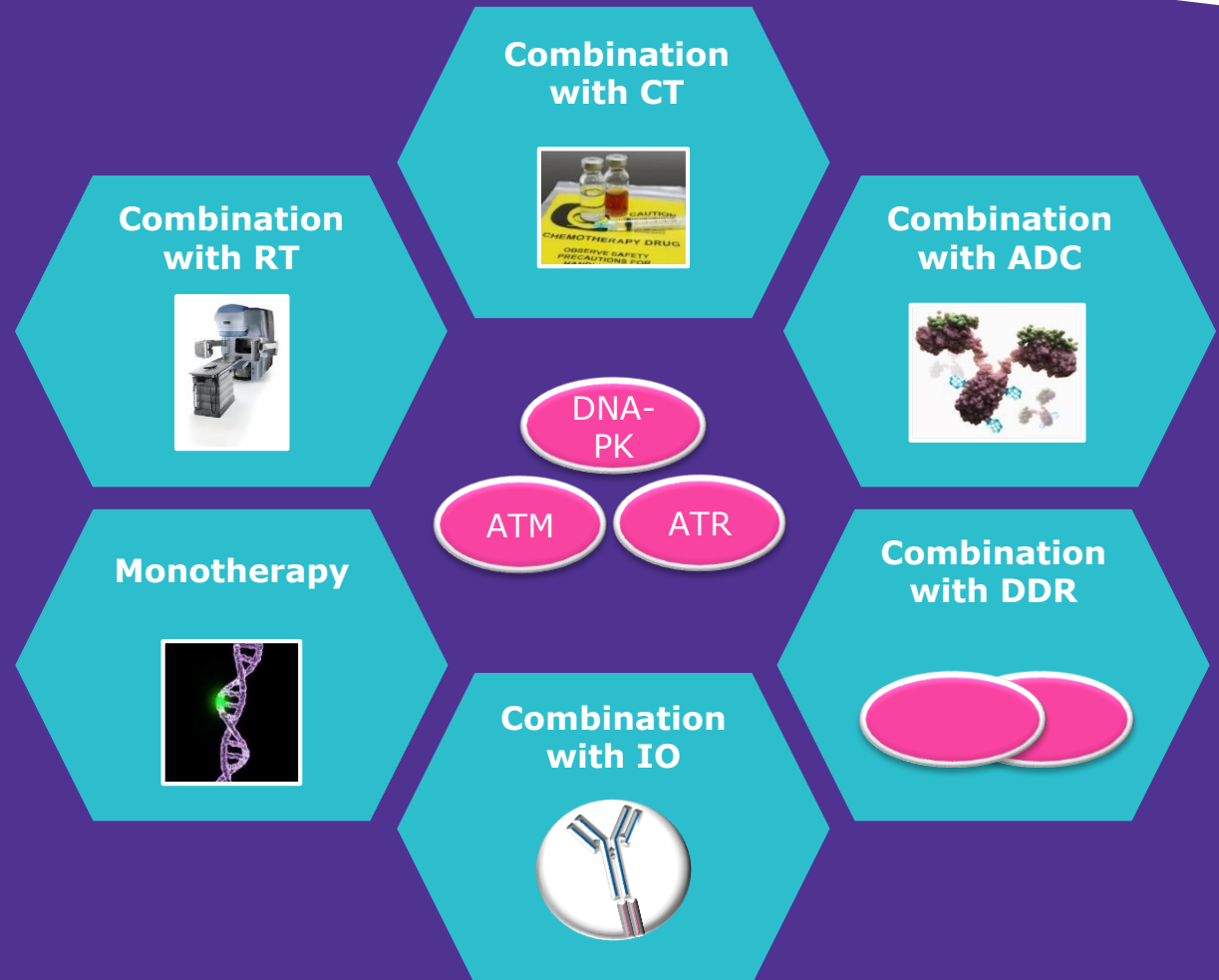
Acronyms: ATM: ataxia-telangiectasia mutated | ATR: ataxia telangiectasia and Rad3 | DNA-PK: DNA-dependent protein kinase | CT: Chemotherapy | RT: Radiotherapy | CRT: chemoradiotherapy | NSCLC: non-small cell lung cancer | SCLC: small cell lung cancer | TNBC: triple negative breast cancer | Note: timelines are event-driven and may change

3 DNA damage response (DDR) Broad combination potential across multiple mechanisms

At least **50%** of all cancer patients receive some type of **RADIATION** therapy (NCI 2016)

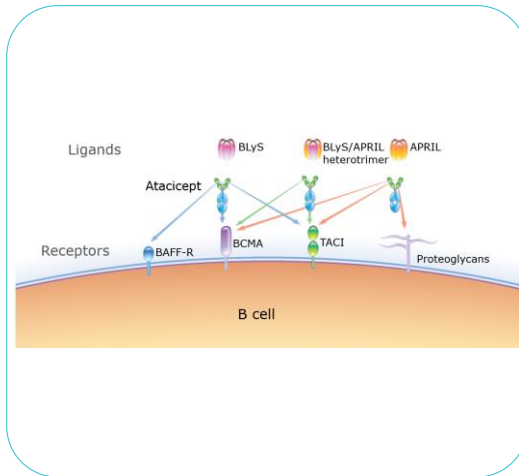
At least **70%** of all cancer patients receive some type of **CHEMOTHERAPY** (NCI 2016)

Significant share of patients to be treated with **CHECKPOINT INHIBITORS**



Update on selected assets

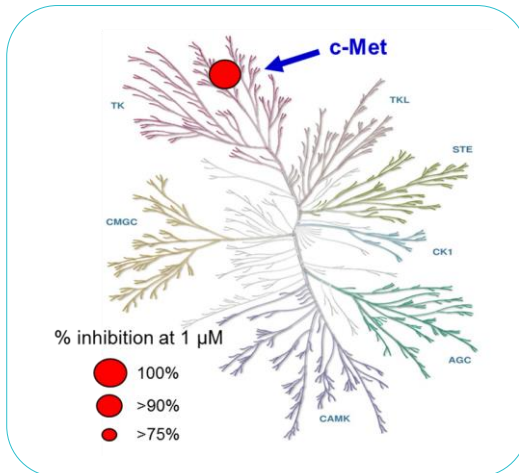
Atacicept



- Binds to receptors of two cytokines regulating maturation, function, and survival of B cells (B-lymphocyte stimulator (BLyS) & a proliferation-inducing ligand (APRIL))
- ADDRESS II (Phase IIb) in SLE patients (n=306):
- Primary endpoint not met, but analyses of predefined subpopulation with high disease activity (HDA; n=158) demonstrated statistically significant treatment effects (e.g. SRI-6 response at week 24 significantly greater with atacicept 150 mg vs. placebo); both doses led to significant reductions in BILAG A and SFI flares

Initiation of phase III subject to external financing

Tepotinib

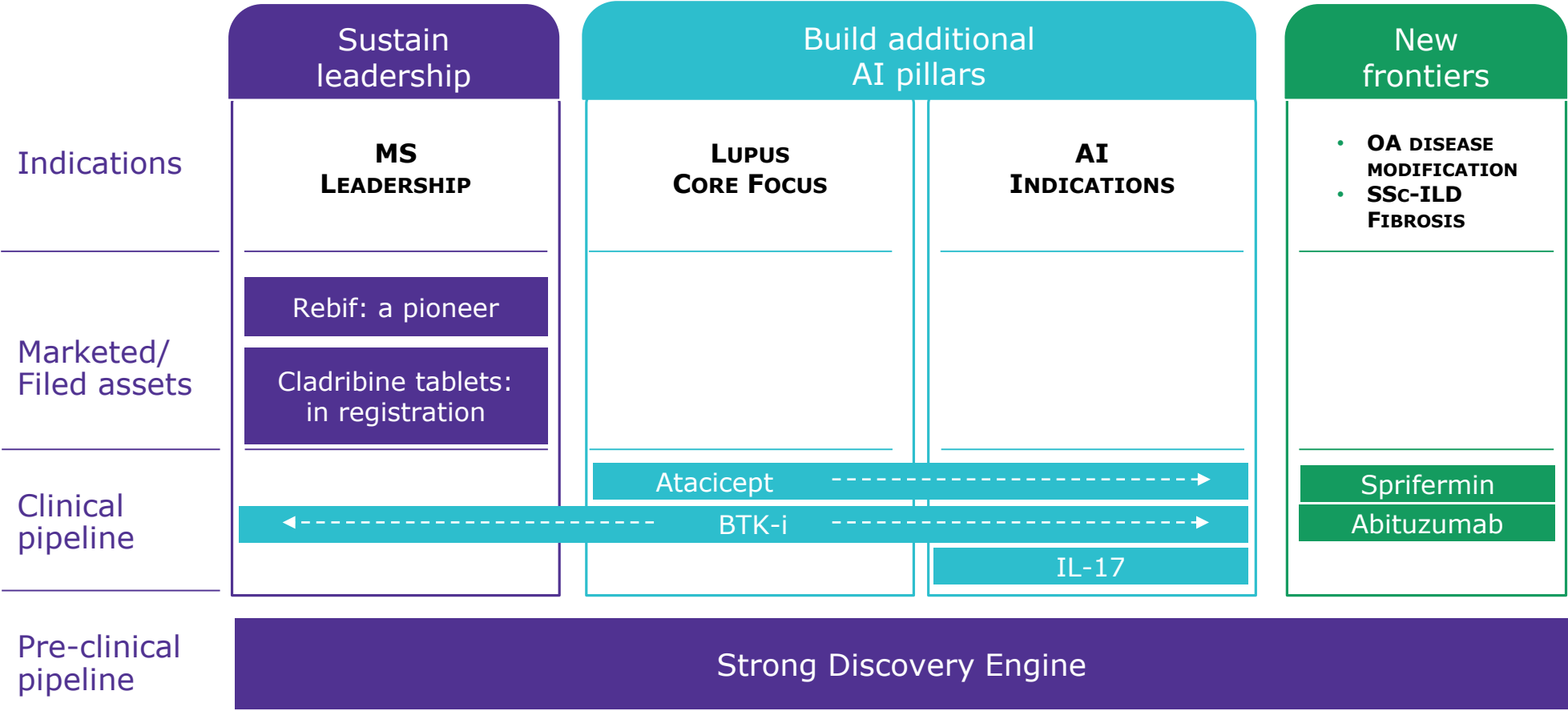


- Highly selective small molecule c-Met inhibitor
- Active in ligand-dependent and ligand-independent tumor models
- Biomarker-driven approach for patient selection
- Preliminary data show encouraging signs of anti-tumor activity in c-Met positive patients in NSCLC and HCC
- Phase II trials in progress in NSCLC and HCC

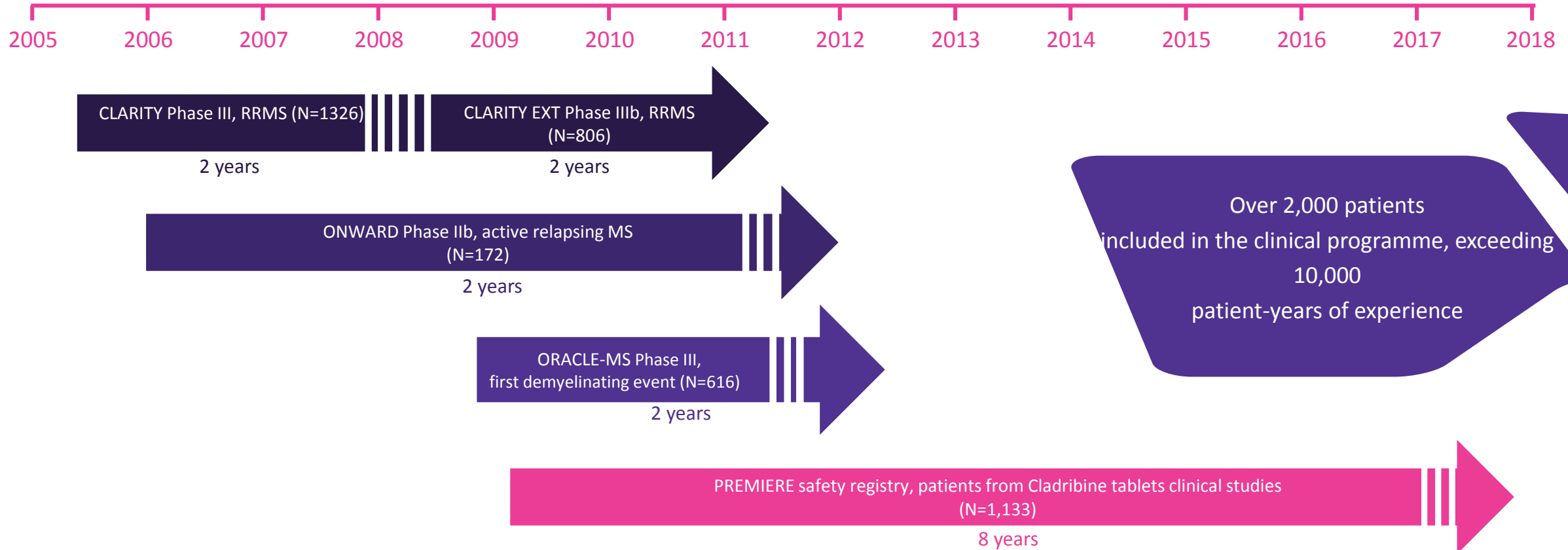
Analysis of Phase II data for HCC and NSCLC expected in H1 2018

Immunology

Strategy anchored on leadership in selected disease areas



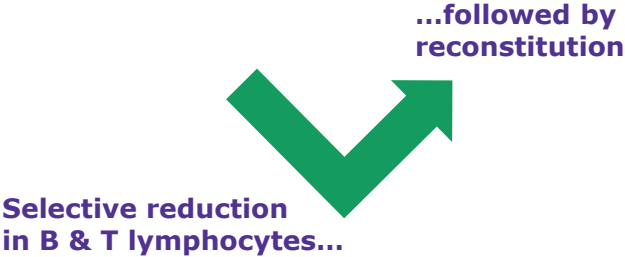
Cladribine tablets supported by 10,000 patient years of experience collected over 13 years including an 8 year safety registry



Healthcare

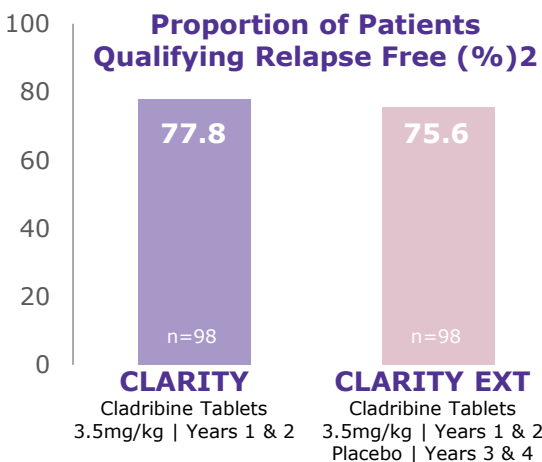
Mavenclad could change MS treatment paradigm

Selective
immune
reconstitution
therapy
(SIRT)¹



Unique
posology:
max. 20 days
of oral
treatment³

4 years
disease
control with
treatment over
2 years²



		Key											
		Lymphocyte count			Treatment			MRI					
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Prior to treatment initiation													
Year 1	TB/HSV/HCV screening ⁴	5 days of treatment	5 days of treatment										
Year 2	TB/HSV/HCV screening ⁴	5 days of treatment	5 days of treatment										

Low
monitoring
requirements⁴

¹ Giovannoni G. Neurotherapeutics 2017; Nov 22 [Epub ahead of print] | Wiendl H et al. Neurology 2017;89:1098-100 | Wiendl H. Nat Rev Neurol 2017; Sept 8 [Epub ahead of print]

² Giovannoni G et al. N Engl J Med 2010;362:416-26 | Giovannoni G et al. Mult Scler Aug 1 [Epub ahead of print]

³ Maximum of 20 days of oral dosing over 2 years with no further treatment required in the next 2 years. For important safety information, refer to the abbreviated Prescribing Information | Oral, weight-based dosing. For an average patient weighing 67 kg. Recommended treatment over 2 years. One treatment course per year, followed by observation for another 2 years. Each treatment course consists of two treatment weeks, one at the beginning of the first month and one at the beginning of the second month of the respective year | MAVENCLAD® EU SmPC, September 2017 | Giovannoni G et al. N Engl J Med 2010;362:416-26

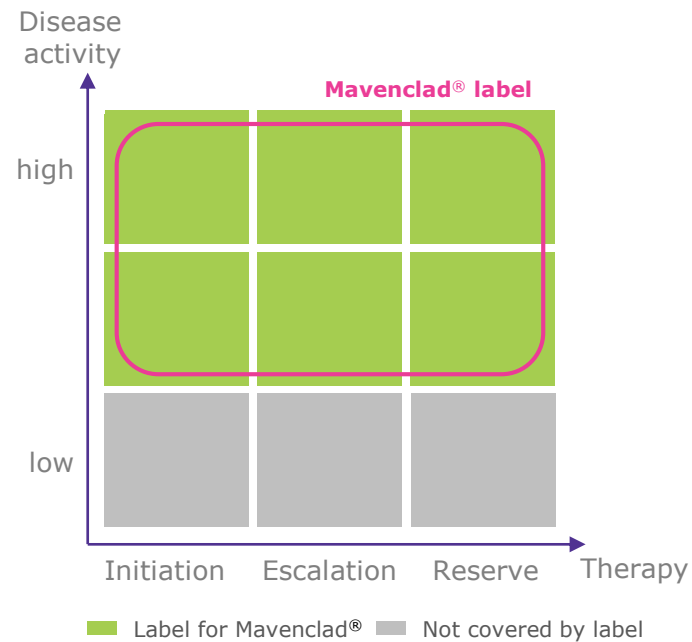
⁴ MAVENCLAD® EU SmPC September 2017 | Screening must be performed prior to initiation of therapy in Year 1 and Year 2. Vaccination of antibody-negative patients is recommended prior to initiation of Cladribine Tablets. AE, adverse event; HBV, hepatitis B virus; HCV, hepatitis C virus; MRI, magnetic resonance imaging; NEDA, no evidence of disease activity; TB, tuberculosis

Healthcare

Mavenclad's attractive label¹ supports integrated franchise strategy

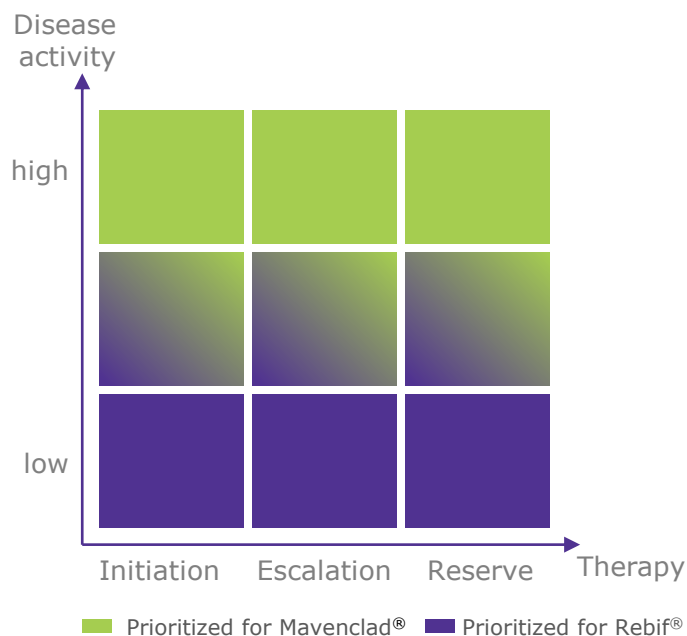
Mavenclad® label covers 60-70% of patients with RRMS² within the MS¹ patient population

MS patient population³



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

RRMS patients, EU-5⁴



integrated franchise strategy

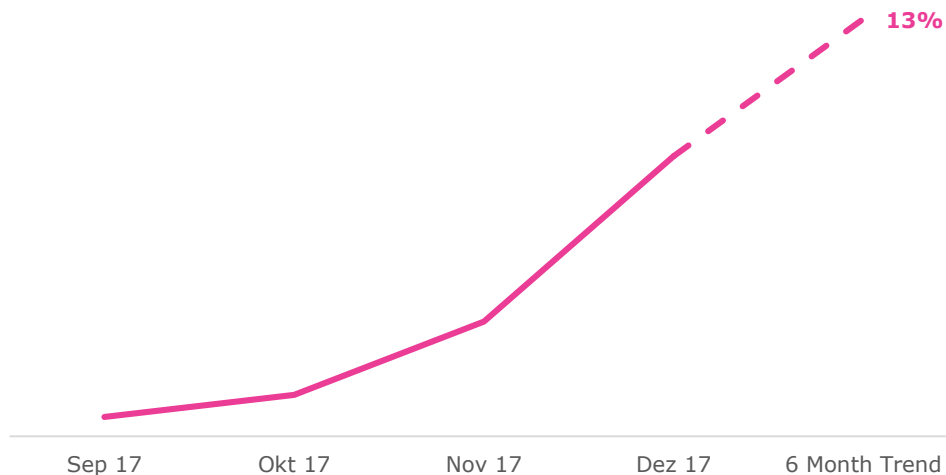
- At patient level: Rebif® and Mavenclad® are highly complementary
- At physician level: High overlap
- Franchise infrastructure investment benefits both brands

¹Mavenclad® label covers: RRMS+rSPMS+rPPMS; ²Abbreviations: RRMS relapsing-remitting multiple sclerosis, MS = multiple sclerosis, rSPMS = relapsing secondary progressive MS, rPPMS = relapsing primary progressive multiple sclerosis; ³Source: Merck KGaA, Darmstadt, Germany; ⁴Source: Merck KGaA, Darmstadt, Germany, Ipsos

Healthcare

Early commercial performance demonstrates ability to deliver innovation

Increasing share of HDA dynamic patients (GER)¹



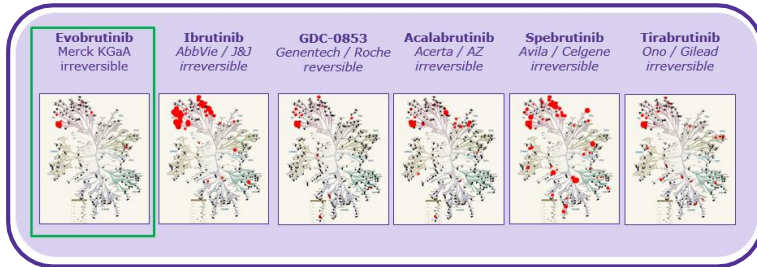
Targeting high double-digit €m sales in 2018

- Germany: continuously rising patient numbers
- UK: positive NICE recommendation; together with healthcare authorities secured immediate access and funding for patients
- Lowest-cost high-efficacy agent in multiple sclerosis
- Further submissions in planning
- U.S.: submission planned in Q2 2018

Expected peak sales ~€500 – 700 M in EU

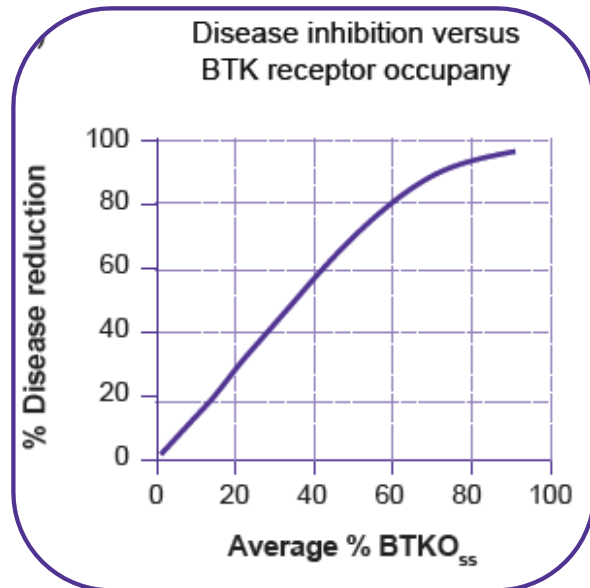
Evobrutinib

Highly selective BTK-i to be explored as chronic therapy



Safety: promising kinase selectivity minimizing off-target effects¹

- Greater selectivity vs. in-class competitors in kinase screen (>270 kinases)
- Besides BTK, two more kinases inhibited (vs. 25 off-target kinases by others)
- Kinase selectivity may result in lower AE rate vs. existing treatments



Efficacy: oral, highly efficacious in pre-clinical models¹

- Evobrutinib (irreversible antagonist) inhibiting signal transduction until protein is naturally degraded (no B-cell depletion)
- Occupancy/efficacy correlation: average BTK occupancy of >80% correlated with near complete inhibition of disease activity¹
- Clinical benefit of addressing B cell biology demonstrated by anti-CD20 targeting agents
- Insights from phase IIa trial (RA) leveraged in broad clinical development program (three phase IIb trials ongoing in MS, SLE, and RA)

Evobrutinib

Comprehensive development plan across immune-mediated diseases

comprehensive phase I/IIa
safety data-setSLE
(Ib)

Safety

- **24 patients**
- Double-blind, Randomized, Placebo-controlled Study

RA
(IIa)

Signal finding

- **65 patients**
- Randomized, double-blind, placebo-controlled trial in subjects with RA on stable Methotrexate therapy

robust phase II program to enable
differentiated phase III

RMS

- Randomized, double-blind, placebo-controlled study in **patients with RMS**
- **267 patients**
- **5 arms study:** placebo vs. 3 drugs-arms (low, mid, high dose) incl. **active control** (Tecfidera)

Primary
endpoint met

Q1 2019

SLE

- Randomized, double-blind, placebo-controlled **dose-ranging study** in subjects with SLE
- **451 patients**
- **4 arms study:** placebo vs. 3 drugs-arms (low, mid, high dose)

Q4 2019

RA

- Randomized, double-blind, placebo-controlled **dose-ranging study** in subjects with RA
- **360 patients**
- **4 arms study:** placebo vs. 3 drugs-arms (low, mid, high dose)

Q1 2019

Est. primary
completion

Outlook

Healthcare is well set for future growth

Stable existing
business



Core business delivering solidly with stable outlook

R&D pipeline
optionality



High quality assets across all three areas continuously complemented with short- and longer term optionalities

Innovative
partnerships



Joint investments and innovative deals models to maximize potential of assets and maintain focus

Disciplined
execution



Systematic pipeline review and timely decision making ensure efficient resource and budget allocation

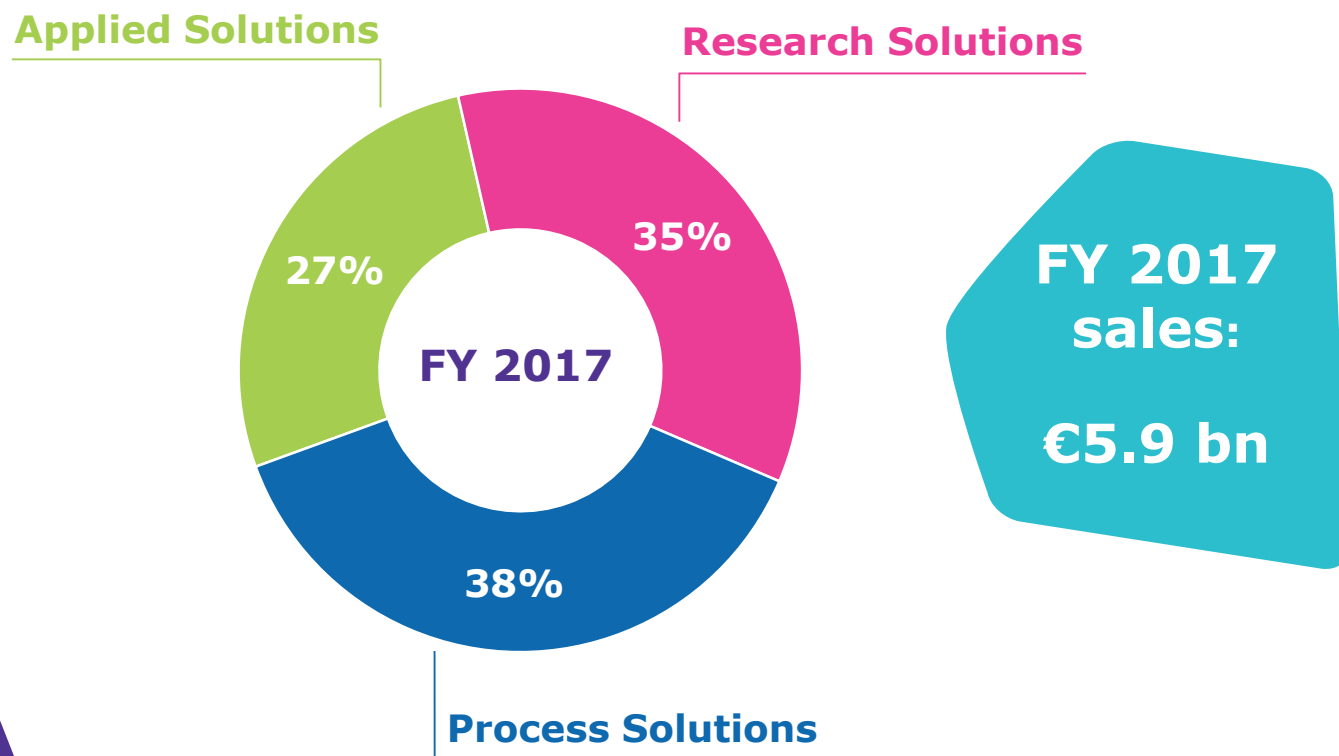




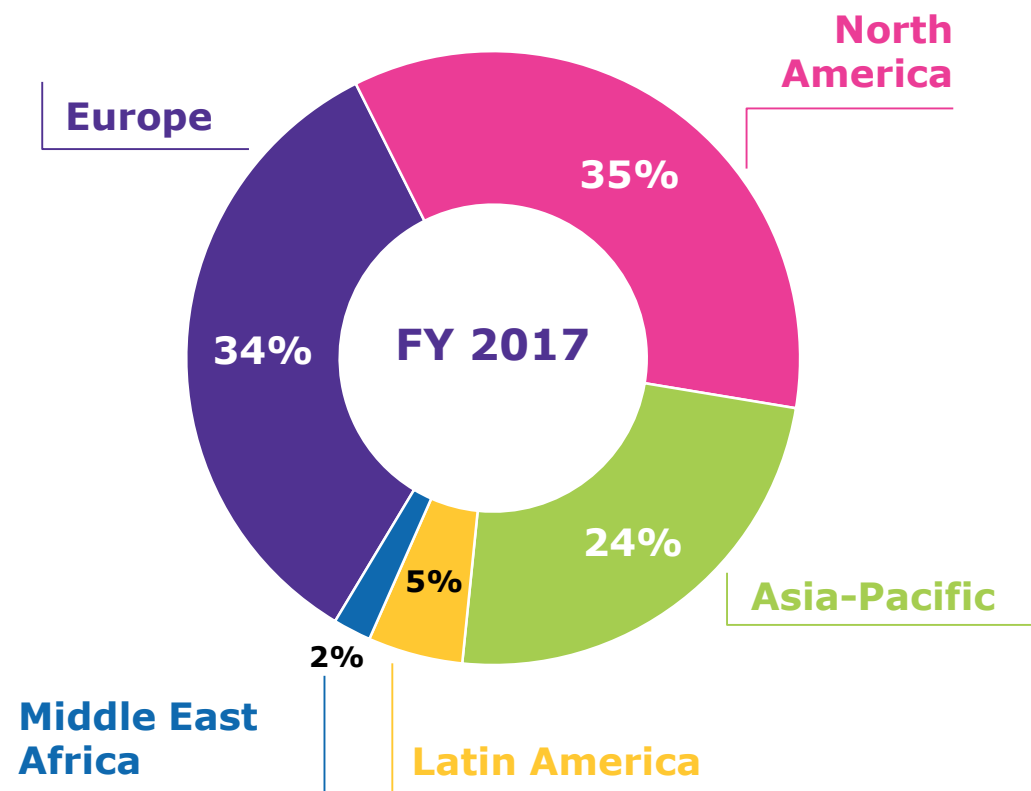
03 LIFE SCIENCE

A balanced portfolio and geographic presence

Sales by business unit



Sales by region



Life Science is an attractive market

RESEARCH

~€42 bn

Low single digit



- Growth in volume of experiments
- Mild growth in academic funding
- Investment in industry R&D

PROCESS

~€38 bn

High single digit



- Drug volume growth
 - from biologics
 - from emerging modalities
- Continued shift to single-use

APPLIED

~€45 bn

Mid single digit



- Volume growth from
 - Population growth
 - Increased testing needs

Success driven by portfolio breadth and differentiation, a customer-centric approach and world-class capabilities

RESEARCH



Broad, relevant and innovative portfolio

Simple customer interface

Ability to manage complexity across organization (e.g., reliability of supply)

PROCESS



Developed market:
Deep expertise in each unit operation

Emerging market:
Broad portfolio

Demonstrated quality & regulatory leadership

APPLIED



Customized workflows for specific applications

Ability to manage complexity across organization (e.g., reliability of supply)

Demonstrated quality & regulatory leadership

Process Solutions

Our end-to-end portfolio for manufacturing mAbs



MAKE

Produce antibodies



PURIFY

Remove cell debris, virus, etc.



FORMULATE

Final drug product



EX-CELL®
Advanced™
CHO Fed-batch
Medium
**Cell culture media
to enhance cell
growth**



2000L CellReady
bioreactor
**Tank for
cultivating cells**



Clarisolve®
clarification
filters
**Removing cell
debris**



FlexReady®
chromatography
Purifying mAbs



Viresolve® Pro
solution
**Removing viruses
from protein
solutions**



Pellicon®
cassette filters
**Washing and
removing cells,
lipids, particles**



Opticap® capsules
Sterile filtration

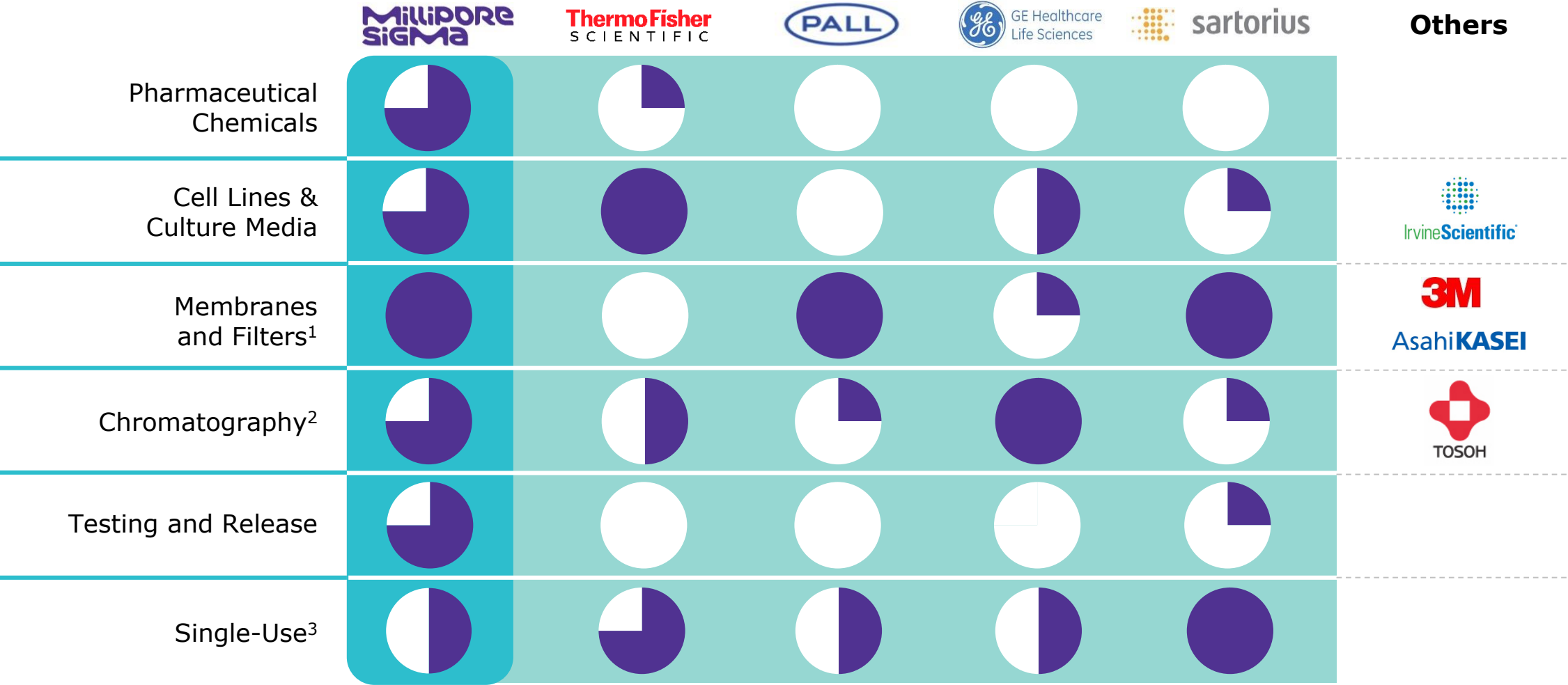
Provantage®

BioReliance®

EMPROVE®

cGMP SOLUTIONS & SERVICES

We are the only company to span the entire value chain of our customers



Pie Charts represent completeness of product offering; ¹Includes Aseptic, Virus, Clarification, TFF; ²Includes resins, columns and hardware for separation and purification; ³Includes assemblies, bioreactors and components

#1 website in research life science industry

Industry leading e-commerce platform and supply chain capability



SEARCH



Hundreds of thousands of products at your fingertips



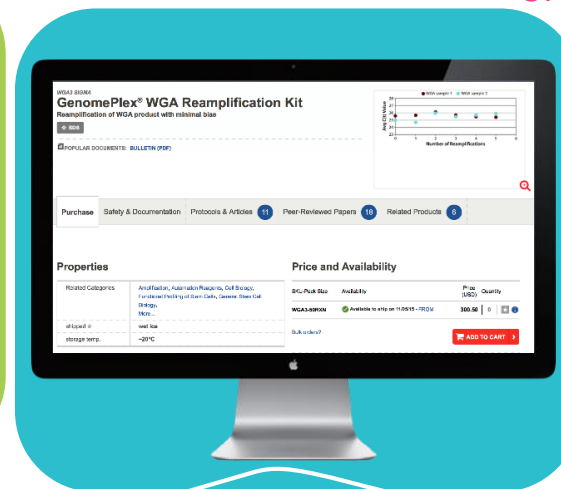
CONTENT



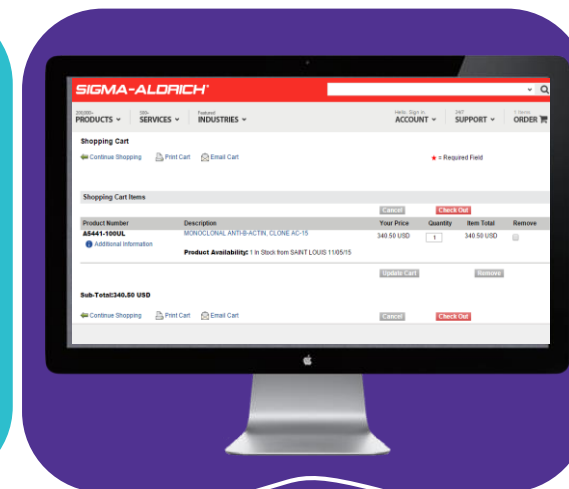
Online leader in scientific content: articles, protocols and peer reviewed papers



ORDER



Real-time pricing and availability



Convenient and simple customer interface: no more than 2 clicks from shopping cart

Focus on strategic growth initiatives will secure long-term growth



Evolutionary

Developing offerings to further existing platforms



Breakthrough

Developing new platforms and product categories

Strategic initiative



SINGLE-USE



END TO END



GENE EDITING & CELL THERAPY

Ambition

Establish leadership in the fast-growing **single-use** bioprocessing segment through standardization and capacity expansion

Offer **process development** services with our complete bioprocessing portfolio especially to small biotechs

Develop tools for **gene editing** and manufacturing services for **cell therapy**

Proof points

- ✓ **Customized offer** by segment
- ✓ **Facilities expanded** in Danvers & Shanghai

- ✓ **15 customers** in Martillac
- ✓ **Additional site in Shanghai** opened in 2018 to augment Martillac & Boston

- ✓ **Foundational patents** in cutting & replacement for CrisprCas9
- ✓ Viral vector manufacturing site in **Carlsbad EMA/FDA approved**
- ✓ Supports **9 out of 10 top gene therapy products** manufacturers

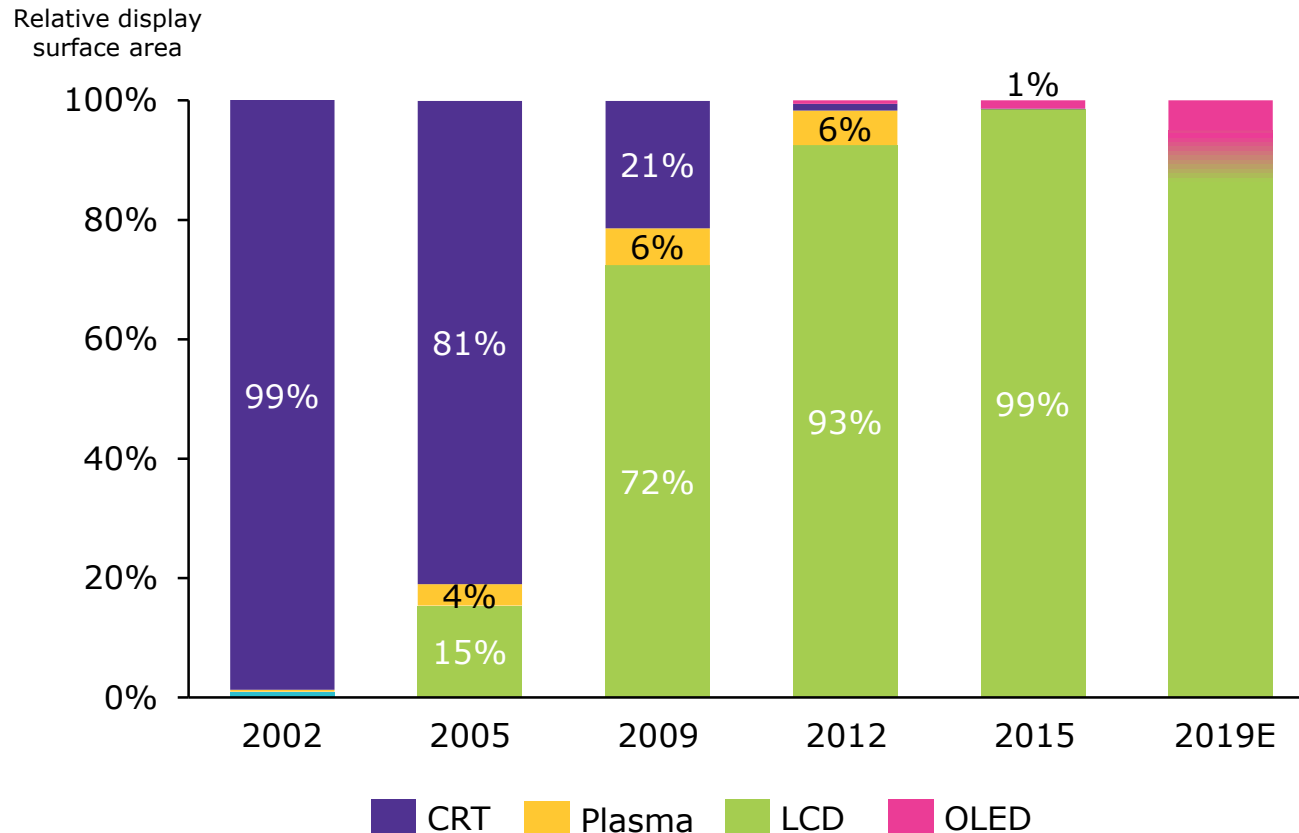


04

PERFORMANCE MATERIALS

Liquid crystals are clearly the dominant display technology

Market share by display technology



Rationale for LCD leadership

For consumers:

- Price
- Thinner frames
- Higher resolution in all sizes
- Proven track record of extreme reliability

For manufacturers:

- Price and scalability
- Production costs and capacities

LCD progress creates higher technological and commercial entry barriers

OLED share will increase in mobile applications

Our leading OLED business is well set to exploit display market opportunities

Market position

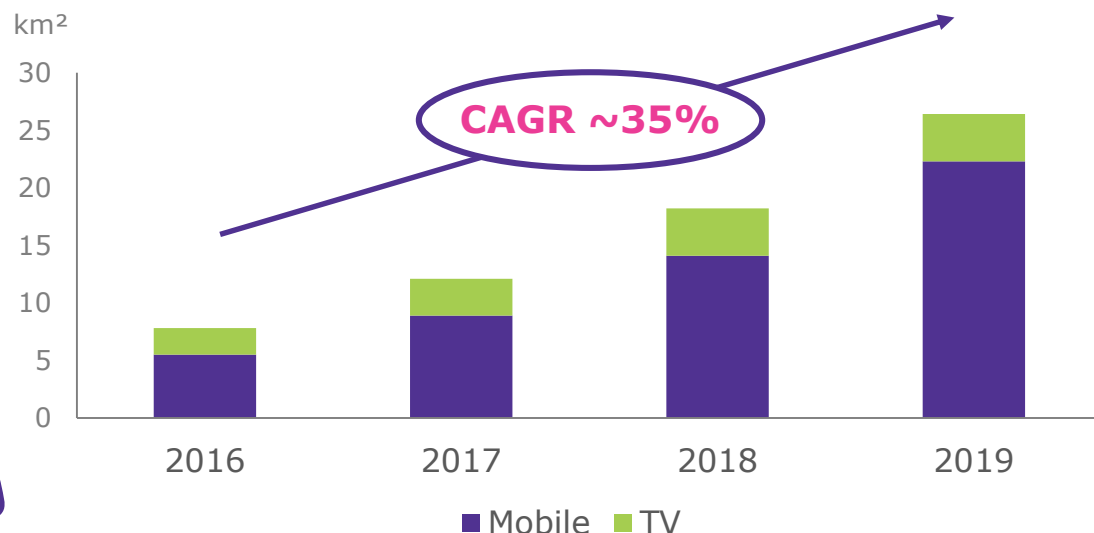
- Among top 3 OLED material provider
- Unrivalled experience and expertise in displays
- Long & intimate relationships with all display producers
- Recent capacity expansion to serve growing demand

our ambition

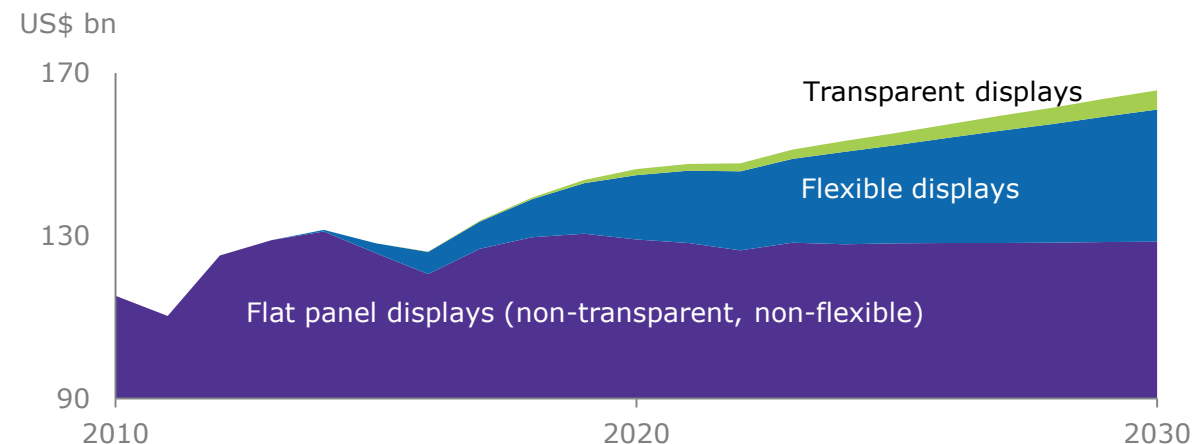
solution provider

- Supplier of all OLED stack layers
- Excellence in vapor & printable materials
- In-house testing of materials
- Tailor-made solutions for customers

Announced OLED capacity expansion¹

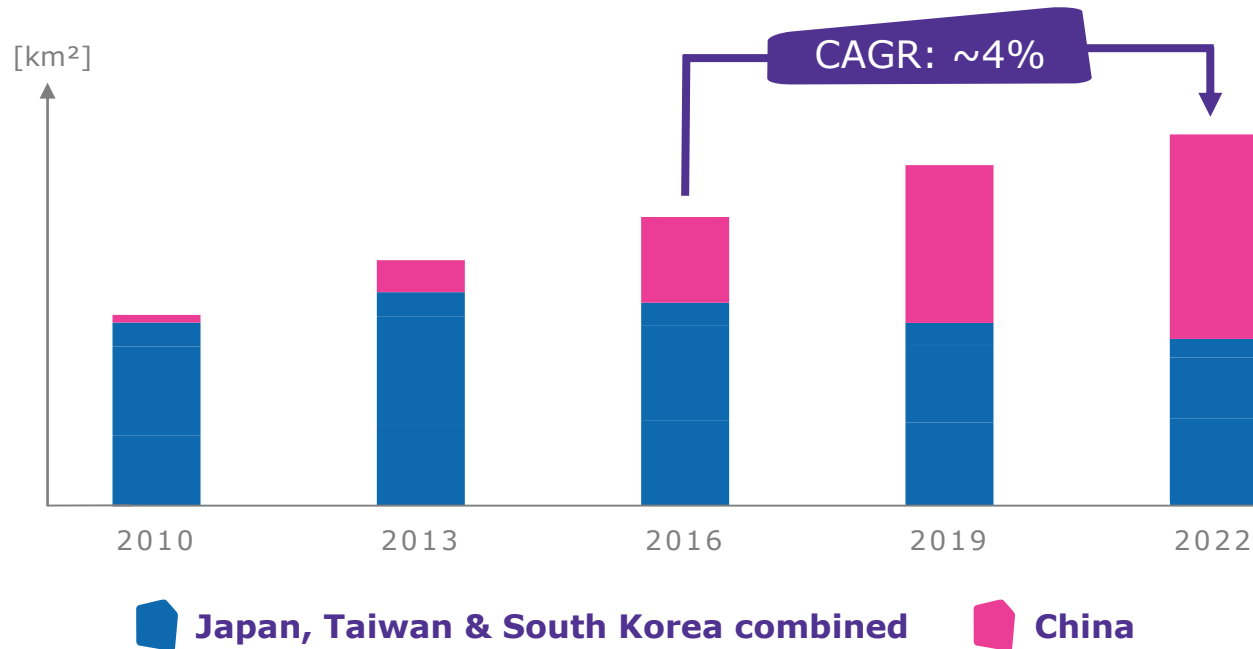


Display market development¹



Merck KGaA, Darmstadt, Germany will leverage its capabilities to address shift towards more dynamic Chinese market

Share of global display production capacities by region [km²]*



Panel market dynamics in China

- Strong capacity build-up since 2012
- Historically main focus on local market supply with low to medium end displays
- Possibility to enter into global and higher-end markets in the future

Leverage Merck's KGaA, Darmstadt, Germany competitive advantage

- *Customer proximity:* Reallocate resources to improve specific customer support
- *Application and production know-how:* Develop technologies that translate into commercial value
- *Continuous innovation:* Investments in Shanghai R&D hub to support local customers

Capacity growth will benefit our leading supply capabilities especially from 2019

Challenges in LC displays amid various opportunities for novel applications

LC for display applications



Maintain leadership position in a more challenging environment:



Innovation

Two new modes SA-VA and UB-Plus in tests with several customers



Know-how

Unrivalled understanding of displays to solve customer challenges with new facilities, especially GEN 10



Customer

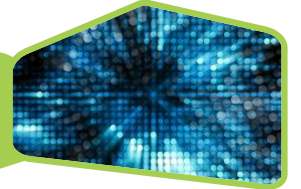
Presence in all customer locations versus more local focus of competitors



IP protection

>2,000 patents and rigorous enforcement of IP

NOVEL Liquid crystals applications



Drive innovation and create further market demand:



LC Windows

LC-Window production facility to start production in Q4 2017 – first project realizations expected in 2018



LC Antennas

Completed product testing with partner Kymeta – expected launch for special applications in 2018



Lighting guiding

Collaboration with Hella and Porsche progressing well. Market demand for high resolution headlamps increasing.

Liquid crystals OFFER a variety of opportunities



1

3

4

5

2

6

1. Adaptive lighting for automotive
2. Adaptive lighting for architecture
3. Smart antenna
4. Liquid crystal windows for architecture
5. Holography
6. Free form LCD

Integrated Circuit Materials

Leading market positions in profitable niches supported by technology trends

ICM¹ sales by end use



■ Memory ■ Logic
■ Foundry² ■ Packaging
■ Other

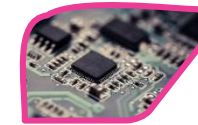
Product portfolio



Lithography materials



Dielectric materials



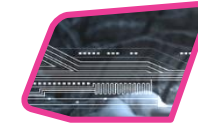
Conductive pastes



Process materials



Silica materials



Deposition materials

Growth drivers and differentiation

- Volume growth is generally driven by wafer starts, estimated to grow with a CAGR of ~5% until 2022
- Merck KGaA, Darmstadt, Germany **outgrowing market** due to:
 - **Innovative** solutions, **broad** portfolio offering and **global** company footprint
 - Benefit from **smaller and more complex** structures (3D chip architecture)
 - Strong **process expertise & application knowhow** enabling cost-efficient production for our customers (improved yield, lower energy, less material)

We have a strong position and will benefit further from complex technological advances and underlying market trends

Market drivers and technological trends

Miniaturization: Devices are becoming smaller with better performance

- Need for enabling materials to reduce size (Moore's law)

Mobility: Everyone is continuously connected without direct power supply

- More chips needed for local energy production
- Energy storage → smaller batteries with higher density

Internet of Things: Everything is continuously connected

- More gadgets and devices that include chips
- Increasing amount of communication and sensor chips

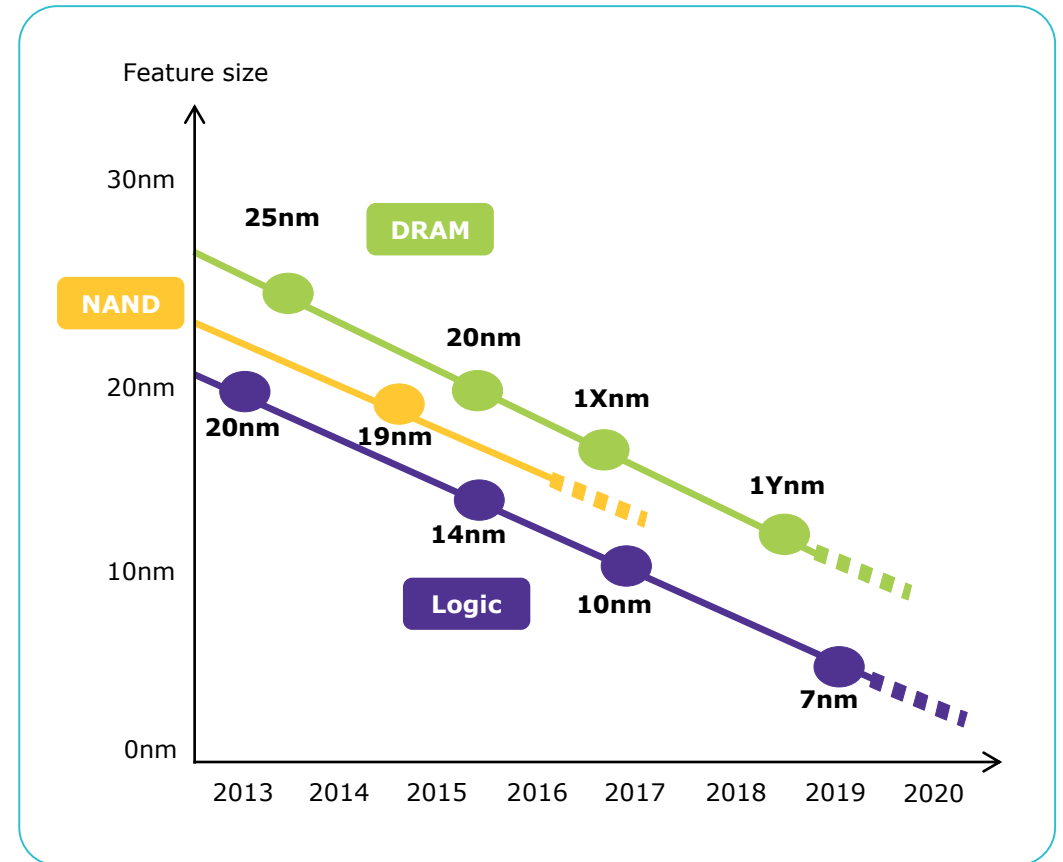
Big Data: Increasing need for intelligent data storage

- Switch from hard disk drives (HDD) to solid state drives (SSD)

Selected competitors

- Tokyo Ohka Kogyo
- Dow Electronic Materials
- Nissan Chemicals
- JSR

Feature sizes develop as predicted by Moore's law



Pigments and Functional Materials

Driving innovation by combining color & function

Pigments & Functional Materials sales by end use



■ Decorative Materials

Product portfolio

Decorative



Color cosmetics

Plastics

Printing

Car coatings

Functional



Laser marking

Coating & Printing

Personal care

Security

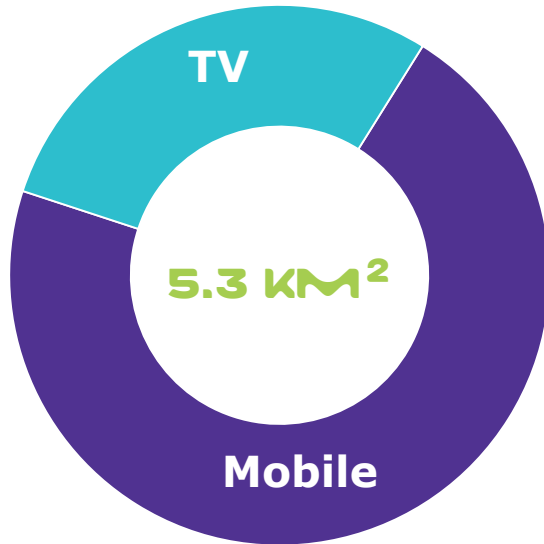
Growth drivers and differentiation

- Volume growth for established decorative business is generally driven by rising living standards in line with GDP*
- Addressable market increasing from €2 bn to €5 bn due to **further expansion into functional markets** combining color and function
- Factors of differentiation to outperform market growth:
 - Broad product portfolio with **unique high-end products**
 - **Global footprint** and diverse customer base ensuring good market access
 - Strong know-how of end applications of our customers enabling **increase of share-of-wallet** and **expansion into new applications**

Advanced Technologies

Our leading OLED business is well set to exploit display market opportunities

OLED Shipment Area* [km²]



Product portfolio

Evaporable OLED Materials



Printable OLED Materials



Growth drivers and differentiation

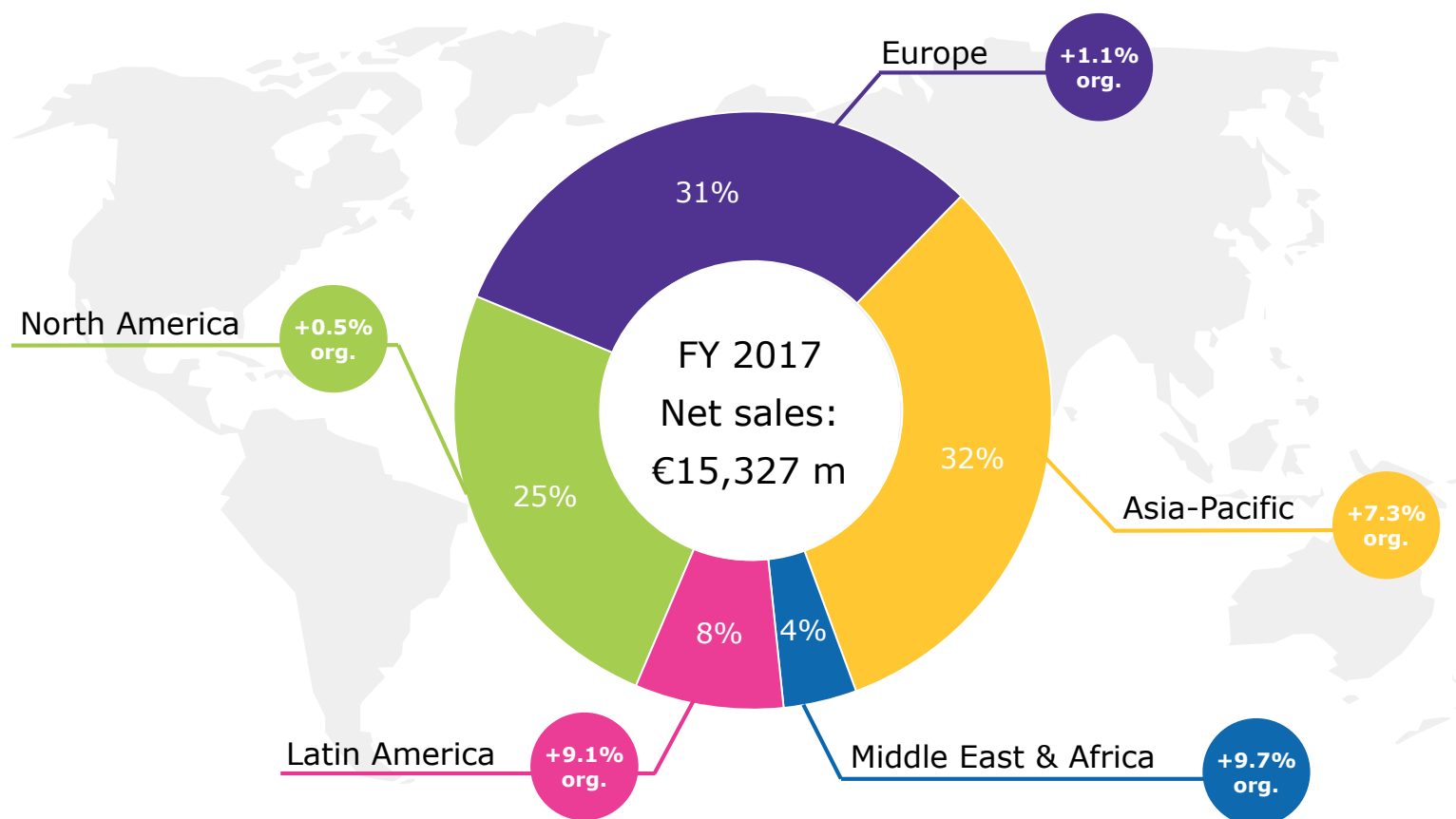
- Volume growth is driven by large investments of OLED panel manufacturers, especially in the mobile market segment
- Strong **R&D and licensing** activities to strengthen our market share
- Factors of differentiation:
 - Broad product portfolio of **evaporable and printable** high-end materials
 - Intimate **customer relations and application labs** in China, Taiwan & Korea
 - Strong supply chain, production capacity and **superior quality** standards



05 FINANCIAL OVERVIEW

Organic growth in all regions

Regional breakdown of net sales [€ m]



Regional organic development

- Organic growth in Europe driven by solid demand in Life Science and CH outweighing decline in Rebif
- Growth in North America from Life Science more than offsets Rebif decline
- Asia-Pacific shows strong organic growth fueled by Healthcare, especially due to Glucophage repatriation, and Life Science outweighing LC decline
- Very strong organic sales development in LatAm and MEA driven across all major businesses, especially GM, CH, and Life Science

Totals may not add up due to rounding;
LC=Liquid Crystals; GM=General Medicine (includes CardioMetabolic Care & General Medicine and Others); CH=Consumer Health

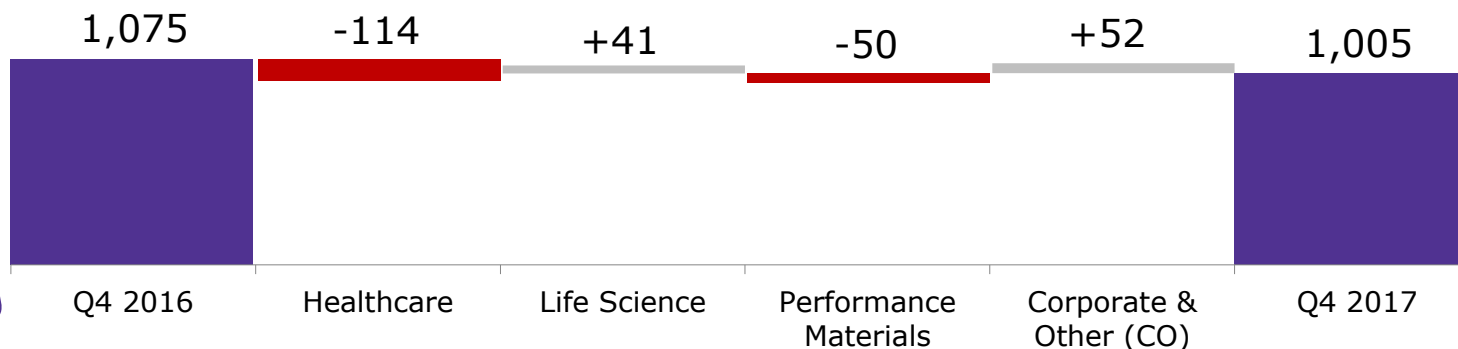
EBITDA pre reflects investments in HC & LC market share decline

Q4 2017 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	5.9%	-4.8%	-0.7%	0.4%
Life Science	8.9%	-5.5%	0.4%	3.8%
Performance Materials	-1.2%	-5.9%	0.0%	-7.1%
Group	5.9%	-5.2%	-0.2%	0.5%

- Strong organic growth of Healthcare driven by sound Fertility, GM repatriation in China, CH and Bavencio offsetting Rebif decline
- Life Science strong organic growth driven by all businesses, esp. Process Solutions
- Growth of ICM, Pigments & Functionals mitigate LC market share decline
- Strong FX headwinds in all businesses

Q4 YoY EBITDA pre contributors [€ m]



- Healthcare reflects higher R&D investments offsetting organic growth
- LS driven by strong organic growth and synergies outweighing FX headwinds
- Performance Materials reflects LC market share decline and FX
- Corporate EBITDA pre contains FX hedging gains and LTIP¹

Totals may not add up due to rounding;
¹LTIP = Long Term Incentive Plan;

Q4 2017: Overview

Key figures

[€m]	Q4 2016	Q4 2017	Δ
Net sales	3,830	3,848	0.5%
EBITDA pre	1,075	1,005	-6.5%
Margin (in % of net sales)	28.1%	26.1%	
EPS pre	1.43	1.31	-8.4%
Operating cash flow	787	642	-18.5%

[€m]	Dec. 31, 2016	Dec. 31, 2017	Δ
Net financial debt	11,513	10,144	-11.9%
Working capital	3,488	3,387	-2.9%
Employees	50,414	52,941	5.0%

Comments

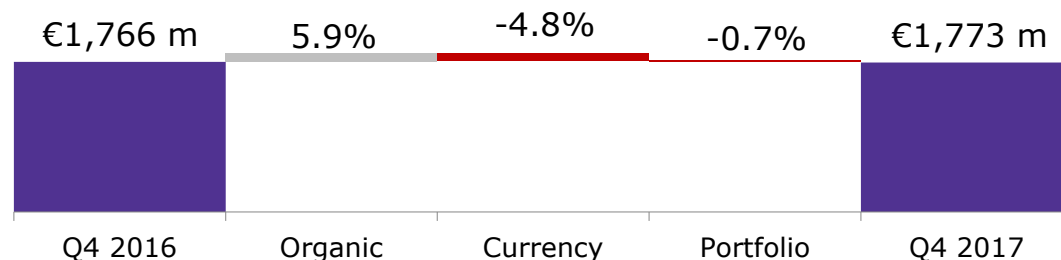
- EBITDA pre & margin decrease reflects LC market share decline, investments in HC and FX headwinds
- EPS pre down due to EBITDA pre decrease
- Lower operating cash flow reflects softer EBIT also driven by HC investments, LC decline and FX
- Net financial debt reduction due to strong focus on deleveraging and FX
- Higher headcount related to growth initiatives in HC and shift in LS from temporary to permanent

Healthcare: Solid org. growth of core business and investments in future growth

Healthcare P&L

[€m]	Q4 2016	Q4 2017
Net sales	1,766	1,773
Marketing and selling	-709	-689
Administration	-68	-73
Research and development	-418	-443
EBIT	279	73
EBITDA	478	308
EBITDA pre	497	384
Margin (in % of net sales)	28.2%	21.6%

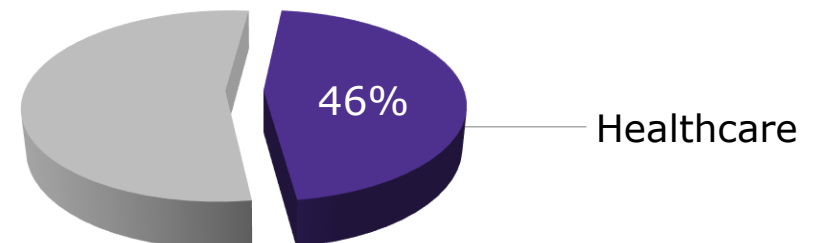
Net sales bridge



Comments

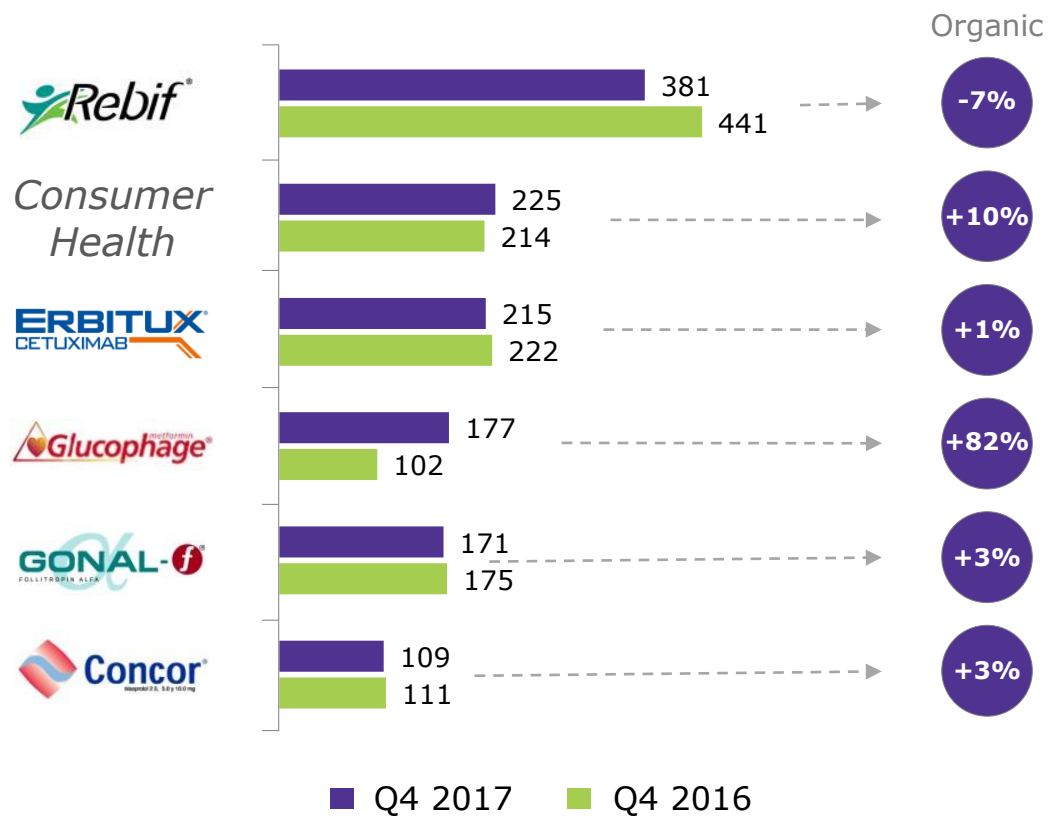
- Solid organic growth driven by Glucophage China repatriation and double digit growth for Consumer Health across all major regions
- Bavencio and Mavenclad successfully launched
- Rebif organic decline driven by volume decline in EU and U.S. partially offset by U.S. pricing
- Erbitux facing competition and price pressure in major markets
- Marketing & Selling slightly lower due to improved cost control and FX
- Profitability impacted by product mix and back-end loaded R&D investments

Q4 2017 share of group net sales

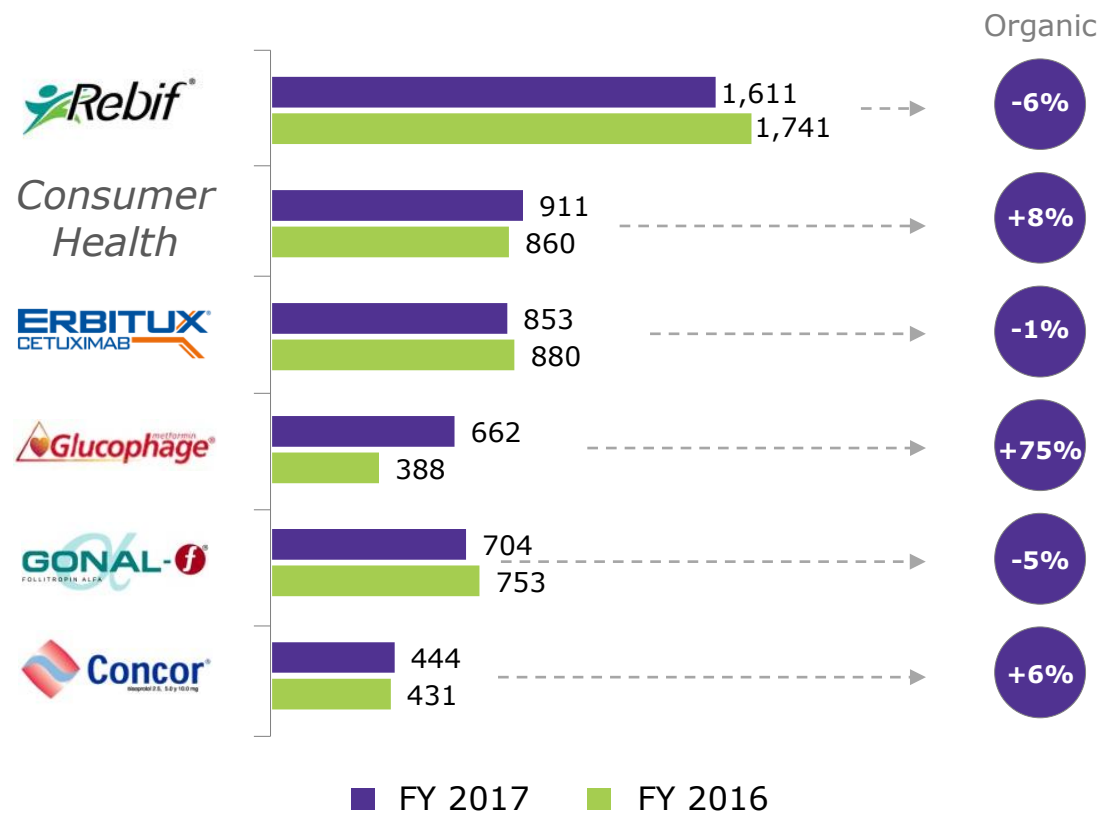


Healthcare organic growth by franchise/product

Q4 2017 organic sales growth [%]
by key product [€ m]



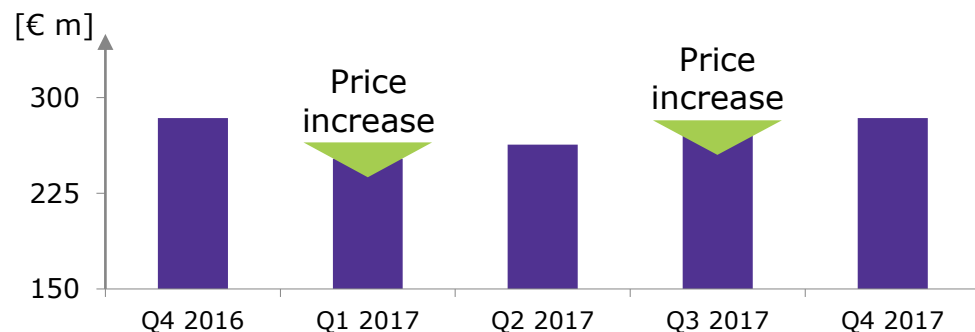
FY 2017 organic sales growth [%]
by key product [€ m]



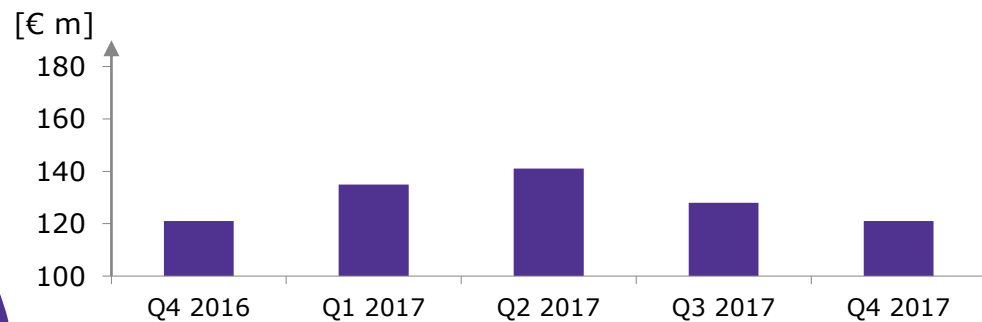
Rebif: Ongoing decline in line with interferon market

Rebif sales evolution

North America



Europe



Q4 drivers
-7.2% org.

- Price
- Volume
- FX

Q4 drivers
-7.6% org.

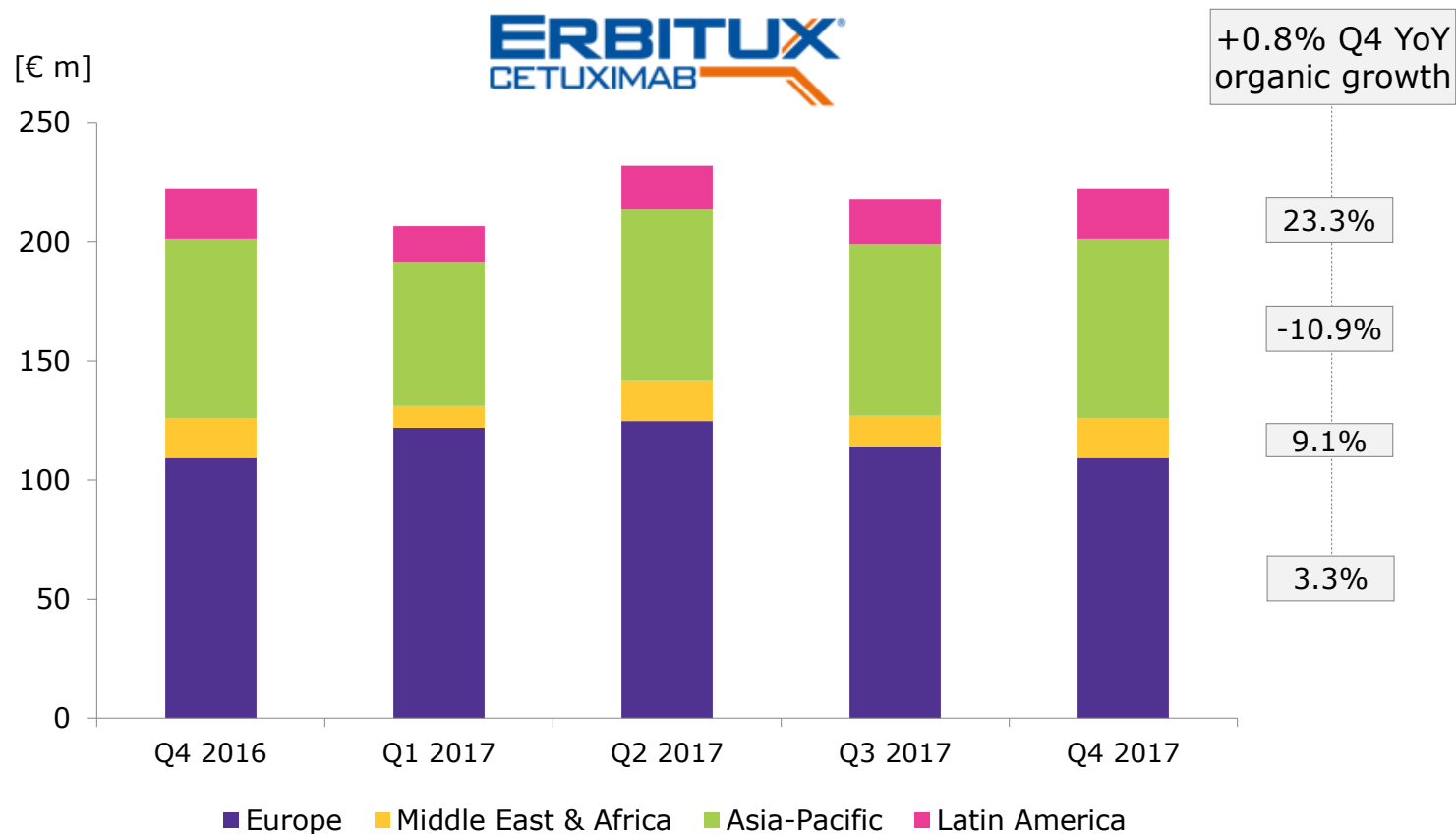
- Price
- Volume

Rebif performance

- Rebif sales of €381 m in Q4 2017 reflect organic decline of -7.2% as well as FX headwinds
- U.S. organic decline due to competition and stocking effects partially offset by price increases
- Market share within interferons stable due to high retention rates and long-term safety track record
- Competition from orals and occasional price adjustments cause ongoing organic decline in Europe

Erbitux: Almost stable in a challenging market environment

Erbitux sales by region



Erbitux performance

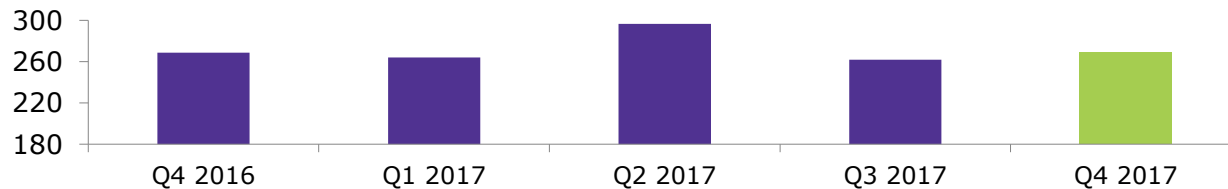
- Sales decrease to €215 m impacted by FX headwinds mainly from APAC & LatAm
- Europe impacted by competition, price reductions and shrinking market size due to increasing immuno-oncology trials
- Asia-Pacific with volume and price erosion in China and Japan
- MEA shows strong organic growth

Strong organic growth in General Medicine and Fertility

Sales evolution

Fertility

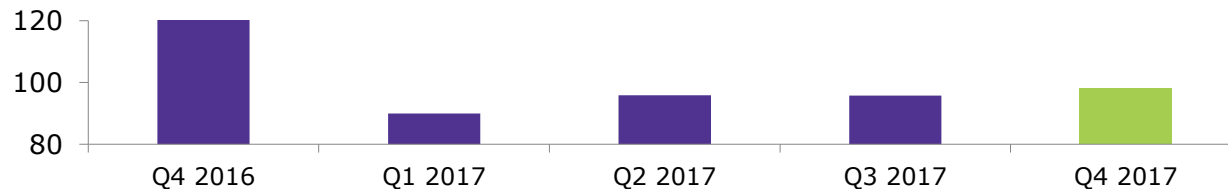
[€ m]



Organic
7.2% org.

Endocrinology

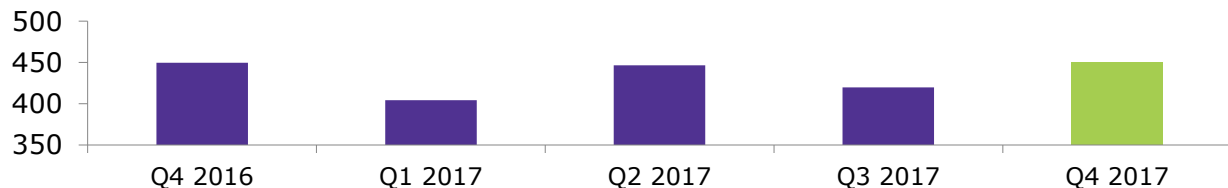
[€ m]



Organic
-13.9% org.

General Medicine (GM)*

[€ m]



Organic
16.1% org.

Q4 drivers

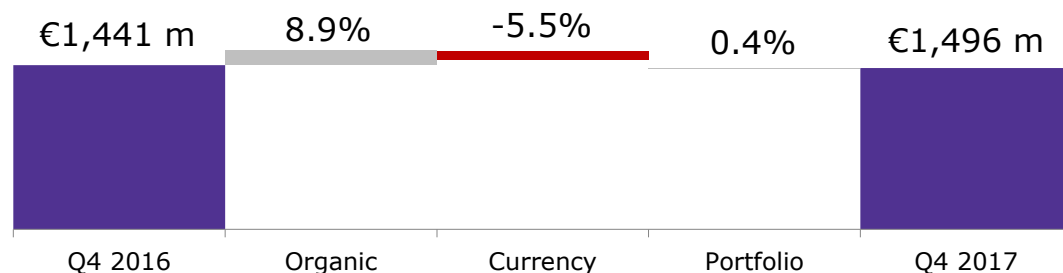
- Fertility shows ongoing growth especially in APAC
- Gonal-f driven by double digit growth in APAC due to increased demand
- LY Endocrinology reflected release of accrual for rebates
- GM organic sales growth driven by Glucophage repatriation in China and increased demand in LatAm
- Euthyrox with strong demand in growth markets

Life Science: Strong sales quarter amid synergy realization

Life Science P&L

[€m]	Q4 2016	Q4 2017
Net sales	1,441	1,496
Marketing and selling	-458	-431
Administration	-71	-67
Research and development	-70	-52
EBIT	70	156
EBITDA	352	338
EBITDA pre	419	461
Margin (in % of net sales)	29.1%	30.8%

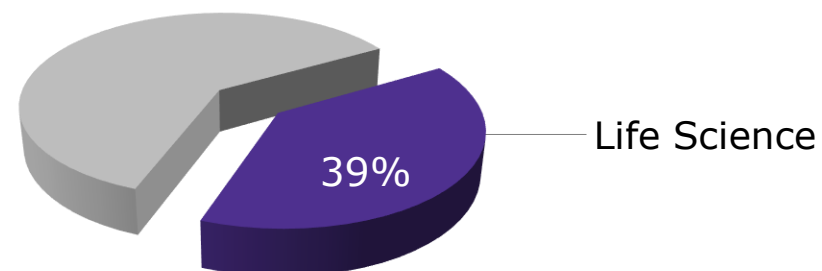
Net sales bridge



Comments

- Process Solutions shows double digit organic growth due to strong demand in single-use & services globally
- Applied Solutions with strong organic growth, benefits from good demand in all regions and all businesses
- Research Solutions growth driven by strong eCommerce
- Q4 LY EBIT contains D&A effects from final purchase price allocation for Sigma-Aldrich
- Higher profitability from organic growth and synergy ramp-up outweighing FX headwinds

Q4 2017 share of group net sales

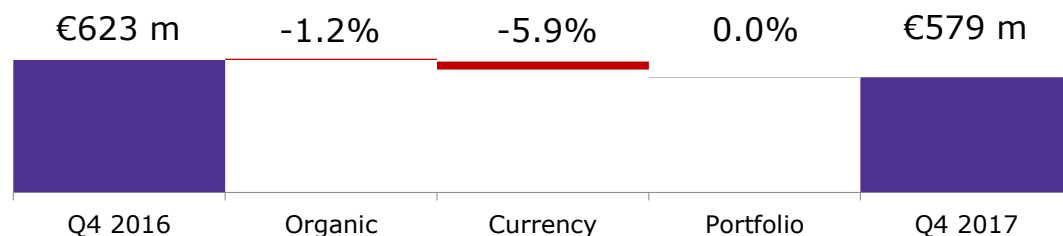


Performance Materials: Profitability burdened by LC market share decline

Performance Materials P&L

[€m]	Q4 2016	Q4 2017
Net sales	623	579
Marketing and selling	-57	-61
Administration	-16	-18
Research and development	-56	-52
EBIT	210	136
EBITDA	269	213
EBITDA pre	278	228
Margin (in % of net sales)	44.6%	39.4%

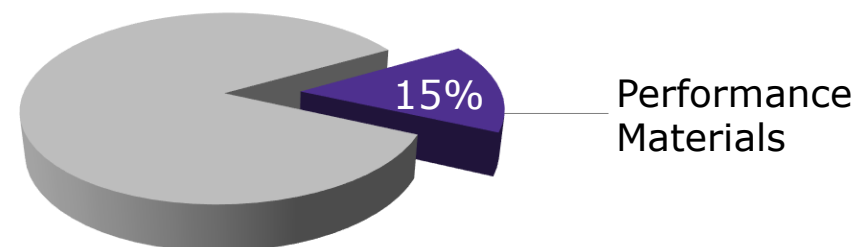
Net sales bridge



Comments

- Organic growth of Integrated Circuit Materials, Pigments and OLED outweighed by Liquid Crystals market share decline
- Innovative UB-FFS technology continues to see strong demand
- Strong growth of Integrated Circuit Materials driven by all major material classes, esp. strong demand of dielectrics and process materials
- Healthy growth of Pigments & Functional Materials due to demand for specialty coating pigments for the automotive industry
- Lower profitability reflects business mix, usual Liquid Crystals price decline and FX headwinds

Q4 2017 share of group net sales



Reported figures reflect US tax reform effect

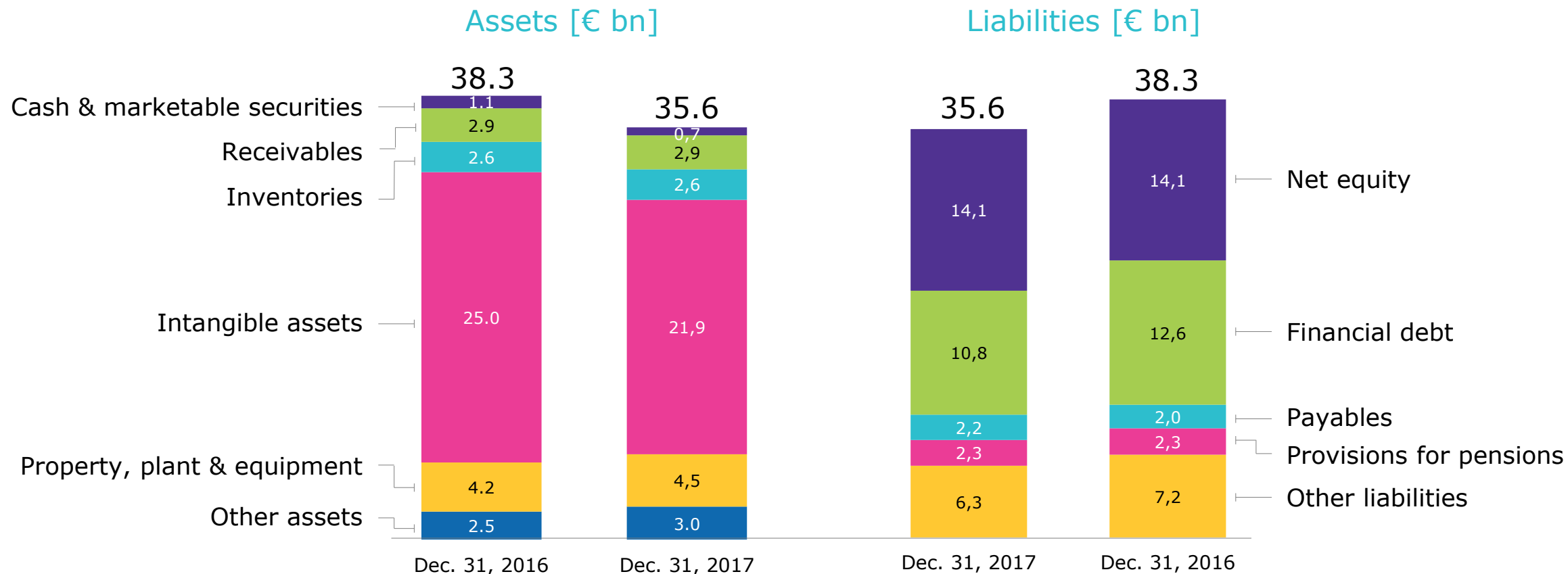
Reported results

[€m]	Q4 2016	Q4 2017	Δ
EBIT	405	241	-40.5%
Financial result	-70	-93	33.4%
Profit before tax	335	148	-55.9%
Income tax	-70	868	n.m.
<i>Effective tax rate (%)</i>	<i>21.0%</i>	<i>n.m.</i>	
Net income	269	1,013	276.8%
EPS (€)	0.62	2.33	275.8%

Comments

- EBIT reflects decreased EBITDA pre due to investments in HC, LC market share decline and FX
- Financial result contains adverse LTIP and negative valuation effects
- Effective tax rate is impacted by one time tax gain due to U.S. tax reform
- Net income and EPS reflect one time tax gain

Balance sheet – continued focus on rapid deleveraging



- Total assets decrease, while equity ratio increases to 39.5%
- Reduction in intangible assets mainly reflects scheduled amortization and FX (-€2.2 bn)

- Net financial debt reduced by €1.4 bn due to healthy operating cash flow and favorable FX translation
- Other liabilities down as U.S. tax reform reduces deferred tax liabilities

Jump in profit after tax driven by U.S. tax reform

Q4 2017 – cash flow statement

[€m]	Q4 2016	Q4 2017	Δ
Profit after tax	265	1,016	751
D&A	548	511	-37
Changes in provisions	-9	81	90
Changes in other assets/liabilities	-191	-1,155	-964
Other operating activities	-17	0	17
Changes in net working capital	191	189	-2
Operating cash flow	787	642	-145
Investing cash flow	-450	-353	97
thereof Capex on PPE	-260	-350	-90
Financing cash flow	-277	-551	-274

Cash flow drivers

- Profit after tax reflects one time U.S. tax reform effect of ~€900 m
- D&A down due to FX effects on asset base
- Changes in other assets/liabilities reflect neutralizing of non-cash relevant U.S. tax gain
- Higher Capex from investments in additional capacities and innovation center
- Financing cash flow reflects repayment of debt

Adjustments in Q4 2017

Adjustments in EBIT

[€m]	Q4 2016		Q4 2017	
	Exceptionals	thereof D&A	Exceptionals	thereof D&A
Healthcare	20	0	109	33
Life Science	93	27	123	0
Performance Materials	25	16	34	19
Corporate & Other	27	1	43	4
Total	165	44	308	56

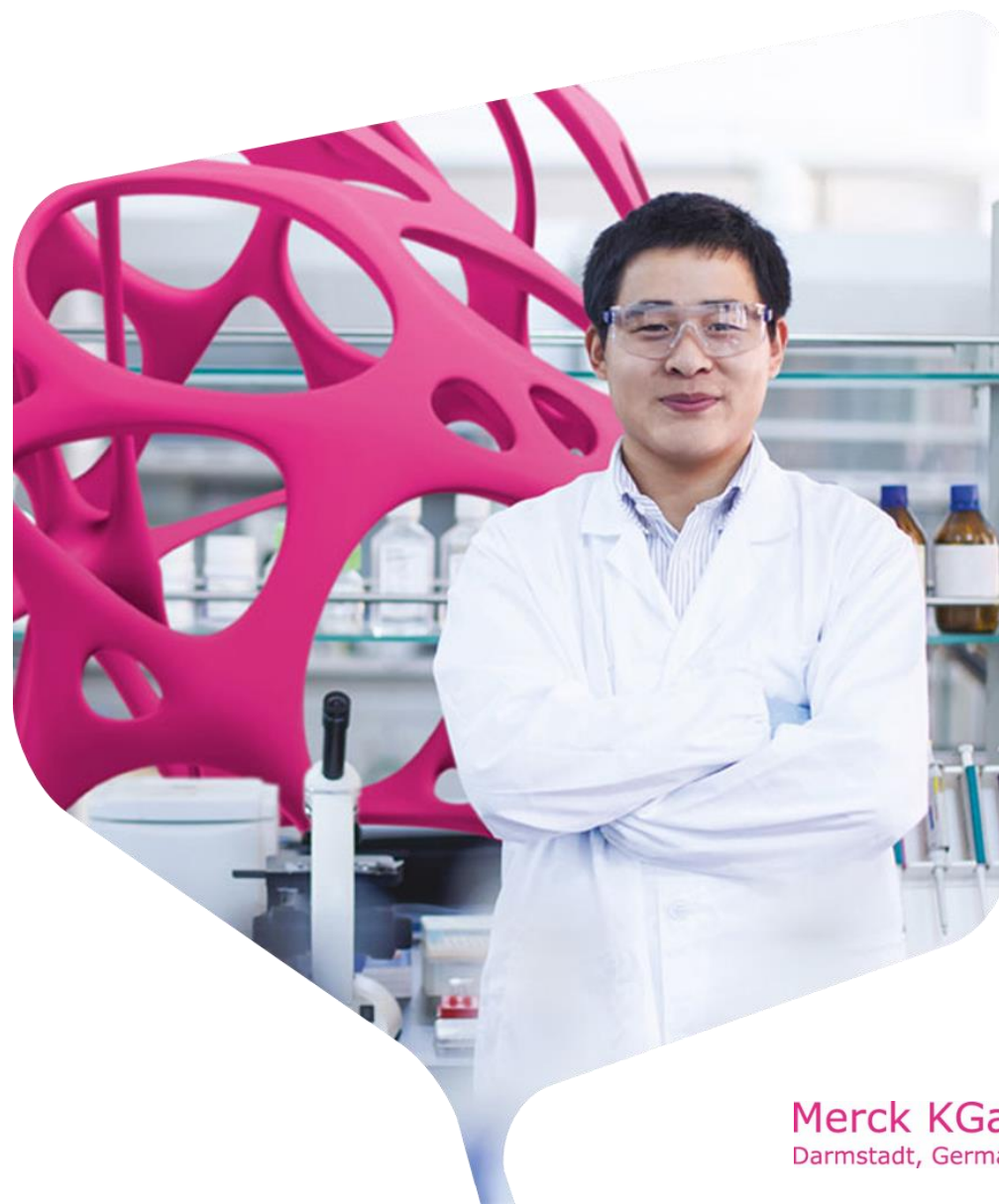
Adjustments in FY 2017

Adjustments in EBIT

[€m]	FY 2016		FY 2017	
	Exceptionals	thereof D&A	Exceptionals	thereof D&A
Healthcare	-225	71	-257	-51
Life Science	301	27	209	3
Performance Materials	46	16	59	26
Corporate & Other	69	1	103	4
Total	191	115	114	-19

Financial calendar

Date	Event
April 27, 2018	Annual General Meeting
May 15, 2018	Q1 2018 Earnings release
August 9, 2018	Q2 2018 Earnings release
November 14, 2018	Q3 2018 Earnings release



CONSTANTIN FEST



Head of Investor Relations
+49 6151 72-5271
constantin.fest@emdgroup.com

SVENJA BUNDSCHUH



Assistant Investor Relations
+49 6151 72-3744
svenja.bundschuh@emdgroup.com

ALESSANDRA HEINZ



Assistant Investor Relations
+49 6151 72-3321
alessandra.heinz@emdgroup.com

ANNETT WEBER



Institutional Investors /
Analysts
+49 6151 72-63723
annett.weber@emdgroup.com

NILS VON BOTH



Institutional Investors /
Analysts
+49 6151 72-7434
nils.von.both@emdgroup.com

EVA STERZEL



Retail Investors / AGM /
CMDs / IR Media
+49 6151 72-5355
eva.sterzel@emdgroup.com

PATRICK BAYER



Institutional Investors /
Analysts
+49 6151 72-5642
patrick.bayer@emdgroup.com

EMAIL: investor.relations@emdgroup.com

WEB: www.emdgroup.com/investors

FAX: +49 6151 72-913321

