MERCK KGAA, DARMSTADT, GERMANY –

GOLDMAN SACHS SEVENTH GERMAN CORPORATE CONFERENCE

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Agenda

01 **Business overview & strategy recap**

02 **Healthcare – Funding for success**

03 **Life Science – Focusing on profitable growth**

04 **Performance Materials – Maintaining leadership and innovation**

05 **Business and Financial Review H1 2018**

06 **Executive summary and guidance**

01 BUSINESS OVERVIEW & STRATEGY RECAP

Group

A platform of three high-tech & science businesses to compete in attractive markets

Leading in specialty pharma markets

- Biologics and small molecules
- Research focus: Oncology, Immunology & Immuno-Oncology

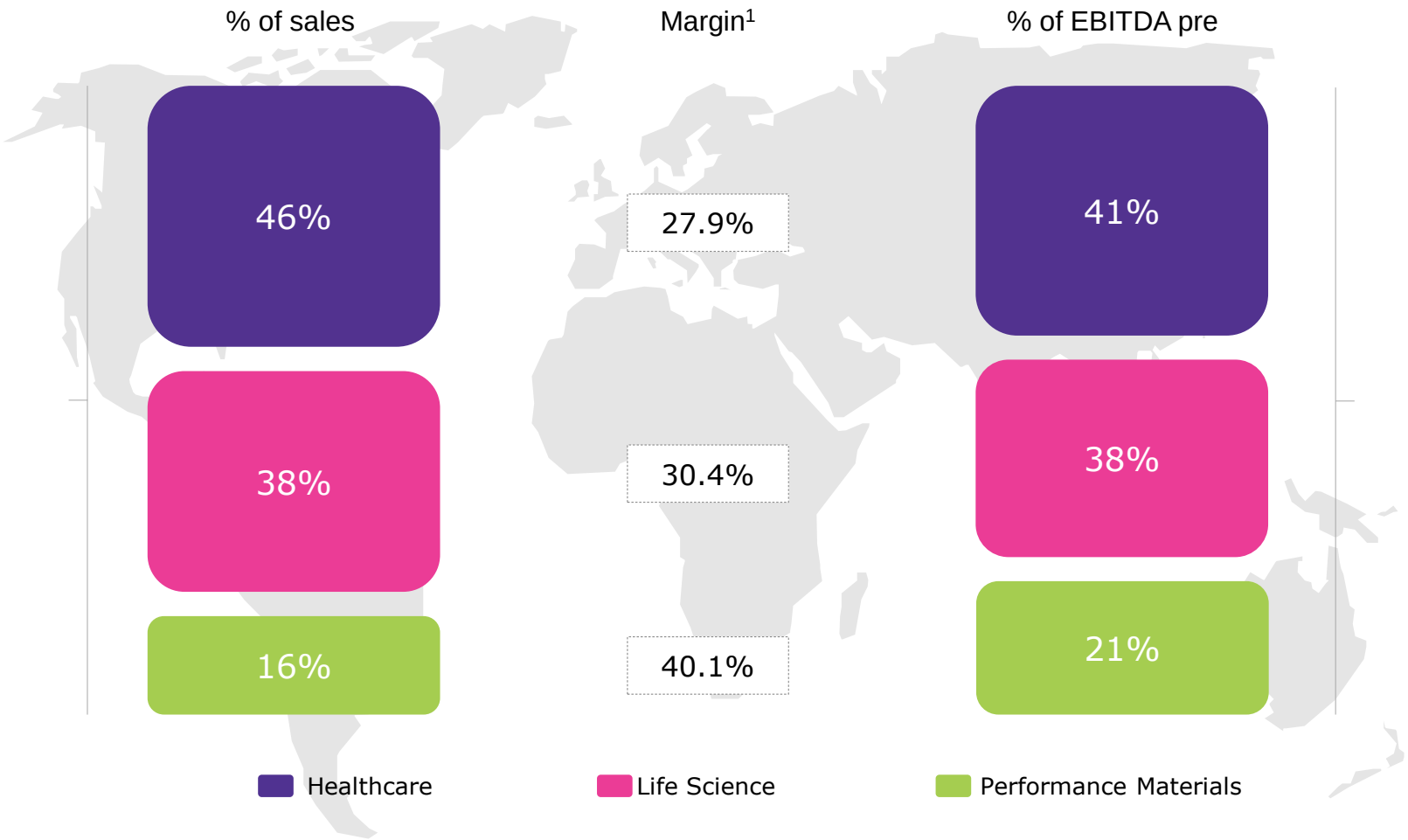
Leading life science company

- Tools and services for biotech research & production
- Tools and laboratory supply for the 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
Strong businesses with attractive margins

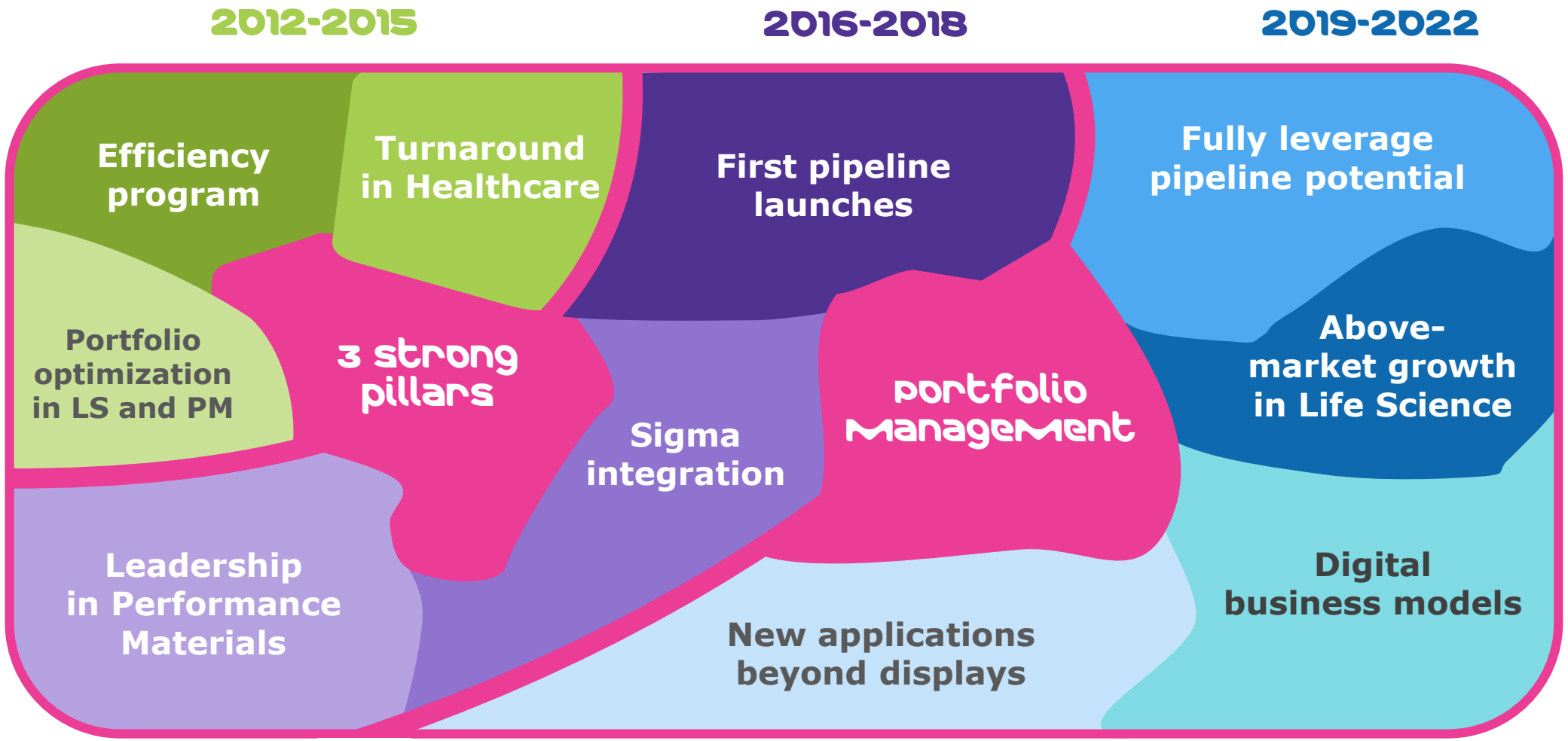


FY 2017
Sales:
€15,327 m

FY 2017
EBITDA pre[2]:
€4,414 m

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

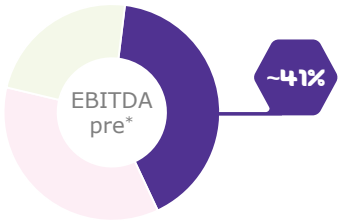
Group
Strategic roadmap 2016-2022



Group

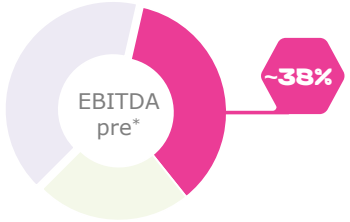
Clear set of priority goals to be realized by 2018

Healthcare



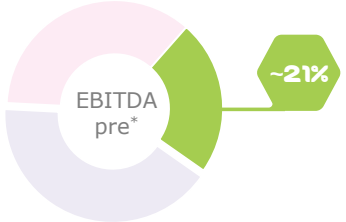
- **Maximize growth of existing franchises**
- **Deliver pipeline: one product launch or indication p.a. from 2017**

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**

*based on FY 2017 reported EBITDA pre, excluding Corporate & Other

D2 HEALTHCARE

Funding for success

Healthcare

Healthcare is set to deliver on promising pipeline candidates

Deliver
on organic growth

Focus
on pipeline

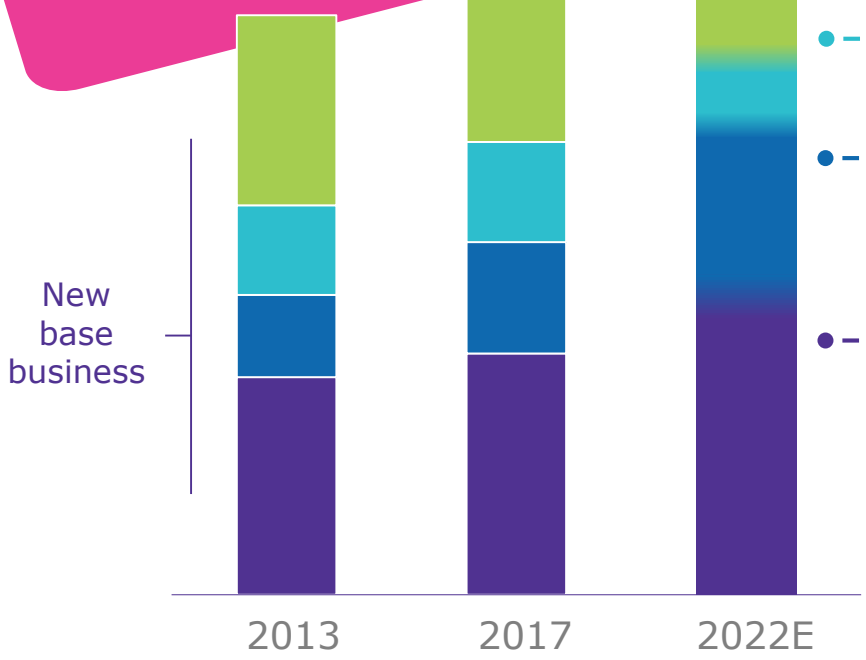
- **Stable core** business
- **Solid pipeline** of oncology, immuno-oncology and immunology molecules
- **Competitive R&D funding** in our focus areas
- **Cost discipline** and efficient execution

Healthcare

Ambition to keep core business sales organically stable until 2022

Healthcare core business net sales until 2022

29 consecutive quarters of organic growth[1]



Rebif®
Decline in line with interferon market

- Maintaining solid track record of patient retention
- Integration into joint franchise strategy with Mavenclad®

Erbitux®
Low single-digit decline

- Driving emerging markets growth
- Mitigate price and competitive pressure in EU by clear Erbitux® franchise positioning

Fertility
Mid single-digit growth

- Drug demand driven by emerging markets growth and demographics
- Differentiation versus competition

General Medicine[2]
Mid to high single-digit growth

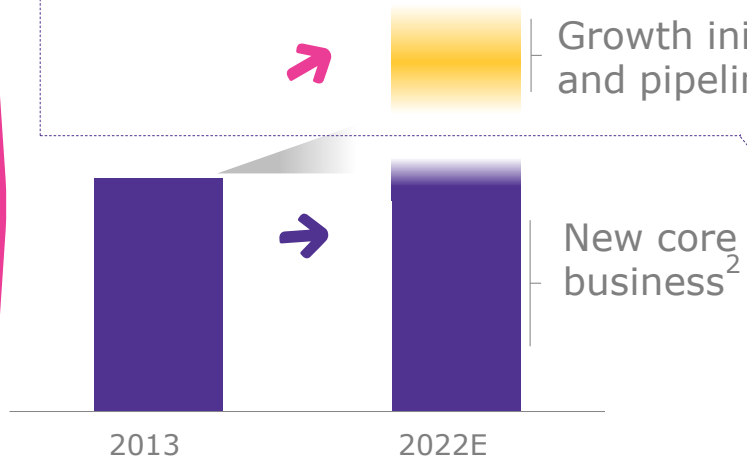
- Emerging markets demand growth enhanced by new launches, e.g. GlucophageXR® China
- Repatriation measures

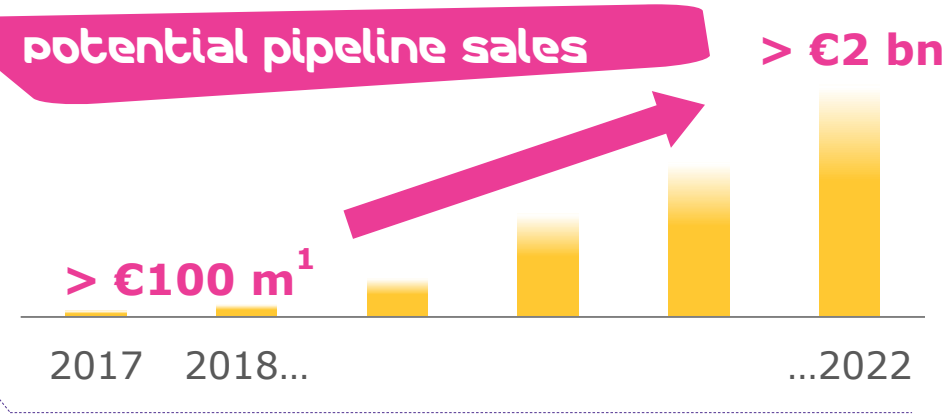
[1]Q2 2011 until Q2 2018; [2]includes General Medicine, CardioMetabolic Care (CMC), Endocrinology & Allergopharma

Healthcare

The business is well on track to deliver the pipeline

Deliver the pipeline





Key investments[3]

Phase I

- DNA Damage Response
- M7824 anti-PD-L1/ TGF-ß trap

Phase II

- tepotinib c-Met kinase inhibitor
- sprifermin
- atacicept
- evobrutinib BTK inhibitor

Phase III

- Avelumab anti-PD-L1 mAb

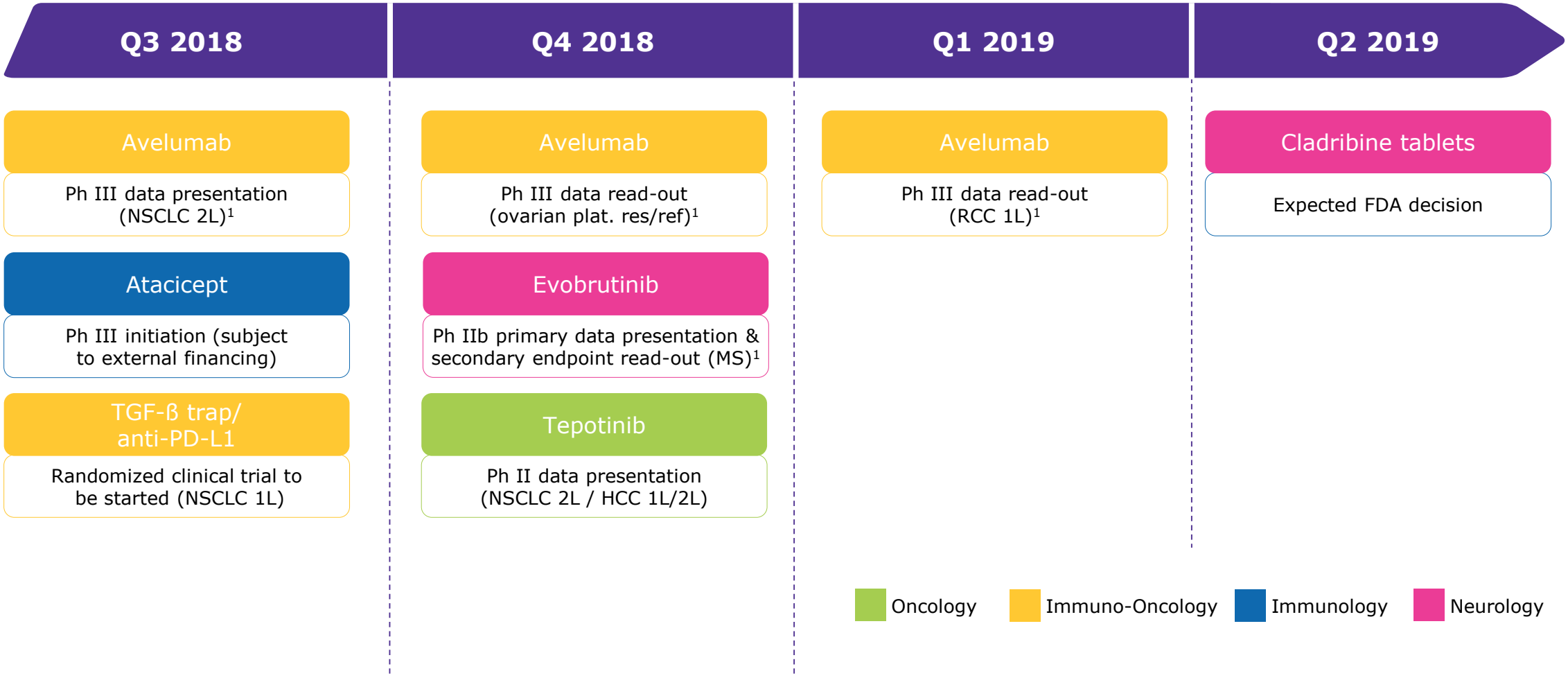
Registration

- cladribine tablets lymphocyte targeting agent[4]

Oncology | Immuno-Oncology | Immunology | Neurology

[1]Illustrations; risk adjusted; [2]after Consumer Health divestment; [3]Illustrative and non-exhaustive pipeline as of August 2, 2018; 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; [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. As announced on July 30 2018, a resubmission of the New Drug Application (NDA) for cladribine tablets as a potential treatment for patients with relapsing forms of multiple sclerosis (MS) has been accepted for filing by the U.S. Food and Drug Administration (FDA).

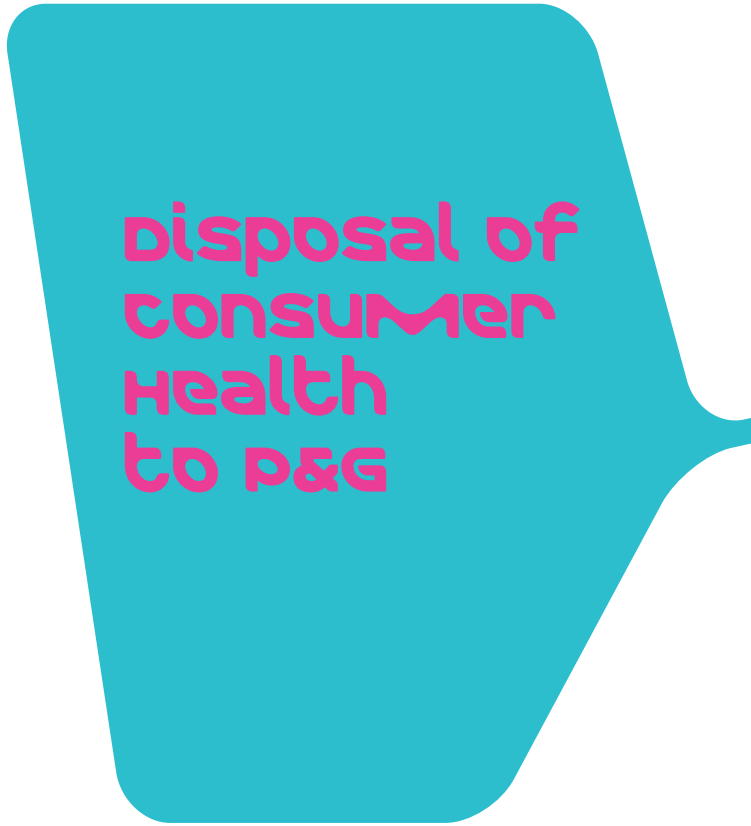
Upcoming catalysts
Major read-outs and ongoing pipeline development ahead



[1]Note: timelines are event-driven and may change.
Acronyms: NSCLC – Non small cell lung cancer | MS – Multiple Sclerosis | RCC – Renal Cell Carcinoma | HCC – Hepatocellular Carcinoma l plat. res/ref – platinum resistant/refractory | FDA – U.S. Food and Drug Administration

Consumer Health disposal agreement
Transaction highlights

1. **Strong buyer:** P&G committed to combine two leading and complementary OTC businesses and will be a great home for our employees as capabilities will be key to fully capture growth opportunities
2. **Full sale**: Agreement foresees the sale of the complete Consumer Health business across 44 countries to P&G
3. **All-cash transaction:** €3.4 bn all-cash disposal price will accelerate deleveraging with closing expected by the end of Q4 2018
4. **Attractive valuation:** Implicit multiples are above recent industry transactions and imply significant value generation with net proceeds exceeding going concern



03 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

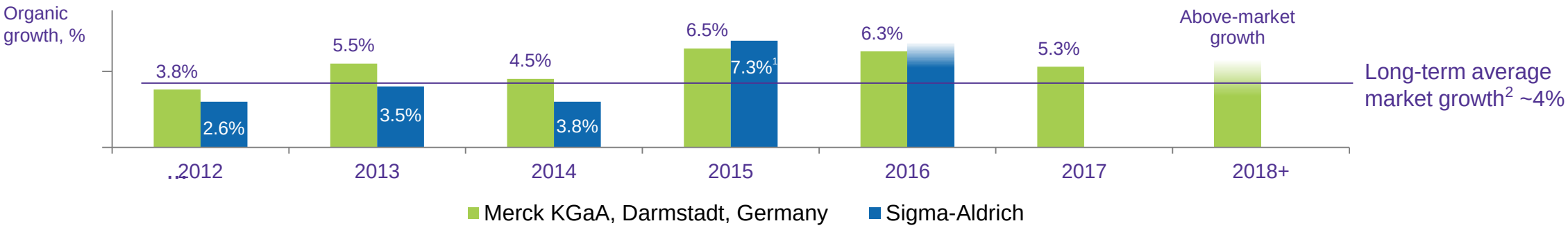
APPLIED

- 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**

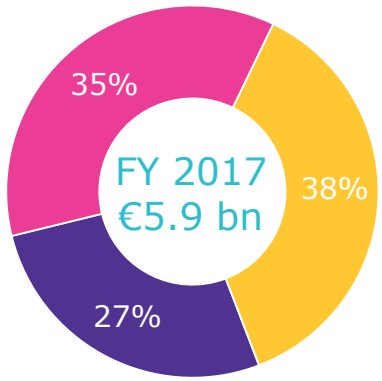
2 Top-line synergies

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

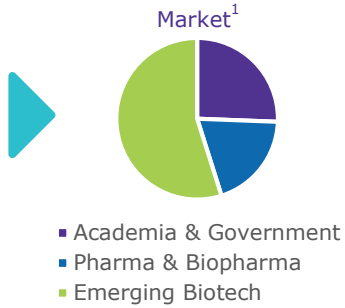
[1]Growth for 9M 2015 (organic growth of $152 m on prior 9M 2014 sales of $2,080 m); [2]Source: Merck KGaA, Darmstadt, Germany market intelligence and broker research

Life Science
Business is on track to deliver above-market organic growth

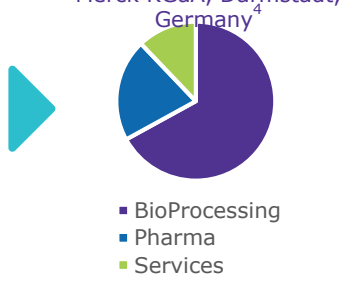
Life Science



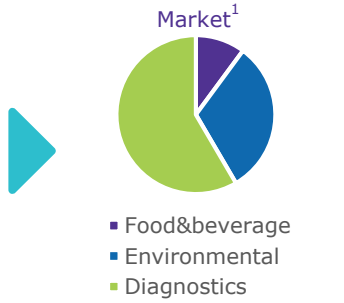
Research Solutions
Low single digit growth



Process Solutions
High single digit growth



Applied Solutions
Mid single digit growth



Long-term growth drivers

- **Research activity**: >3,000 projects in research pipelines[2], rising number of experiments and newly emerging therapies/technologies backs healthy growth in biotech and CROs[3]
- **Public and private funding**: availability, access and predictability drive demand from academia and emerging biotech customers
- **Regulation**: rising requirements foster long-term customer partnerships

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- **Biologics**: mAbs production[5] 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% today[6]
- **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

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- **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

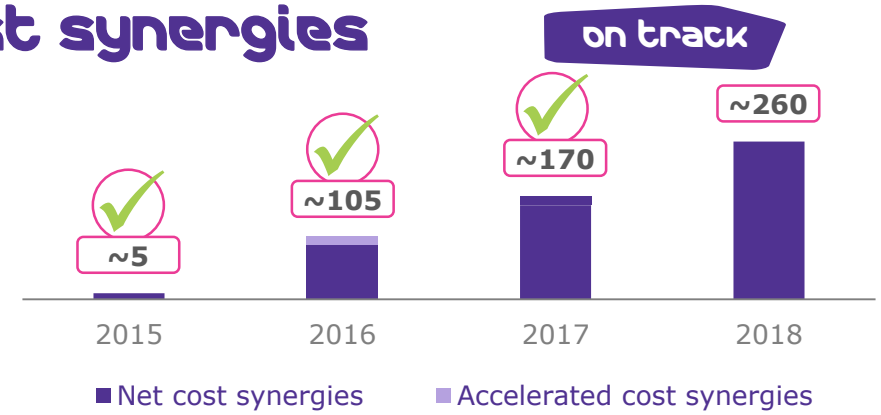
[1]Source: Merck KGaA, Darmstadt, Germany Factbook; [2]Source: PhRMA; [3]CRO = Contract Research Organization; [4]Indicative only; [5]mAbs = monoclonal antibodies; [6]Source: EvaluatePharma April 2017

Life Science

Integration of Sigma and synergy generation progressing well

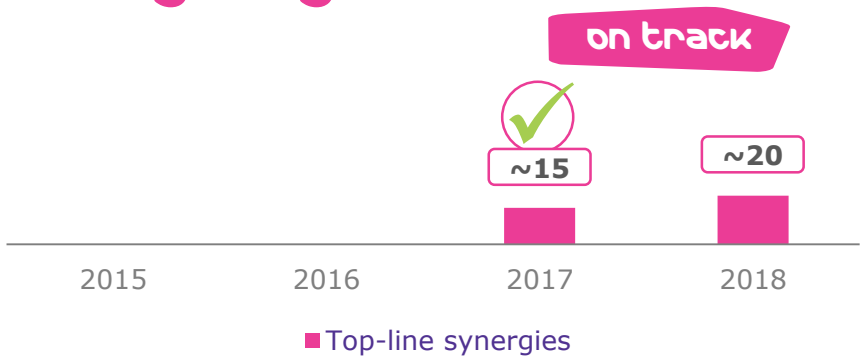
on track to deliver planned synergies of ~ €280 M until 2018

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**

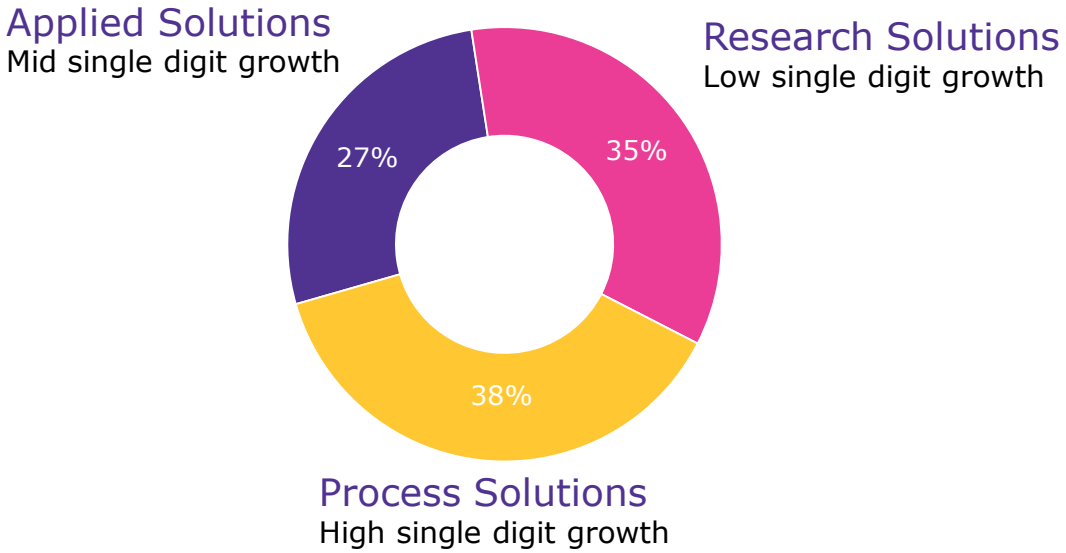
topline synergies



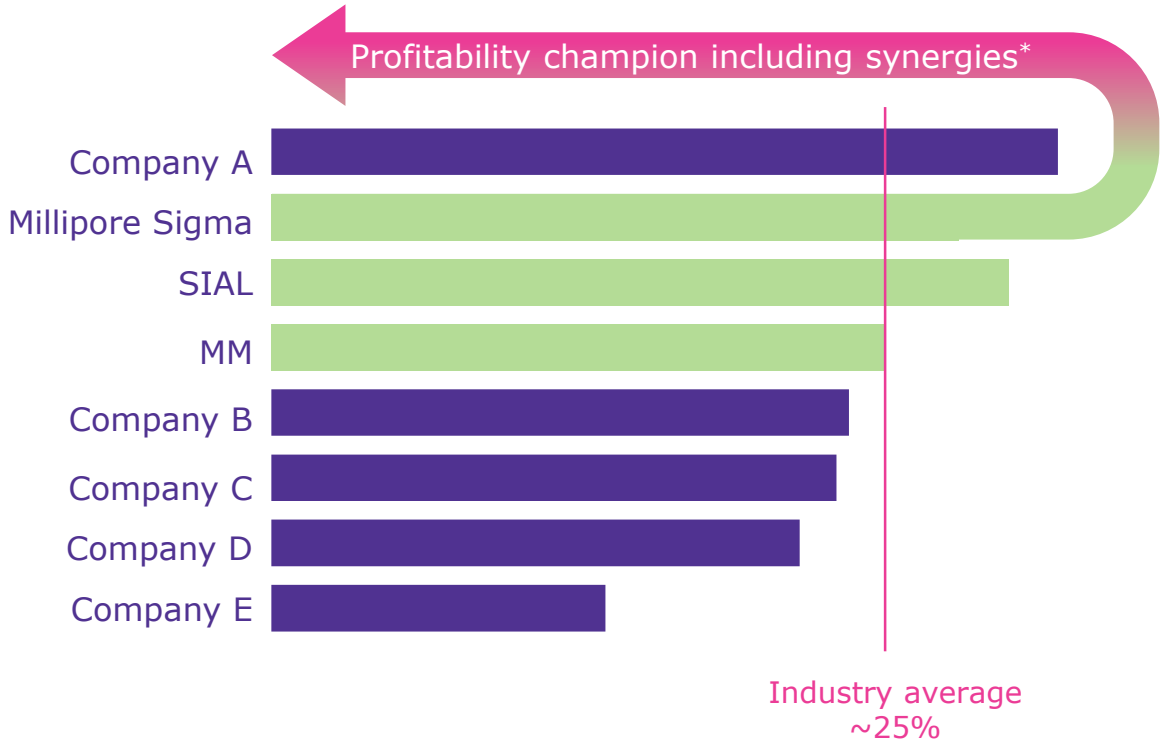
- **Continued integration of sigmaaldrich.com**
  - ~80% of relevant products in U.S. and EU are available online
  - >1/3 of Merck KGaA, Darmstadt, Germany eCommerce orders now contain products from both legacy companies
- **Complete offering in Process Solutions**

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

*Pro-forma combination based on 2015 financials including 100% of targeted synergies

04 PERFORMANCE MATERIALS

Maintaining leadership and innovation

Market

Performance Materials
A leader in the electronic materials market

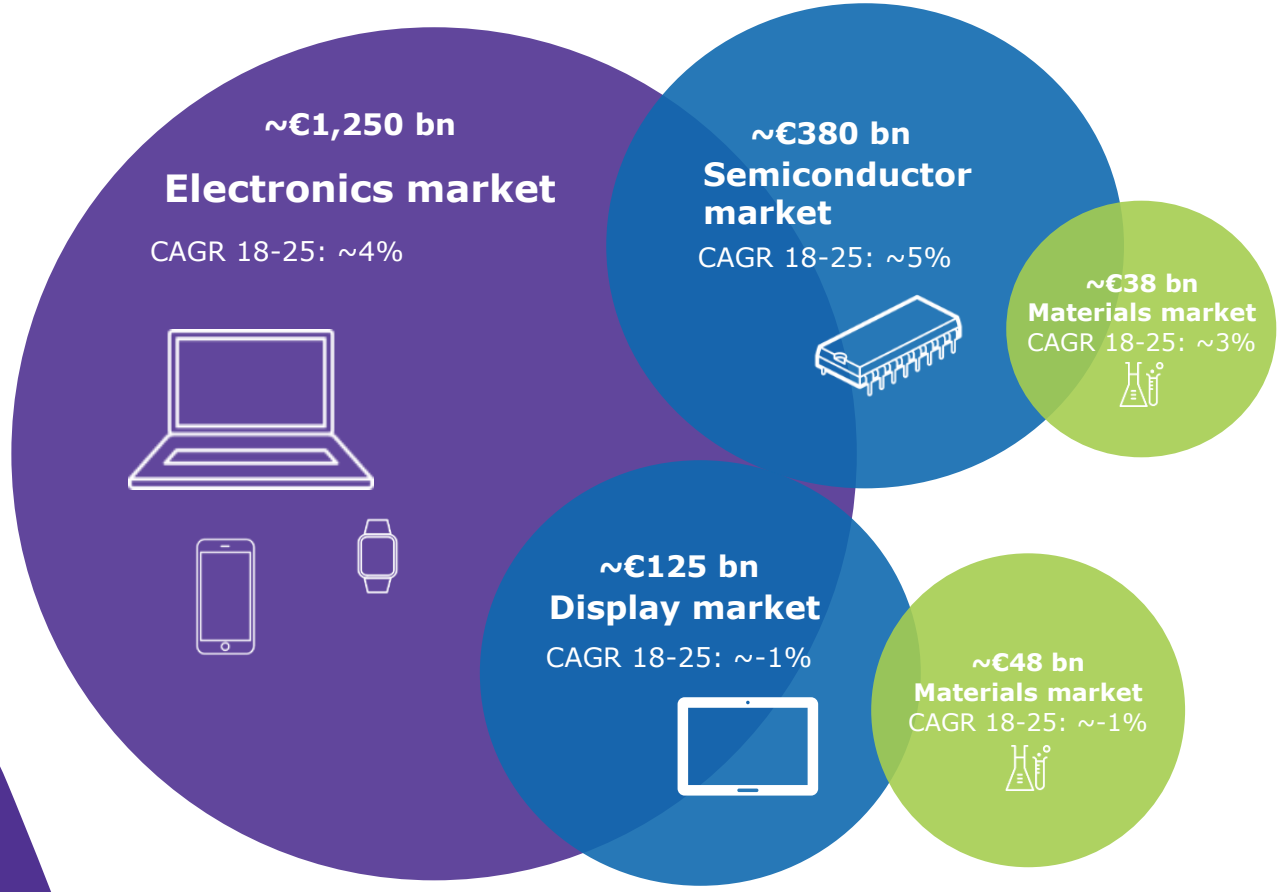
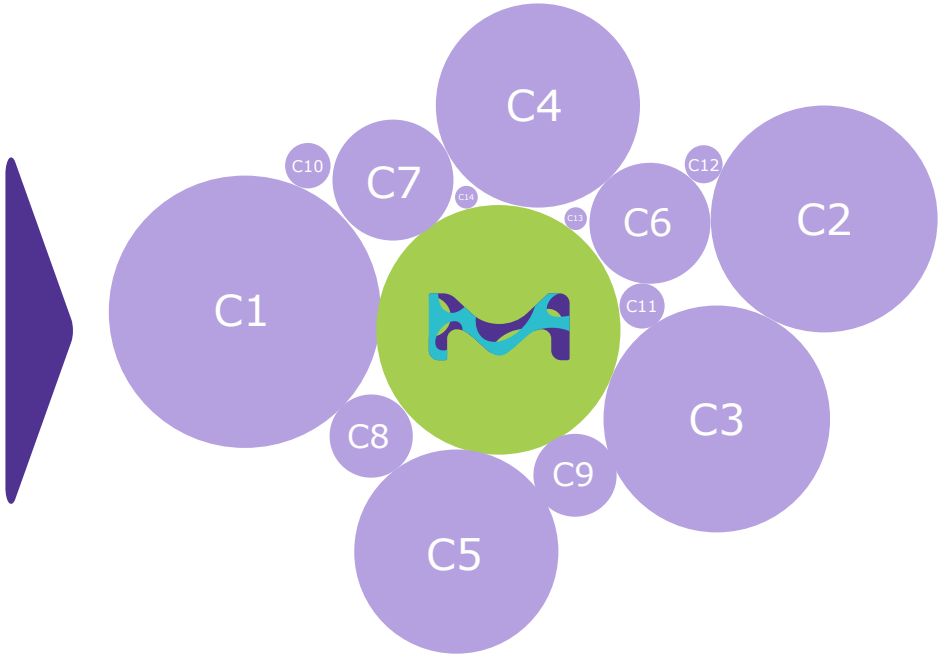


Illustration of the electronics market and thereof its selected sub markets

Electronic materials competitor landscape[1]



[1]Bubble size in competitive landscape illustrates share of semiconductor and display material sales of indicated competitors (C1 – C14)

[1]Source: Linx 2018, Research & Markets 2017, Semi 2015, McClean/IC Insights 2018, IC insights, Gartner 2017, Prismark 2018, FujiChimera, IHS, Market size as of 2017

Performance Materials: New structure combines LC with OLED, serving same customer group

Business allocation within Performance Materials	% sales	Products
Integrated Circuit Materials **semiconductor solutions**	~20-25%	• Dielectrics, colloidal silica, lithography materials, yield enhancers, edge-bead removers • Polyimide raw materials and printing materials
Display Materials **display solutions**	~50-55%	• 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
Advanced Technologies OLED Optoelectronics Pigments and Functional Materials **surface solutions**	~20-25%	• Effect pigments and functional materials for coatings, plastics, printing and cosmetics • Functional materials for cosmetics & special applications • Functional materials for electronics and energy solutions

"Bright Future"

5-year transformation program drives long-term performance

Back to organic growth

- Exploit market growth of Semi & Surface
- Manage Liquid Crystal sales decline
- Refocus innovation and life cycle management
- Explore growth in adjacent technologies

2-3% CAGR

Resource allocation & process excellence

- Efficient reallocation/adjustment of resources
- Centralized early research approach
- Rigid R&D portfolio management

~30% Margin

Portfolio Management

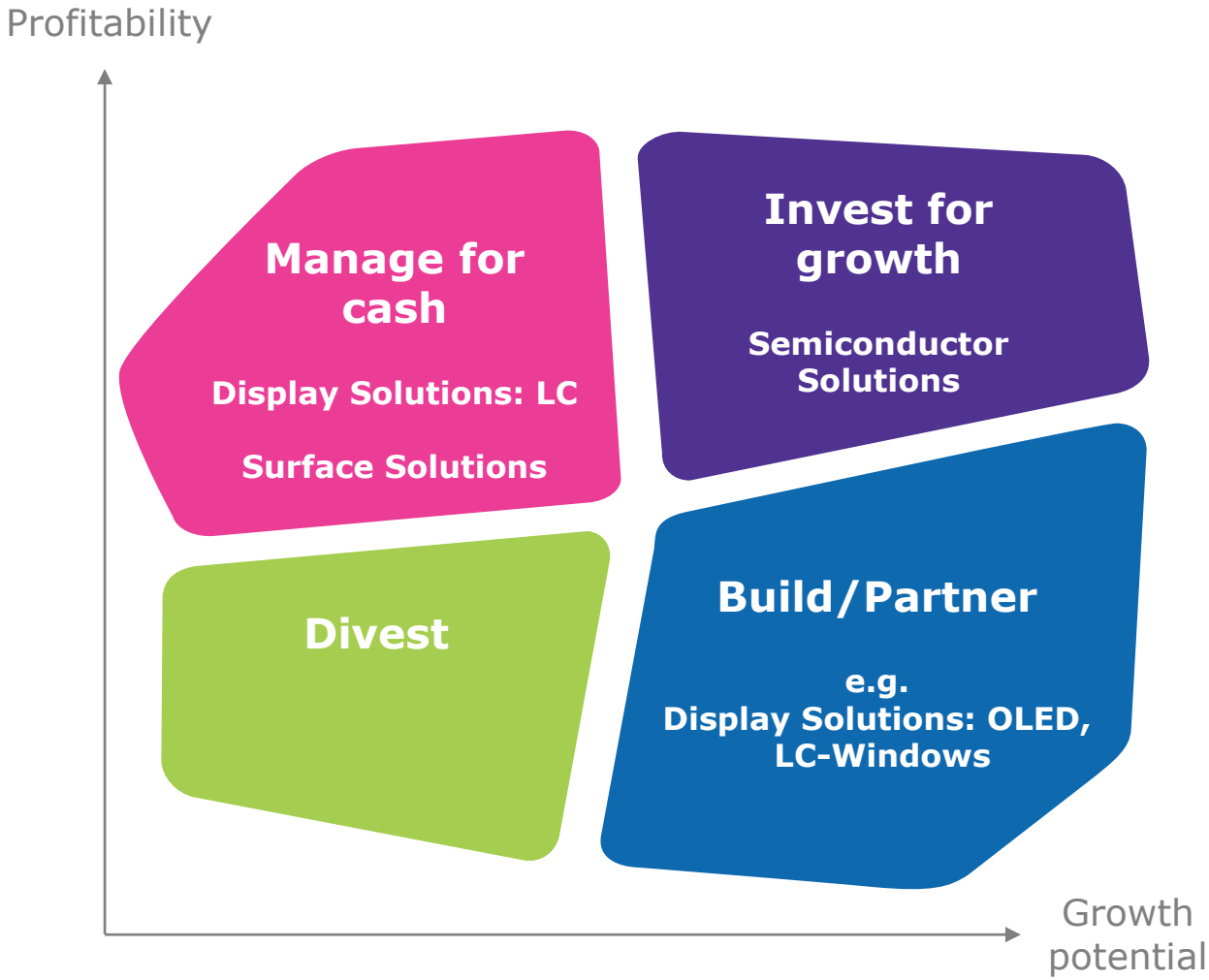
- Continuous review of entire portfolio
- Evaluation of partnering approaches
- Consider inorganic growth options
- Drive solution based business models

Cultural change

- Foster customer-centric mindset
- Market-driven innovation
- Enhance a common Performance Materials spirit

Performance Materials

Business portfolio management drives capital allocation and enables future value creation



Invest for growth

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

Manage for cash

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

Build or Partner

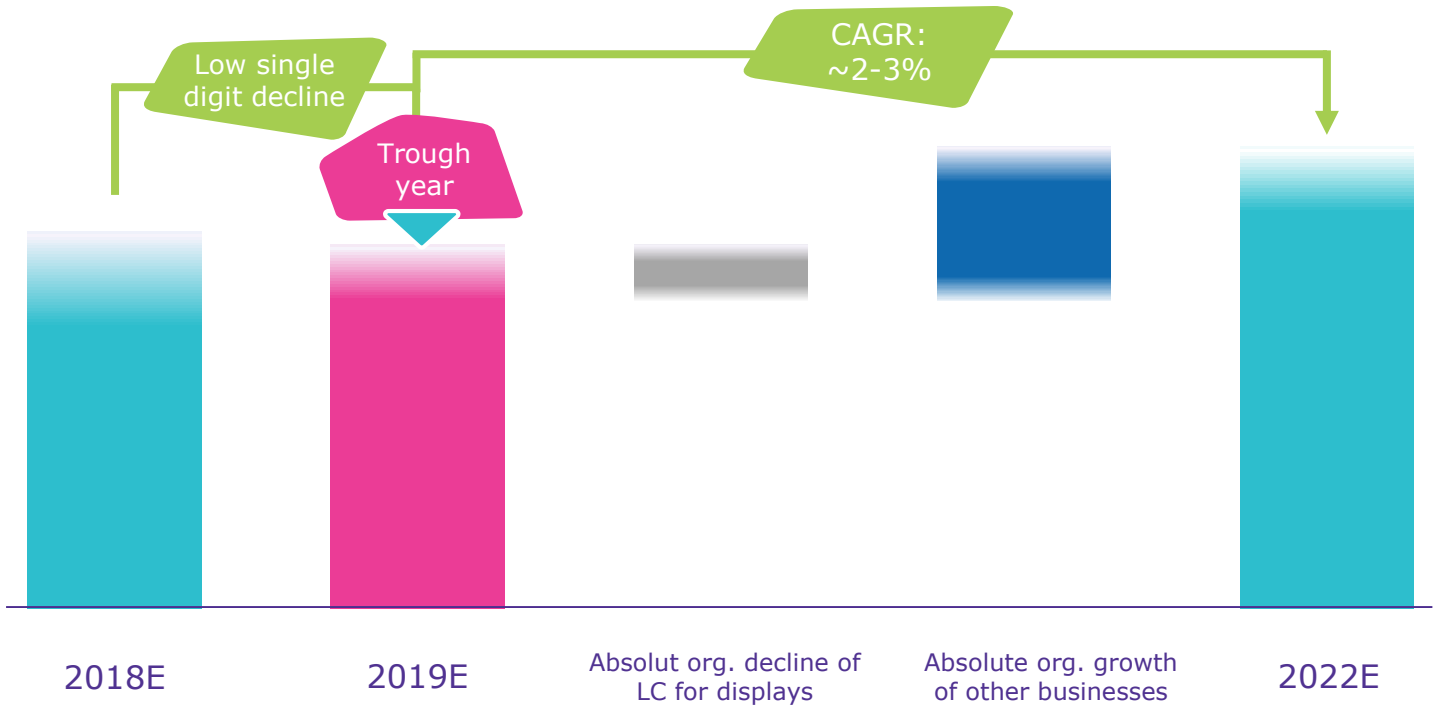
- Early industry cycles with strong potential
- Strictly prioritize and diversify risk

Divest

- Regular review for better strategic owner

Performance Materials will return to sales growth after 2019

Performance Materials sales development, in €m



2019-2022 sales growth trajectory


Semiconductor Solutions

Mid- to high-single digit growth


Surface Solutions

Low-single digit growth


Display Solutions

Low-single digit decline

After 2019 sales growth of Semiconductor & Surface Solutions, OLED and Photoresists will overcompensate the decline of Liquid Crystals for displays

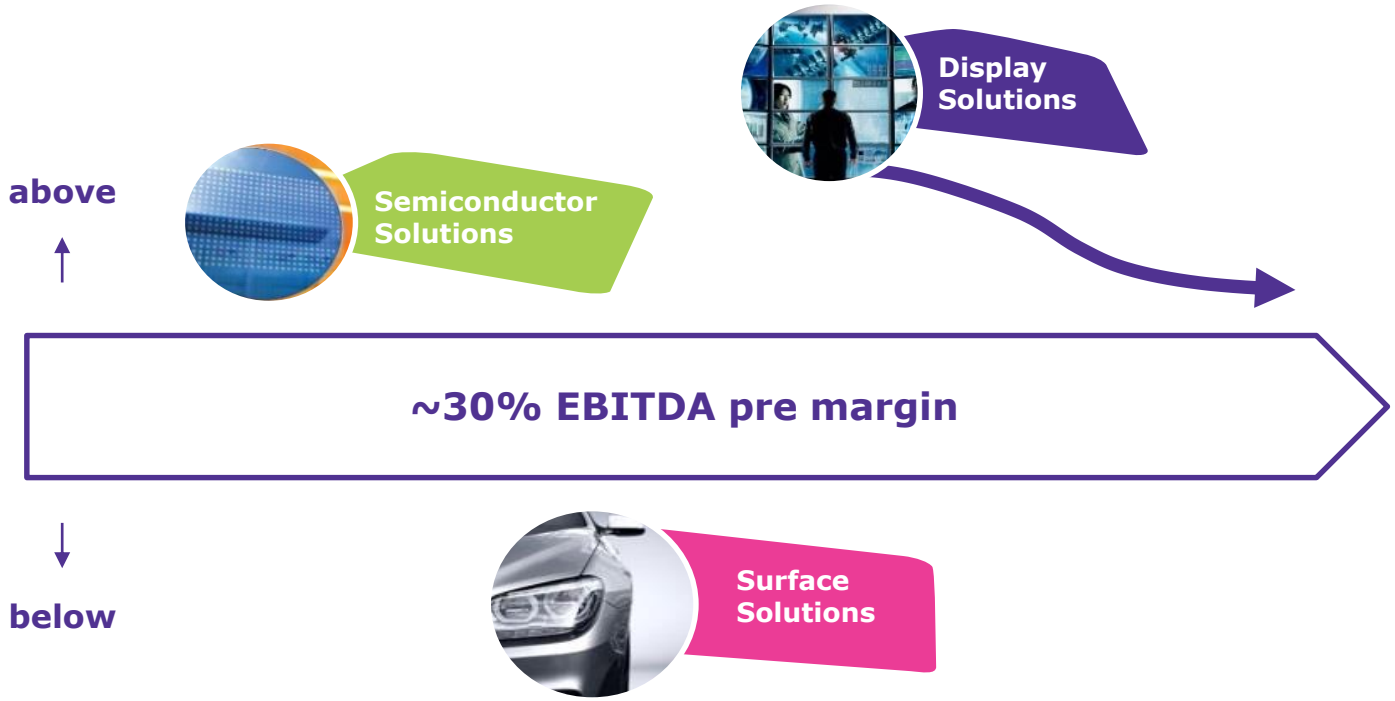
Margins of PM will remain around 30% in the long-run

Financials

profitability indication

- Display Solutions will adjust towards PM average margin
- Bottom-line management to support margin
- Strong FX exposure will cause fluctuations

EBITDA pre margin indication by business



05 BUSINESS AND FINANCIAL REVIEW H1 2018

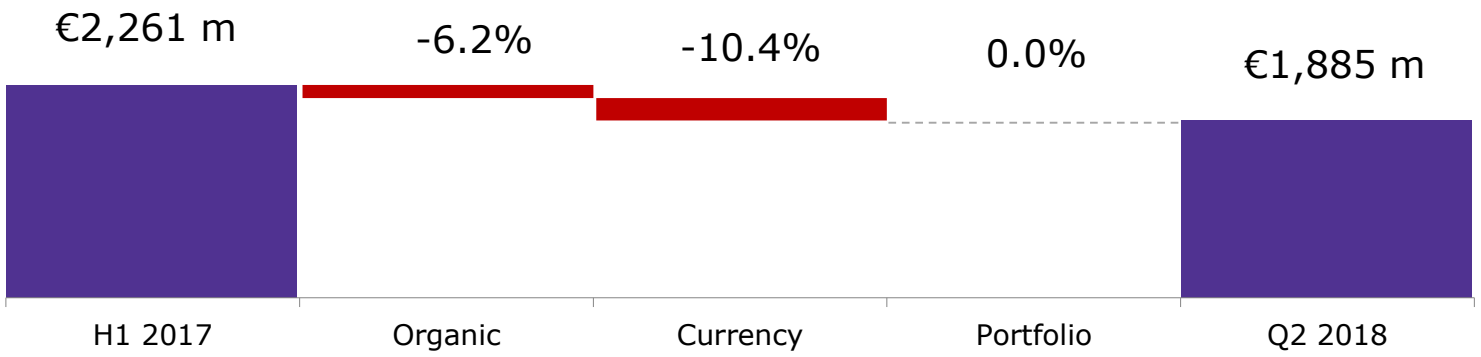
Organic growth driven by Healthcare and Life Science but more than offset by FX

H1 2018 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	2.8%	-6.0%	0.0%	**-3.2%**
Life Science	8.3%	-6.5%	0.0%	**1.8%**
Performance Materials	-1.9%	-6.6%	0.0%	**-8.5%**
Group	4.2%	-6.3%	0.0%	**-2.1%**

- Healthcare reflects strong Fertility & Glucophage, Rebif decline partially offset by Mavenclad
- Organic above-market performance in Life Science driven by all business units
- Performance Materials organically lower as growth of Semiconductor and OLED is outweighed by ongoing LC decline
- Strong FX headwinds (-€464 m) in H1 2018

H1 YoY EBITDA pre



- Organic decline of EBITDA pre driven by Healthcare's higher investments and LY one-time effect, PM business mix and ongoing price decline
- Currency effects mainly related to EUR/USD development

Totals may not add up due to rounding

H1 2018: Overview

Key figures

[€m]	H1 2017	H1 2018	Δ
Net sales	7,352	7,199	-2.1%
EBITDA pre	2,261	**1,885**	-16.6%
Margin (in % of net sales)	*30.8%*	*26.2%*	
EPS pre	3.24	**2.56**	-21.0%
Operating cash flow	1,297	**748**	-42.4%

[€m]	Dec. 31, 2017	Jun. 30, 2018	Δ
Net financial debt	10,144	**10,674**	5.2%
Working capital	3,387	**3,677**	8.5%
Employees	52,941	**54,009**	2.0%

Comments

- EBITDA pre & margin reduction reflects LY one-time effects in Healthcare, FX headwinds and ongoing LC decline
- Operating cash flow driven by business dynamics, LY cash flow reflects positive tax effects
- Net financial debt increase due to higher dividend payment
- Working capital reflects LY Glucophage repatriation and business dynamics

Totals may not add up due to rounding

Healthcare: Solid organic sales growth while profitability declines in relation to FX headwinds and LY's substantial favorable one-time effects

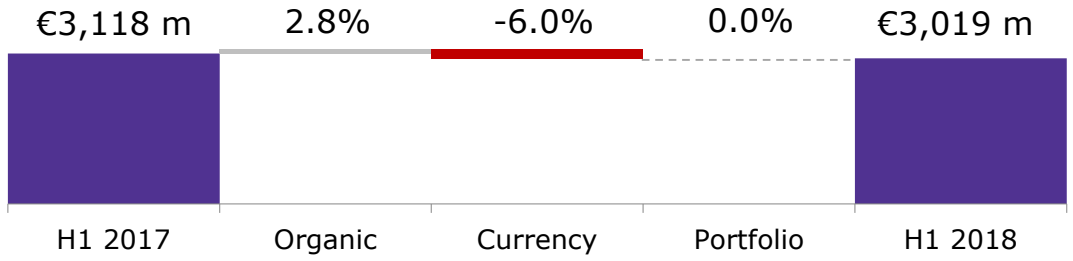
Healthcare P&L

[€m]	H1 2017	H1 2018
Net sales	3,118	**3,019**
Marketing and selling	-1,184	**-1,142**
Administration	-139	**-152**
Research and development	-750	**-785**
EBIT	727	**350**
EBITDA	1,021	**717**
EBITDA pre	1,036	**758**
Margin (in % of net sales)	*33.2%*	***25.1%***

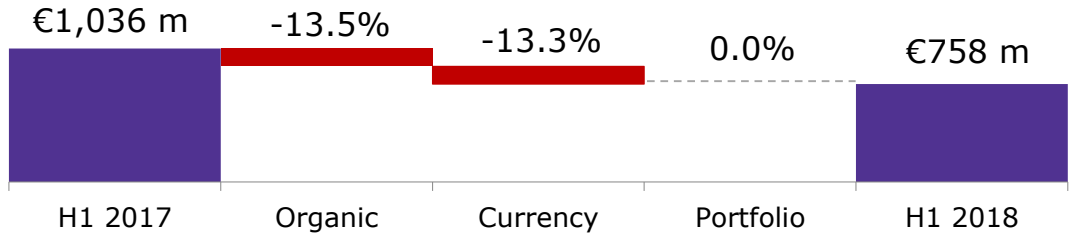
Comments

- Organic growth supported by strong Fertility and Glucophage; Mavenclad and Bavencio contribution on track
- Rebif with ongoing volume and price declines in Europe and stable market shares in Interferons market in North America, partially offset by Mavenclad
- Erbitux facing ongoing competition and price pressure in major markets; decline is overcompensated by Bavencio
- Lower Marketing & Selling mainly due to favorable FX; higher M&S for Mavenclad and Bavencio offset by lower investment in mature products (esp. Rebif and Erbitux)
- R&D investment picking up, expected further ramp-up in H2
- Profitability reflects significant FX headwinds and unfavorable product mix mitigated by Kuvan milestone payment (+€50 m); LY included royalty income swap (€116 m) and Bavencio Milestone payments (~€73 m)

Net sales bridge



EBITDA pre bridge



Totals may not add up due to rounding

Life Science: Strong organic performance across all business; Profitability reflects Q2 phasing and one-time effects

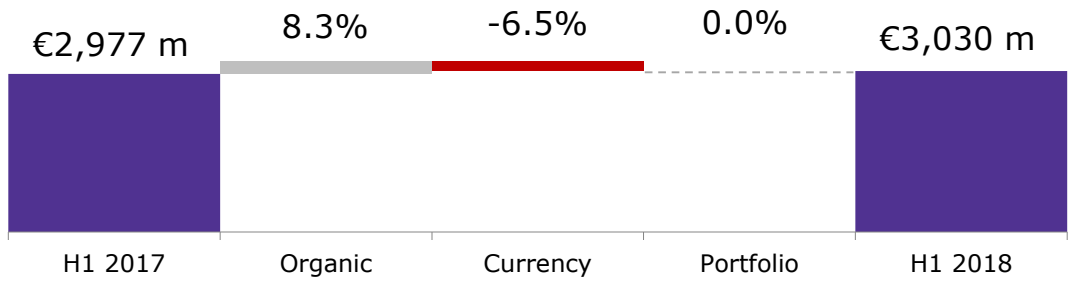
Life Science P&L

[€m]	H1 2017	H1 2018
Net sales	2,977	**3,030**
Marketing and selling	-891	**-859**
Administration	-135	**-130**
Research and development	-129	**-120**
EBIT	457	**527**
EBITDA	841	**884**
EBITDA pre	900	**906**
Margin (in % of net sales)	*30.2%*	***29.9%***

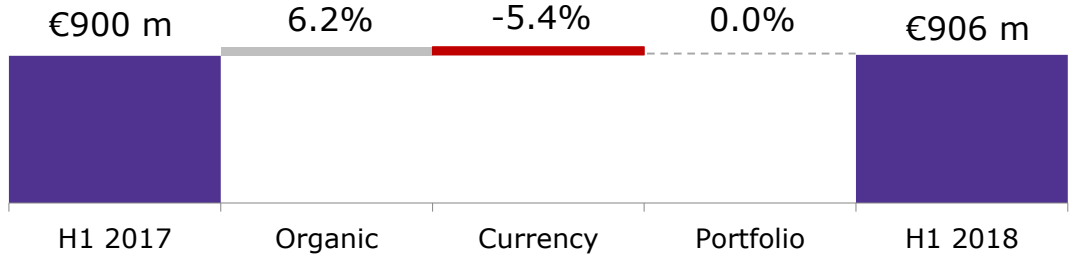
Comments

- Process Solutions with double-digit growth driven by all major businesses, especially high demand for single use and cell-culture media
- Applied Solutions shows mid single-digit organic growth, fueled by all major businesses across all major regions
- Research Solutions posts solid organic growth from high demand across all major businesses, mainly laboratory & specialty chemicals and reagents
- Profitability reflects unfavorable portfolio mix, one-time effects of startup costs on innovation projects and dissolving Sigma Aldrich regional operating model

Net sales bridge



EBITDA pre bridge



Totals may not add up due to rounding

Performance Materials: Adjusting margin level due to ongoing LC decline

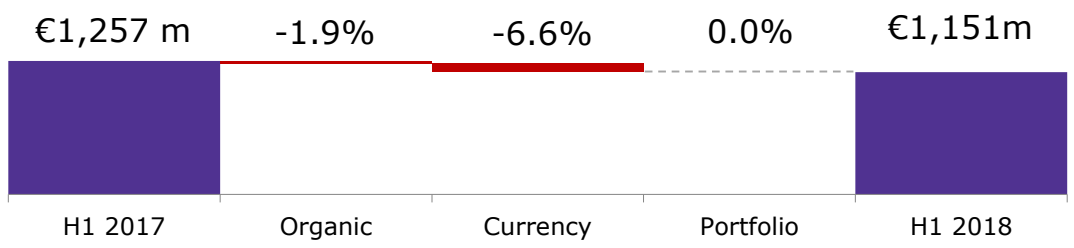
Performance Materials P&L

[€m]	H1 2017	H1 2018
Net sales	1,257	**1,151**
Marketing and selling	-126	**-121**
Administration	-36	**-42**
Research and development	-116	**-118**
EBIT	362	**267**
EBITDA	487	**384**
EBITDA pre	503	**392**
Margin (in % of net sales)	*40.0%*	***34.0%***

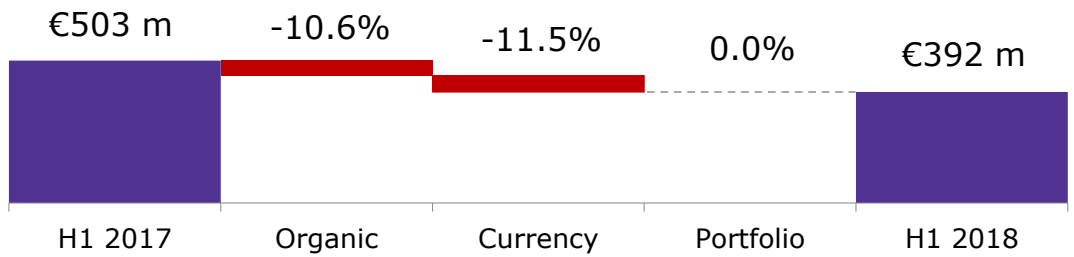
Comments

- Strong growth of Semiconductor Solutions and OLED more than offset by ongoing LC decline
- Stronger demand for innovative UB-FFS technology
- Semiconductor Solutions with above-market growth due to strong demand from all major material classes, esp. dielectric materials
- Lower profitability reflects FX headwinds and business mix from ongoing LC decline

Net sales bridge



EBITDA pre bridge



Totals may not add up due to rounding

06 EXECUTIVE SUMMARY AND GUIDANCE

We are well on track to deliver on our promises

Group

Net debt reduced by >€2 bn[1]
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

New strategic agenda in place
New technologies in test phase

Important Milestones reached to deliver on our promises

FY 2015 **FY 2017** **2018**

Illustration; [1]Net financial debt ex pension provisions as of Dec. 31, 2017 versus December 31, 2015

Key EBITDA pre* drivers

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®
- BioMarin milestone payment of €50 m

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
- 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
- FX remains a strong headwind, esp. in H1 2018, and is slightly stronger than anticipated so far; expected EUR/USD 1.19-1.22 for FY 2018

*Constant portfolio

Group

Full-year 2018 guidance*

Net sales:
Organic +3% to +5% YoY
FX ~ -3% to -5% YoY
~ € 14.1 – 14.6 bn

EBITDA pre:
Organic -1% to -3% YoY
FX -5 to -7% YoY
~ € 3,750 – 4,000 m

EPS pre:
~ € 5.00-5.40

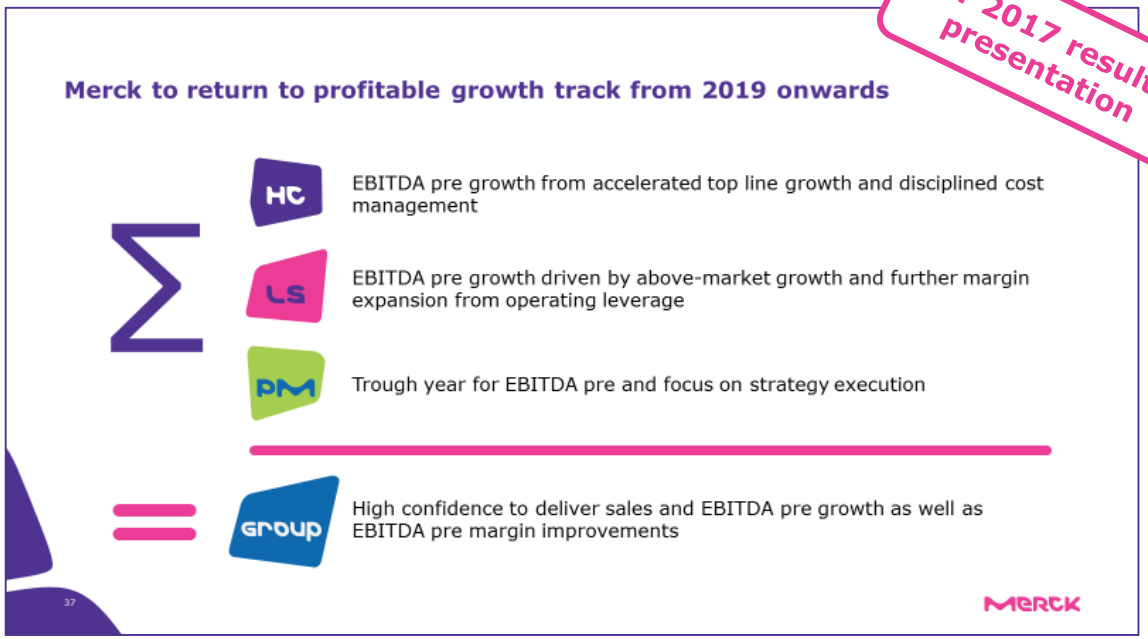
*Excluding Consumer Health

Group on a growing and profitable trajectory

2019 Group EBITDA pre increase confirmed

2019		2018
Sales	>	Sales
EBITDA pre	>	EBITDA pre
Margin	>	Margin

FY 2017 results presentation



Healthcare and Life Science will compensate for Performance Materials' trough year

Appendix

01 GUIDANCE DETAILS

Group

2018 business sector guidance*

Net sales

- Moderate organic growth +3% to +5%: ongoing organic Rebif decline offset by growth in other franchises
- Full-year contributions from 2017 launches

EBITDA pre

- Organic -1% to -2% YoY
- FX -5% to -7% YoY
- ~ €1,580 – 1,650 m (excl. CH)

Net sales

- Organic growth ~+5% to +6%, slightly above market
- Full realization of expected topline synergies

EBITDA pre

- Organic ~ +8% YoY
- FX -3% to -5% YoY
- ~€1,830 – 1,880 m

Net sales

- Slight to moderate organic decline of -2% to -4%
- Volume increases in all businesses
- Continuation of Liquid Crystals sales decline

EBITDA pre

- Organic -14% to -16% YoY
- FX -6% to -8% YoY
- ~€745 – 785 m

*Excluding Consumer Health

Additional financial guidance 2018

Further financial details

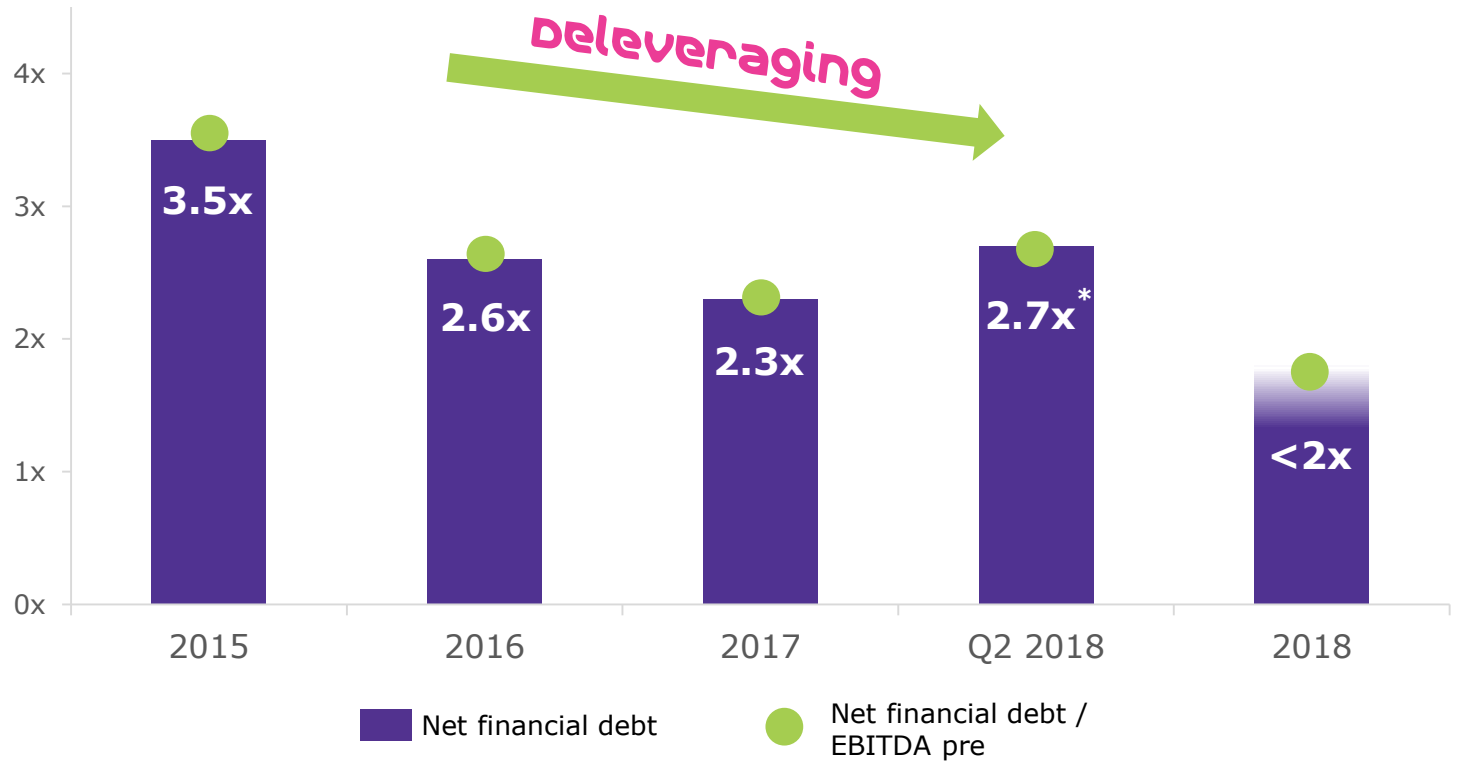
Corporate & Other EBITDA pre	**~ -€360 – -400 m**
Interest result	**~ -€230 – -250 m**
Effective tax rate	**~ 24% to 26%**
Capex on PPE	**~ €900 – 950 m**
Hedging/USD assumption	**2018 hedge ratio ~50-60% at EUR/USD ~ 1.19 to 1.20**
2018 Ø EUR/USD assumption	**~ 1.19 – 1.22**

Group

Strong focus on cash generation to ensure swift deleveraging

Net financial debt[1] 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) remain ruled out 2018

[1]Net financial debt (without pensions);
*EBITDA pre (except FY) reflects last twelve months value including CH EBITDA pre (Q2 2018: €39m)

Group

We have clear financial priorities

Focus on cash flow and deleveraging

- **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

Ongoing cost discipline

- **Synergy generation** is utmost priority
- **Cost discipline** continues in all business sectors
- **Further efficiency gains** from ongoing improvement and harmonization of processes and systems

Efficient capital allocation

- **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

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 exposure[1]

Low — High

FX impact on EBITDA pre[2]

Low — High

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 exposure[1]

Low — High

FX impact on EBITDA pre[2]

Low — High

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 exposure[1]

Low — High

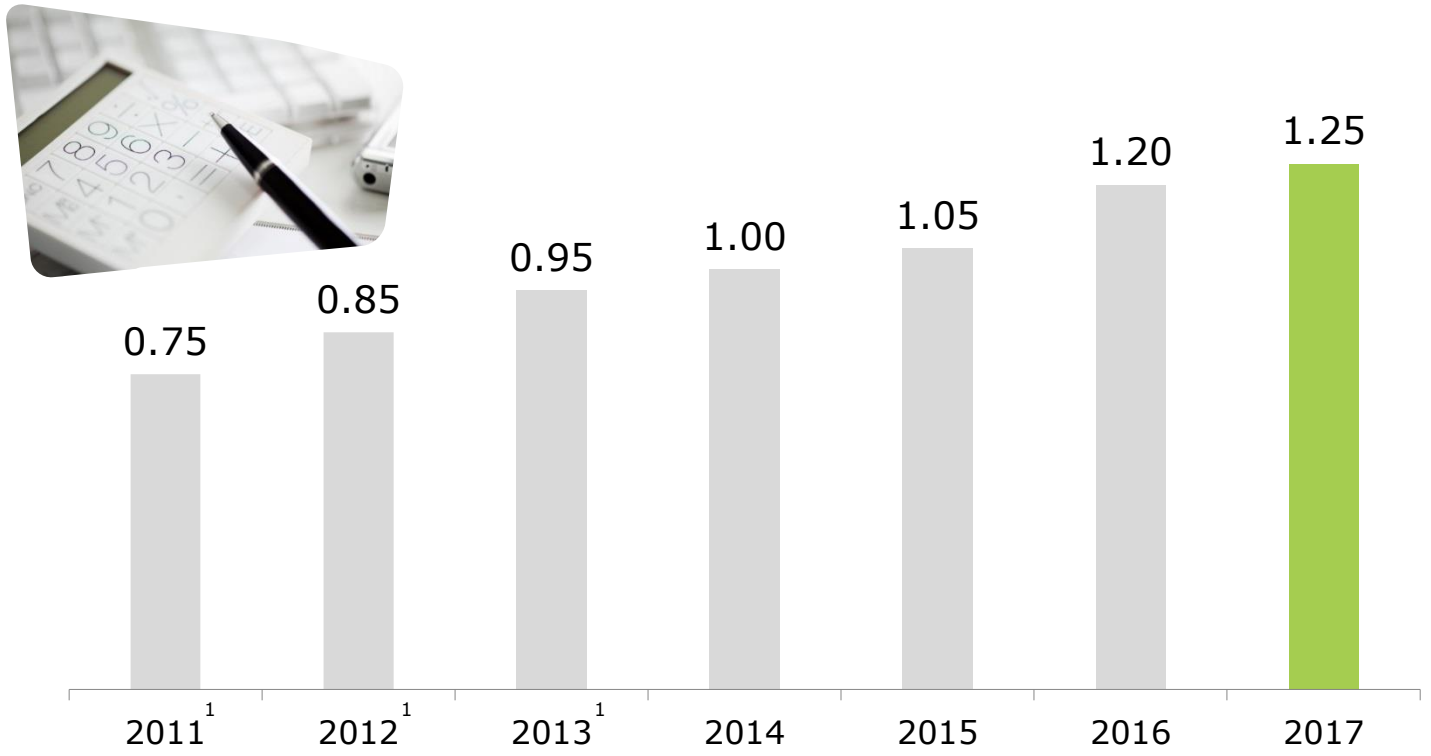
FX impact on EBITDA pre[2]

Low — High

[1]Net sales not generated in €; [2]Indicative feedthrough of net sales FX impact to EBITDA pre; can vary over time

Group
Dividend growth sustained

Dividend[1] development 2011-2017



2017 dividend

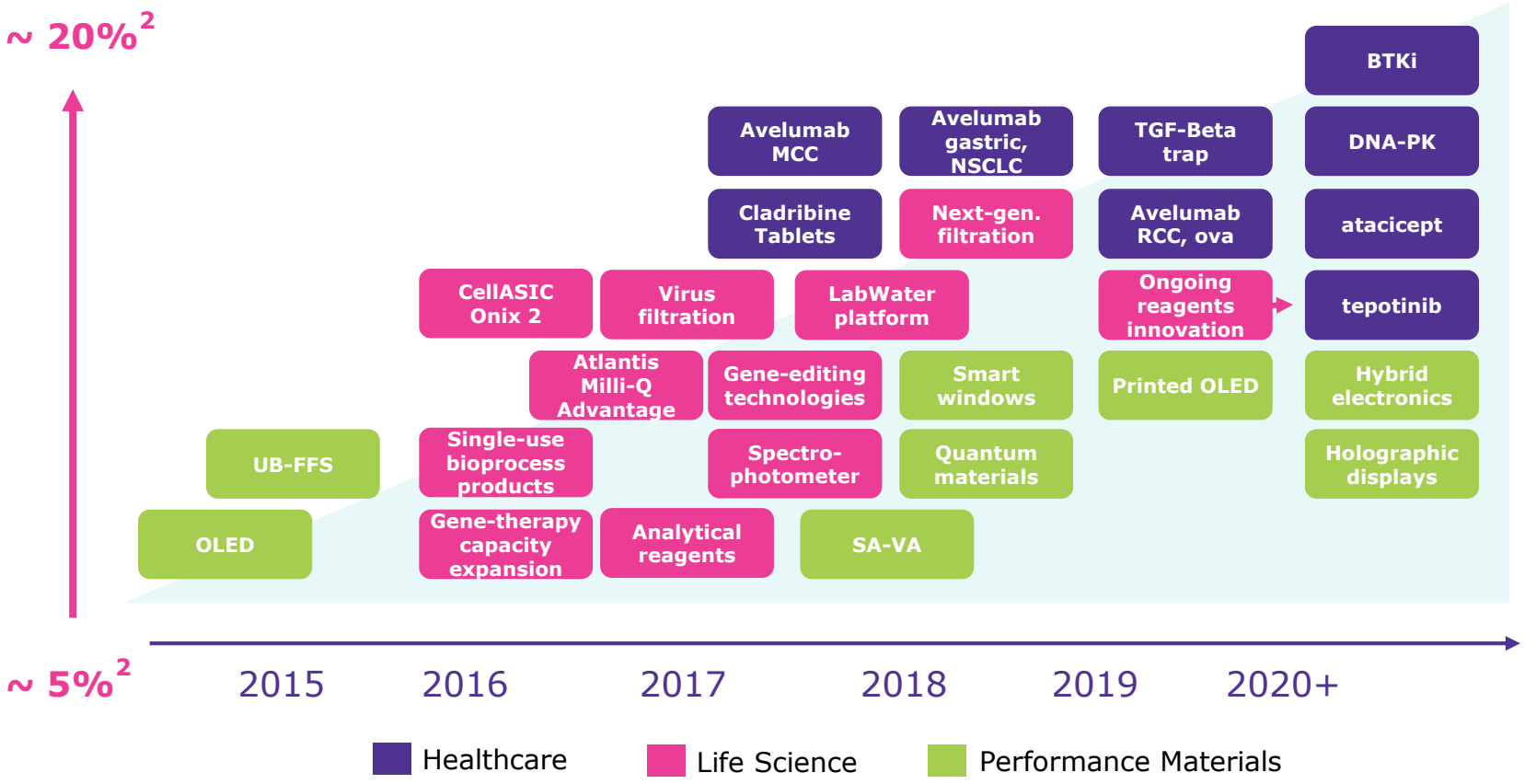
- Dividend of €1.25 (+4% YoY) per share approved for 2017
- 20.3% of EPS pre
- Sustainable dividend growth
- Dividend yield[2] of 1.4%

[1]Adjusted for share split, which has been effective since June 30, 2014; [2]Calculated with 2017 year-end share price of 89.75€ per share

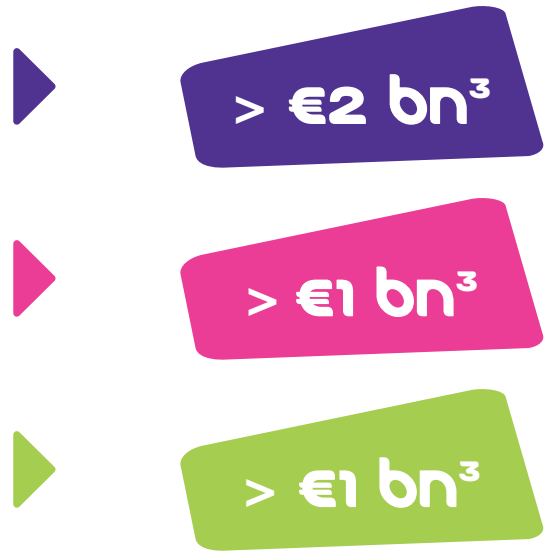
Group

Our strong innovation capabilities will drive growth

New product launch cadence[1] by business sector



New product sales[3] potential 2022



Ourrich pipeline will strongly drive sales

[1]Illustration: 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; [2]Share of total Group net sales from new products launched over the past 5 years, risk-adjusted; [3]risk-adjusted

D2 HEALTHCARE

2.1 HEALTHCARE

Healthcare Strategy

Healthcare Strategy

Portfolio management: Differentiating across diverse business models

General Medicine

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

Biologics

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

Oncology & Immunology Innovation

- **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

Healthcare Strategy

The road to maximizing Healthcare's core franchises is clear

BAVENCIO avelumab injection 20 mg/mL cladribine tablets

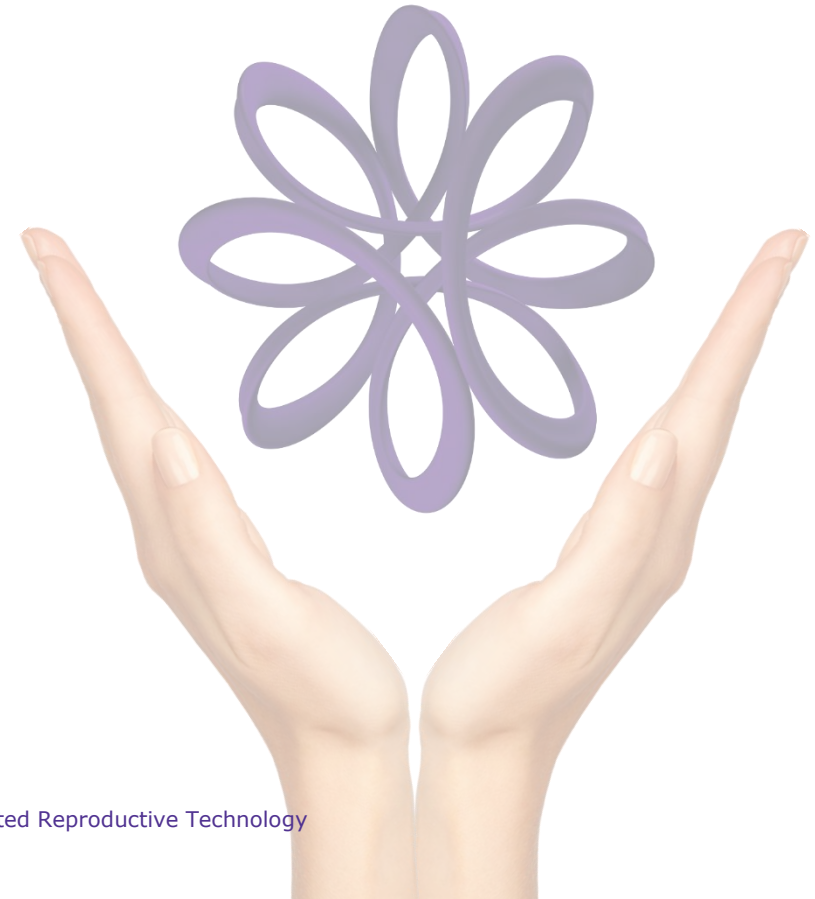
Foster an innovative pipeline
of immuno-oncology and immunology

Rebif

Capitalize on strong efficacy and new smart devices to maximize differentiation and defend franchise

GONAL-f Pergoveris (follitropin alfa and lutropin alfa for injection) OVIDREL Luveris Cetrotide

Build on No.1 position and ART[2] 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

ERBITUX CETUXIMAB

Continue to drive mCRC[1] share
by increasing patient testing and expanding head and neck coverage

Glucophage Concor Euthyrox

Build on existing track record in emerging markets, drive brand and lifecycle management and **expand business** including asset repatriation

[1] mCRC = metastatic colorectal cancer; [2]ART = Assisted Reproductive Technology

Healthcare Strategy
The Healthcare Pipeline continues to deliver

August 1, 2018

Phase I

M2698
p70S6K & Akt inhibitor
Solid tumors

M3814
DNA-PK inhibitor
Solid tumors

M6620 (VX-970)
ATR inhibitor
Solid tumors

M4344 (VX-803)
ATR inhibitor
Solid tumors

M3541
ATM inhibitor
Solid tumors

M8891
MetAP2 inhibitor
Solid tumors

M7583
BTK inhibitor
Hematological malignancies

avelumab
anti-PD-L1 mAb
Solid tumors

avelumab
anti-PD-L1 mAb
Hematological malignancies

M9241 (NHS-IL12)
Cancer immunotherapy
Solid tumors

M7824
anti-PD-L1/TGFbeta trap
Solid tumors

M4112
Cancer immunotherapy
Solid tumors

M6495
anti-ADAMTS-5 nanobody
Osteoarthritis

M1095 (ALX-0761)[2]
anti-IL-17 A/F nanobody
Psoriasis

M5717
PeEF2 inhibitor
Malaria

Phase II

tepotinib
c-Met kinase inhibitor
Non-small cell lung cancer

tepotinib
c-Met kinase inhibitor
Hepatocellular cancer

avelumab
anti-PD-L1 mAb
Merkel cell cancer 1L[1]

avelumab
anti-PD-L1 mAb
Solid tumors[3]

avelumab
anti-PD-L1 mAb
Non-small cell lung cancer[3]

avelumab
anti-PD-L1 mAb
Urothelial cancer[3]

abituzumab[4]
pan-αv integrin inhibiting mAb
Colorectal cancer 1L[1]

sprifermin
fibroblast growth factor 18
Osteoarthritis

atacicept
anti-BlyS/APRIL fusion protein
Systemic lupus erythematosus

atacicept
anti-BlyS/APRIL fusion protein
IgA nephropathy

evobrutinib
BTK inhibitor
Rheumatoid arthritis

evobrutinib
BTK inhibitor
Systemic lupus erythematosus

evobrutinib
BTK inhibitor
Multiple sclerosis

Phase III

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

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

avelumab - anti-PD-L1 mAb
Ovarian cancer platinum resistant/refractory

avelumab - anti-PD-L1 mAb
Ovarian cancer 1L[1] and 1L-M[1M]

avelumab - anti-PD-L1 mAb
Ovarian cancer 1L[1,5]

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

avelumab - anti-PD-L1 mAb
Renal cell cancer 1L[1]

avelumab - anti-PD-L1 mAb
Locally advanced head and neck cancer

Registration

cladribine tablets
lymphocyte-targeting agent
Relapsing multiple sclerosis[6]

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

[1] First-line treatment; [1M] First-line maintenance treatment.
[2] 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. [3] Avelumab combination studies with talazoparib, axitinib, ALK inhibitors, chemotherapy, or novel immunotherapies. [4] As announced on May 2 2018, in an agreement with SFJ Pharmaceuticals Group, abituzumab will be developed by SFJ for colorectal cancer through Phase II/III clinical trials. [5] Avelumab in combination with talazoparib. [6] As announced on July 30 2018, the US Food and Drug Administration (FDA) has accepted the resubmission of the New Drug Application (NDA) for cladribine tablets.

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.

Healthcare

ASCO 2018: Key data at a glance

Oncology | Immuno-Oncology

Anti PD-L1/ TGF-beta trap (PD-naïve NSCLC 2L)

- Results from "PDx-naïve NSCLC 2L" ph Ib cohort (no prior immunotherapy)
- 80 patients; progressed following 1L standard treatment; 2 doses (500 mg/1200 mg)
- Unconfirmed ORR = 25.0% (500 mg ORR = 22.5%; 1200 mg ORR = 27.5%)
- **ORR = 40.7% in PD-L1+ (≥1%)/71.4% high expression (≥80%)** (1200 mg)
- Promising efficacy of monotherapy across PD-L1 subgroups; treatment well tolerated

Anti PD-L1/ TGF-beta trap (HPV assoc. cancers)

- 16 patients with HPV associated cancers from ph Ib cohort (9 cervical, 4 anal, 3 H&N)
- **ORR = 37.5%** incl. **confirmed ORR = 45.5% in HPV+ patients**
- Manageable safety profile; continues to be evaluated *(e.g. IST by NCI)*

Tepotinib (NSCLC)

- Interim data from phase II in patients with stage IIIB/IV MET Exon 14 NSCLC
- **Confirmed PR 9/15 (60.0%)** and SD 3 (20.0%) (investigator assessment)
- Safety profile as expected based on prior studies (recruitment ongoing)

Avelumab (mMCC)

- Two-year efficacy and safety update from JAVELIN Merkel 200 (phase 2) in patients with mMCC and progression on prior chemotherapy
- **Confirmed ORR = 33.0%;** median OS = 12.6 months
- Unchanged from previous analyses; efficacy and safety results confirm lasting clinical benefit of avelumab in patients with mMCC

2.2 HEALTHCARE
Oncology Strategy

Oncology Strategy
Strategy anchored on five foundational pillars

1	**Targeted Oncology**	1. Erbitux: continued leadership in CRC and SCCHN 2. Tepotinib: c-met driven cancers	1. Numerous Erbitux ISTs incl. combination with Avelumab 2. Tepotinib in NSCLC, HCC
2	**Avelumab**	1. Monotherapy as a basis for combinations 2. Establish immunogenic priming in combination or sequence with CT/RT[1] 3. Novel combinations 4. Establish value of unique molecular characteristics (ADCC)	1. NSCLC 1L (high intensity) 2. Maintenance in UC 1L, gastric 1L, ovarian 1L 3. Avelumab + Inlyta (RCC 1L) 4. Unique combinations leveraging ADCC
3	**IO bi-functionals**	Engineer or access platforms where biology is best addressed by a bi-functional approach	• TGF-beta trap/anti-PD-L1 • Anti-LAG-3/anti-PD-L1 • NHS-IL 12
4	**DNA Damage Response inhibitors**	Establish leadership in DDR and leverage synergies across portfolio (immuno-oncology plus emerging platforms)	• DNA-PK-i • ATR-i • ATM-i
5	**Emerging Platforms**	Invest in complementary technologies within focus discovery areas	• Antibody-Drug-Conjugates (ADC, e.g. partnership with Mersana/Sutro)

[1] Acronyms: CT: Chemotherapy | RT: Radiotherapy | ATM: ataxia-telangiectasia mutated |ATR: ataxia telangiectasia and Rad3 | DNA-PK: DNA-dependent protein kinase | RCC: Renal Cell Carcinoma | MCC: Merkel Cell Carcinoma | NSCLC: non-small cell lung cancer | DLBCL: Diffuse Large B-cell Lymphoma | UC: Urothelial Cancer

Oncology Strategy
External Innovation: 2017 deal activity is aligned with our strategic pillars

2 Avelumab

Clinical collaborations for avelumab combinations

Expand across the immunity cycle

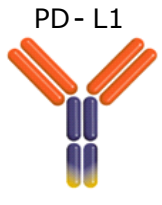
- **EpiThany:** EP-101 STEMVAC vaccine (breast cancer)
- **Vaximm:** Oral T-cell immunotherapy (glioblastoma, colorectal cancer)

3 IO bi-functionals

& F-star BISPECIFIC. BY DESIGN.

Leading bi-specific platform

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



4 DNA Damage Response inhibitors

& VERTEX THE SCIENCE of POSSIBILITY

strengthen DDR platform

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

Vertex

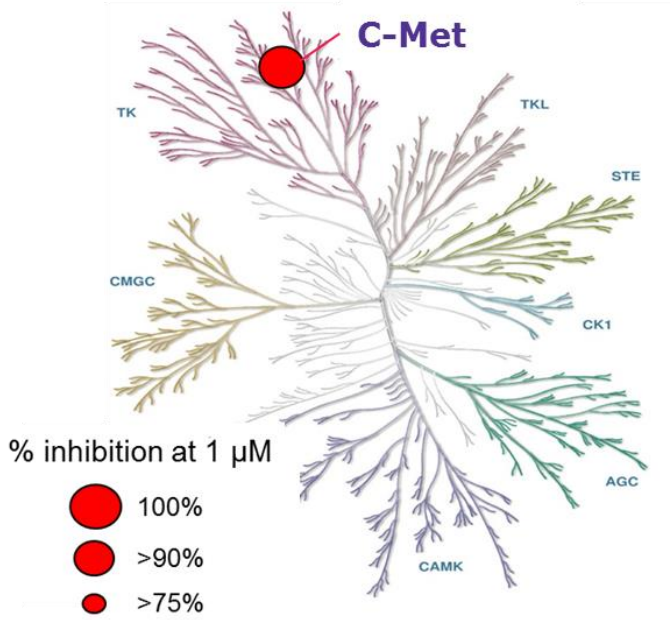
- Two **ATR-inhibitors**
- One **DNA-PK inhibitors**
- Two programs

Merck KGaA, Darmstadt, Germany

- DNA-PK inhibitor
- **ATM-inhibitor**

Tepotinib: Highly selective c-met inhibitor
Pre-clinical data indicated high target activity (>90% c-met inhibition)

Selectivity Profile[1]



- ATP competitive, **reversible small molecule** c-Met inhibitor[2]
- **Highly selective** according to preclinical benchmarking[1]
  - In panel of >240 kinases, only c-Met inhibited at 1 µM
  - >90% inhibition of phospho-c-Met levels (tumor biopsy)

Study Results

- **Encouraging safety profile:** 147 patients treated up to 1,400 mg (MTD not reached). 37/60 (62%) patients on regimen 3 (QD) reported at least one treatment-related AE[3]
- RP2D: 500 mg QD (based on PK/PD modelling, PD, safety)
- Preliminary signs of **anti-tumor activity:** two confirmed PR; 12 had stable disease lasting for ≥ 6 weeks, including 1 unconfirmed PR[3]

(1) Merck KGaA, Darmstadt, Germany data on file | (2) Bladt et al, 2013 | (3) Falchook et al, ASCO 2015

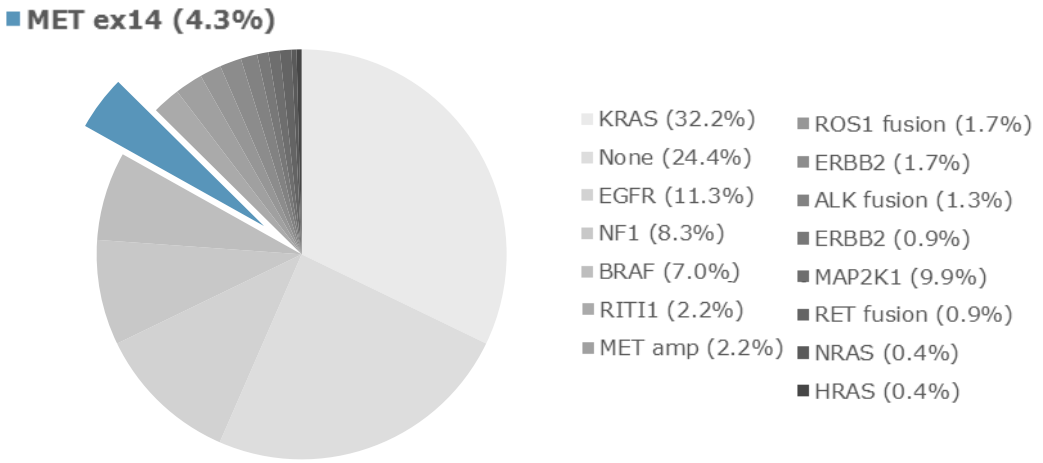
Tepotinib: Precision medicine approach
Targeting biomarker enriched NSCLC population with critical medical need

Precision Medicine

- Targeted therapies work in tumors that **critically depend on the target** for their growth or survival
- Target is often an **"oncogenic driver"** (tumor specific)
- **Prospective identification** of responders requires **predictive biomarkers**

Oncogenic drivers in lung adenocarcinoma[1]

- MET-mutations are clinically **unique molecular subtypes** of NSCLC
- MET exon 14 alteration confer oncogene addiction in **~3-4 % of NSCLC**
- **No approved therapy** specifically targeting METex14 and/or c-Met amplification



(1) Cancer Genome Atlas Nature 2014;511:543-50

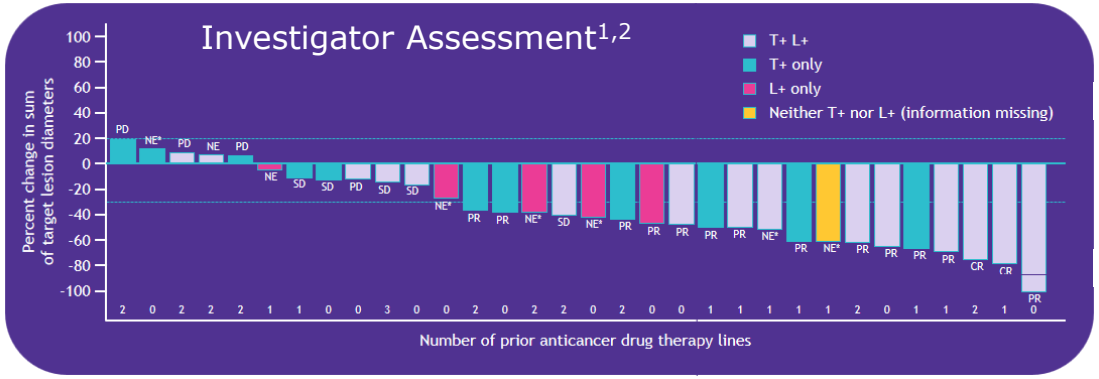
Tepotinib: Interim Phase II results (NSCLC MET exon 14)
Encouraging efficacy with a highly targeted approach

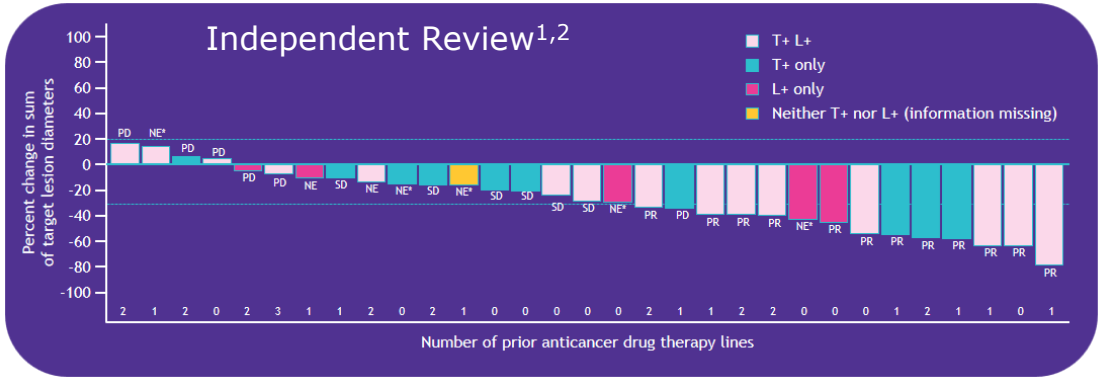
Results

- **Encouraging signs of activity** in patients with advanced NSCLC harboring **MET exon 14-skipping mutations**
- ORR to date based on independent review **(42.9%)** and investigator assessment **(53.6% incl. two CR)**[1]
- Generally **well tolerated** (most common side effects: peripheral edema and diarrhea, both mild to moderate)
- Recruitment ongoing **(LBx and TBx)**[2]

Tepotinib 500 mg[1,3]	Investigator	Independent
Complete response	2 (7.1)	0 (0)
Partial response	13 (46.4)	12 (42.9)
Stable disease	5 (17.9)	6 (21.4)
Progressive disease	4 (14.3)	5 (17.9)
Non-evaluable	4 (14.3)	5 (17.9)
ORR n (%) [95% CI][4]	15 (53.6) [33.9, 72.5]	12 (42.9) [24.5, 62.8]
DCR: n (%) [95% CI][5]	20 (71.4) [51.3, 86.8]	18 (64.3) [44.1, 81.4]

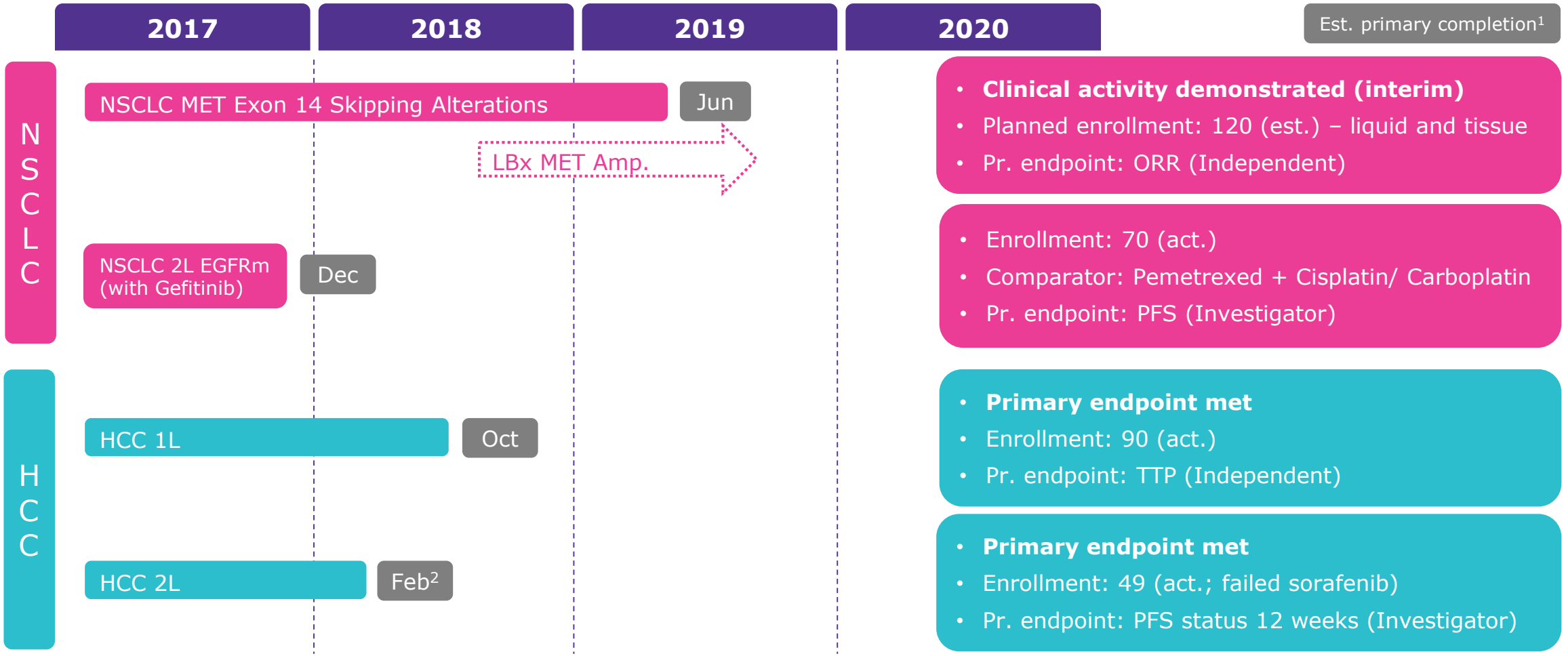
Assessment / Review



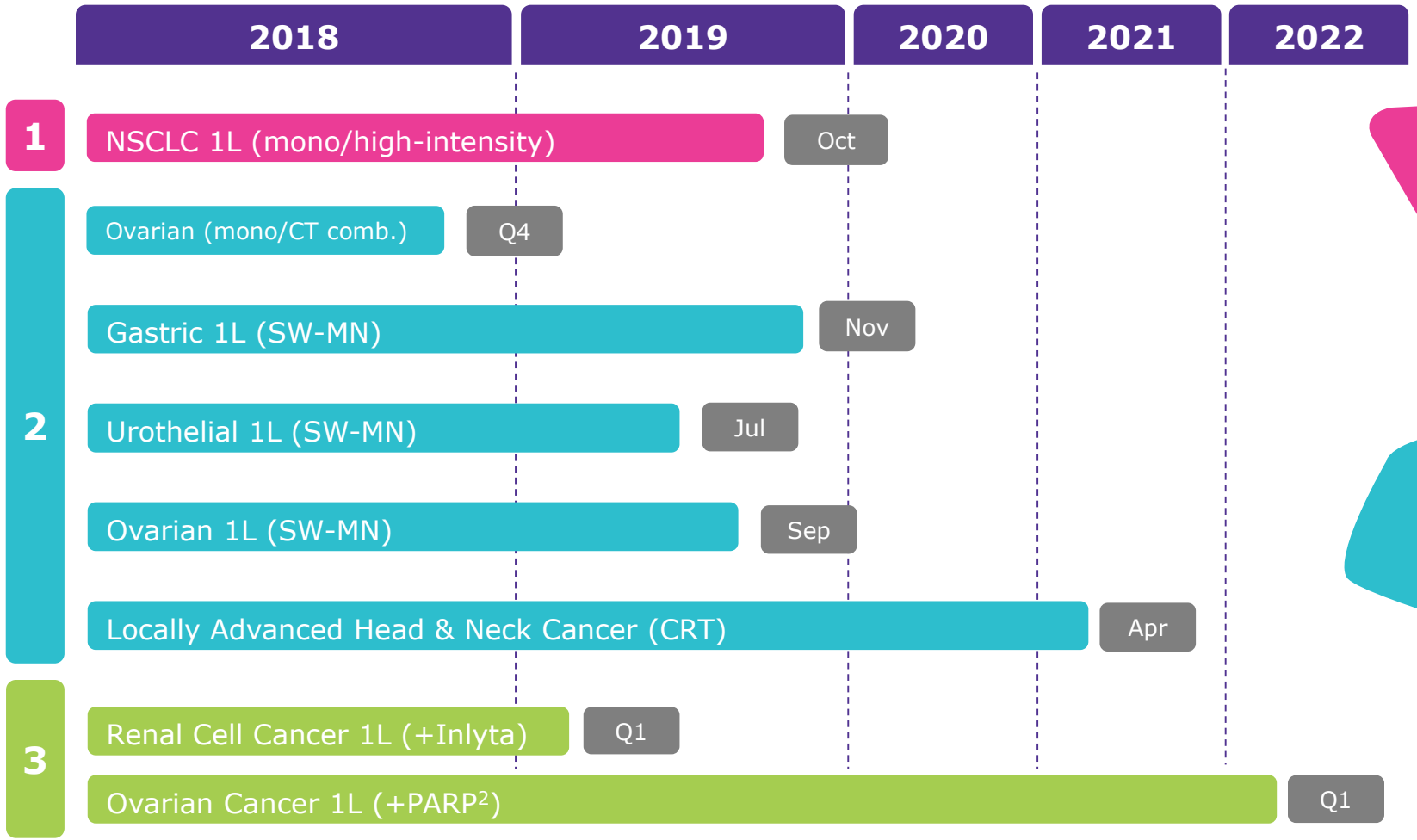


(1) Felip E et al, ASCO 2018 | (2) L+, *MET*exon14-skipping mutation-positive in ctDNA (liquid biopsy = LBx); T+, *MET*exon14-skipping mutation-positive in tumor (tissue biopsy = TBx) | (3) Combined analysis (n=28); efficacy analysis includes only patients having at least 2 post-baseline assessments or who discontinued treatment for any reason (n=28) | (4) Confirmed complete response/partial response | (5) Confirmed complete response/partial response or stable disease lasting at least 12 weeks. | CI, confidence interval

Tepotinib: program overview
Development will focus on biomarker enriched patient populations



Avelumab:clinical program
Ongoing studies across six cancer types in seven indications



Monotherapy as basis for exploring combinations

Leverage potential of unique molecular characteristics (ADCC)

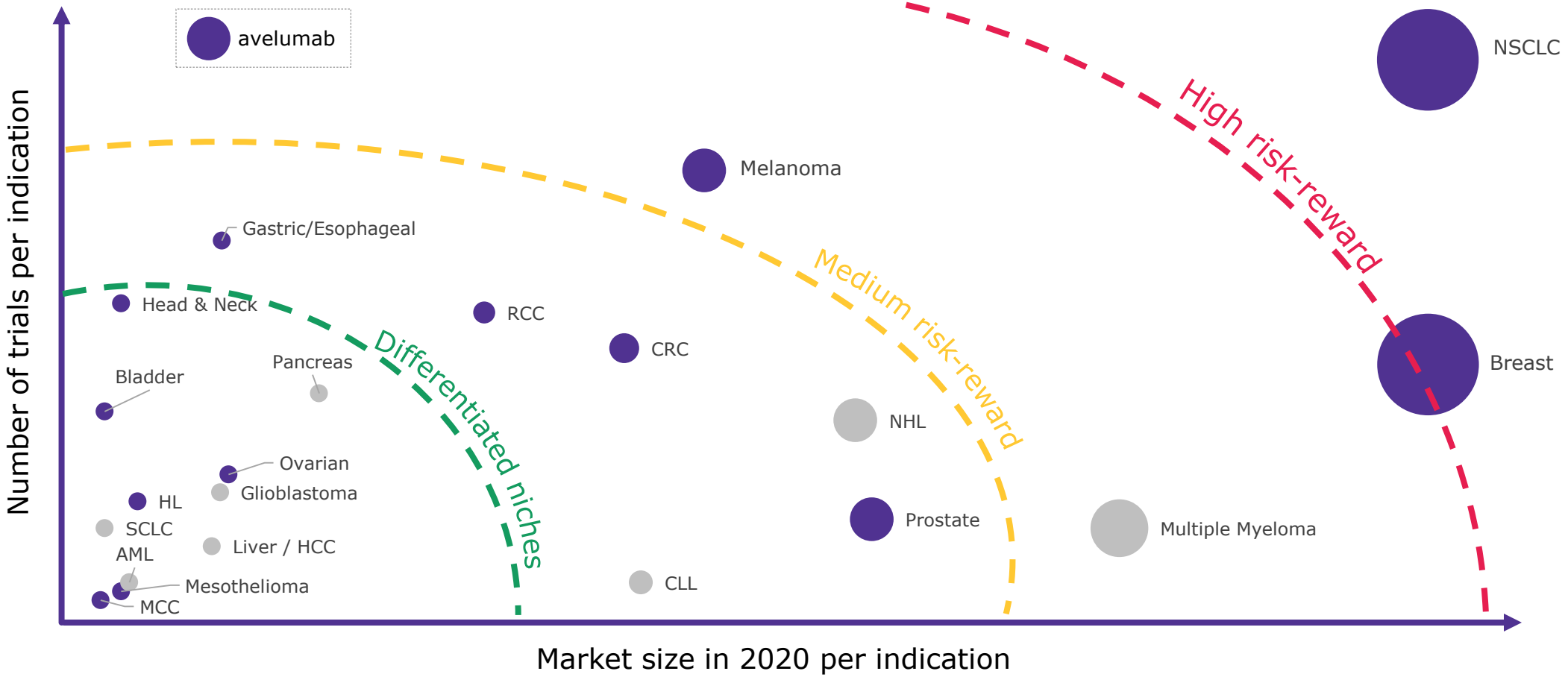
Establish potential of immunogenic priming (incl. combination and sequencing with CT/CRT)

Proprietary combinations

[1] Estimated primary completion date according to Clinicaltrials.gov as of July 27, 2018 | Acronyms: NSCLC: Non Small Cell Lung Cancer | CT: Chemotherapy | CRT: Chemoradiotherapy | Plat. Res./Ref.: Platinum Resistant/Refractory | MN: Maintenance | SW: Switch; [2] PARP=Talazoparib

Avelumab

Avelumab plays predominantly in attractive and differentiated niches



Avelumab

Differentiation strategy varies according to chosen target indication and market

1. Saturated and / or major indications

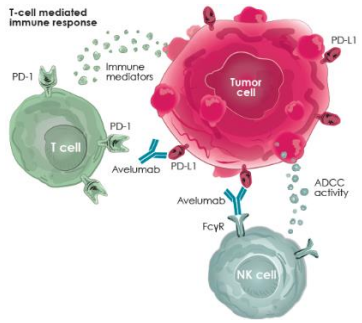
- **Learn from experience** of incumbents/early movers in major indications (e.g. NSCLC, Bladder)
- **Potential for combinations** given breadth of combined development pipelines
- **Differentiate** in trial design and explore application of further biomarkers

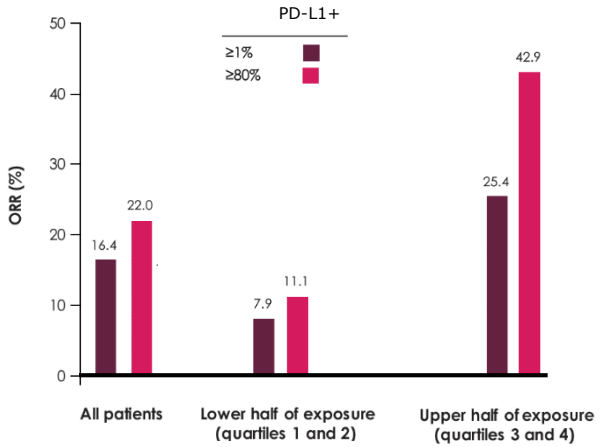
2. Unsaturated and / or niche indications

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

Avelumab
NSCLC 1L: Assessing potential efficacy upside in mono-therapy[1]

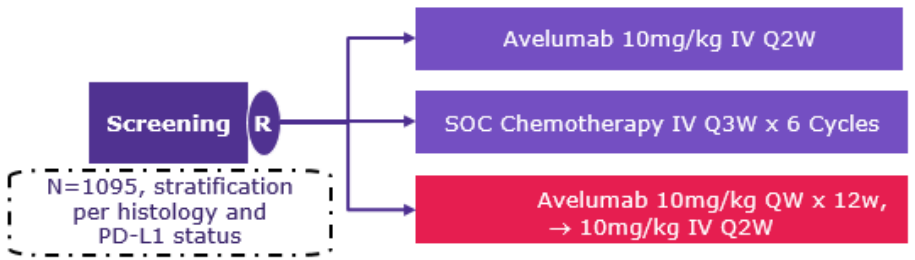
NSCLC 2L+: exposure response





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

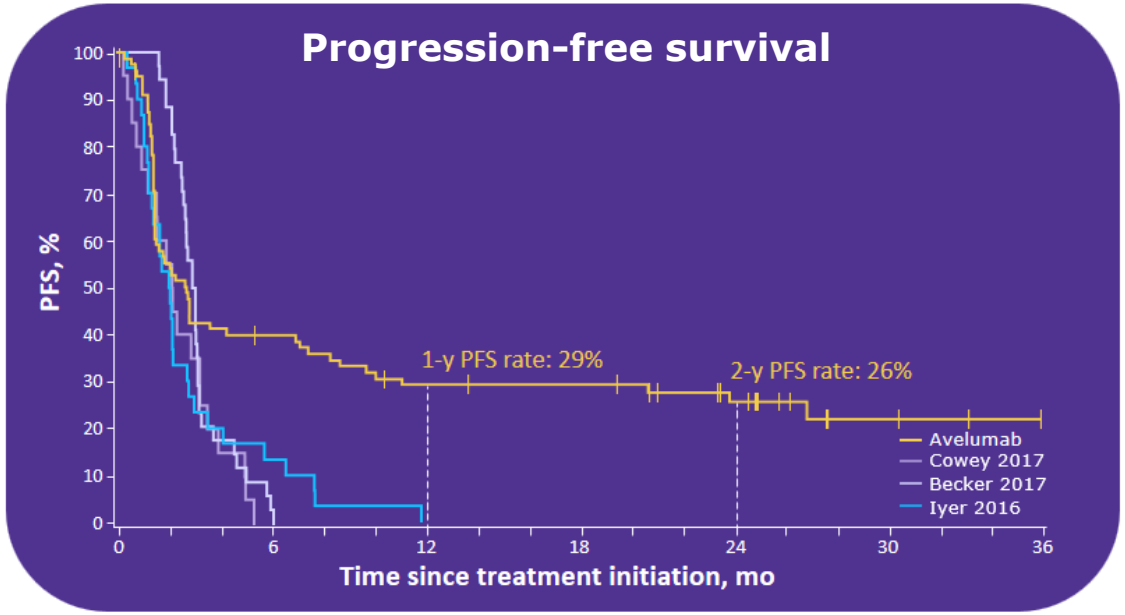
- **Hypothesis:** higher drug intensity may result in greater efficacy (potentially driven by ADCC)
- Potential association between **higher ORR** and **higher avelumab exposure**
- ORR highest in patients with both higher avelumab **exposure** and tumors with higher levels of **PD-L1 expression**
- **NSCLC 1L phase III trial amended** to leverage high-intensity hypothesis (est. primary completion Jul 2019)

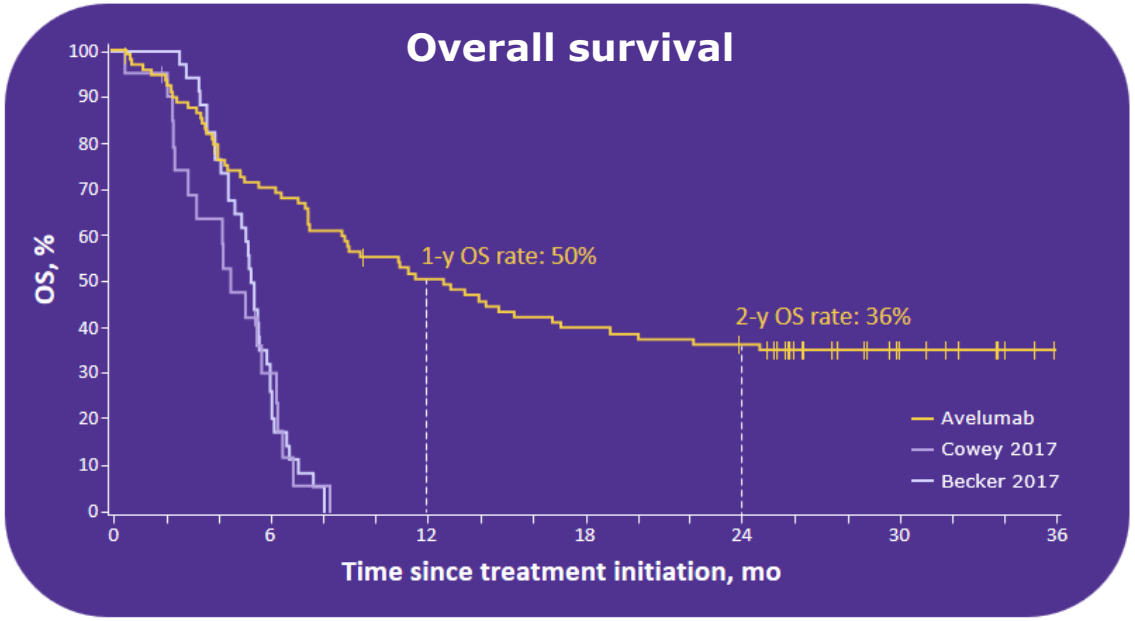


- **Primary endpoints:** PFS & OS @ high PD-L1-expression
- **Secondary endpoints:** PFS & OS @ moderate and low PD-L1-expression (BOR, DOR, Safety, QoL)
- **Hierarchical ordered hypothesis**

[1] Abstract No. 9086. Presented at the 53rd ASCO Annual Meeting; June 2-6, 2017; Chicago, IL, USA: Exposure–response and PD-L1 expression analysis of second-line avelumab in patients with advanced NSCLC: data from the JAVELIN Solid Tumor trial | Acronyms: ORR: Overall Response Rate

Avelumab: two year follow-up for Merkel Cell Carcinoma registrational study[1]
Changing the natural history of the disease





Merkel Cell Carcinoma

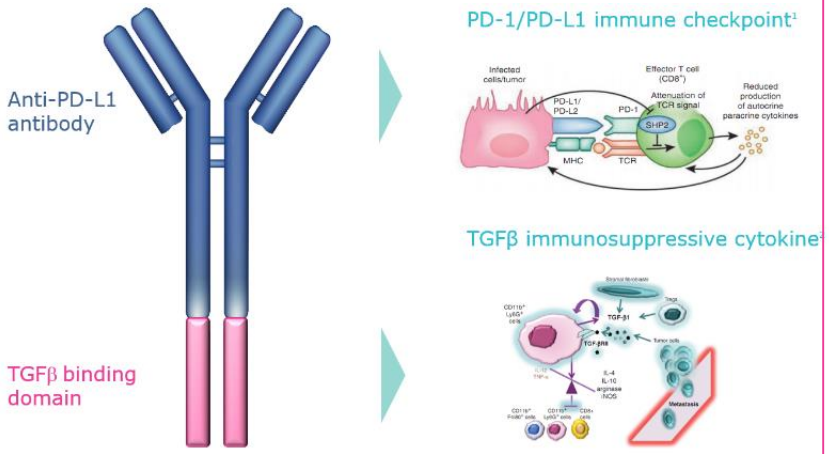
- **Chemo-sensitive disease** but responses seldom durable
- **Avelumab first approved therapy**
- 2 year follow-up confirmed **durable responses**
- **Survival rates: 36%** (2 years)

(1) P. Nghiem et al, ASCO, Jun 2018 (abstract 9507) | Figures for non-avelumab studies in upper two graphs are for illustrative purposes only and is not direct head-to-head comparison (retrospective data)

Anti-PD-L1/TGF-ß trap

With the dose escalation showing first signs of clinical activity[1], PD-L1–TGF-beta indicates potential to move beyond checkpoint inhibitors

Mode of Action

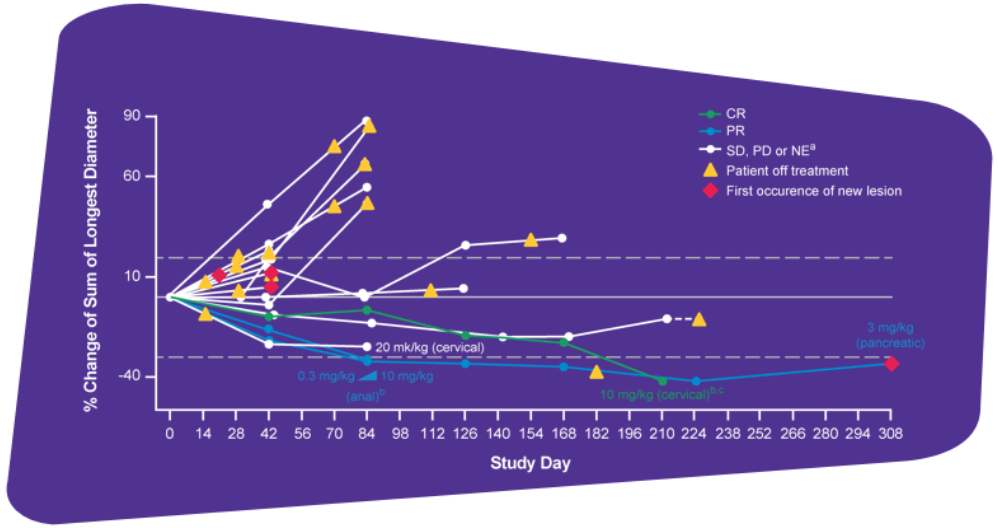


- Innovative first-in-class bifunctional fusion protein designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF-β signaling)
- Bifunctional mode should result in broader application vs. respective mono-functional agents

Study Results

- Manageable safety profile (patients with heavily pretreated advanced solid tumors)
- Saturated peripheral PD-L1 and sequestered all released plasma TGF-β1, -β2, and -β3[1]
- Great potential when combined with Standard of Care, immunotherapy and internal pipeline drug candidates

- Dose level finding of Phase I completed
- Tested in 14 Phase Ib expansion cohorts across >700 patients
- **Further Ph Ib results to be presented at upcoming scientific congress**



[1] As presented by J. L. Gulley at ASCO Annual Meeting 2017, June 5, 2017.

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

Dose escalation completed[1]

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

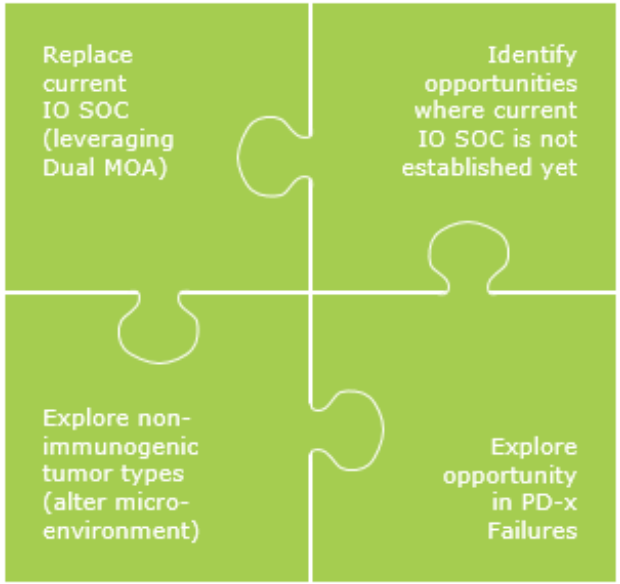
J. L. Gulley[1], C. R. Heery[2], J. Schlom[1], R. A. Madan[3], L. Cao[1], E. Lamping[4], J. L. Marte[1], L. M. Cordes[5], O. Christensen[6], C. Helwig[7], J. Strauss[1]

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

PRESENTED AT: 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)

14 cohorts in recruitment



Defined criteria allow timely decision

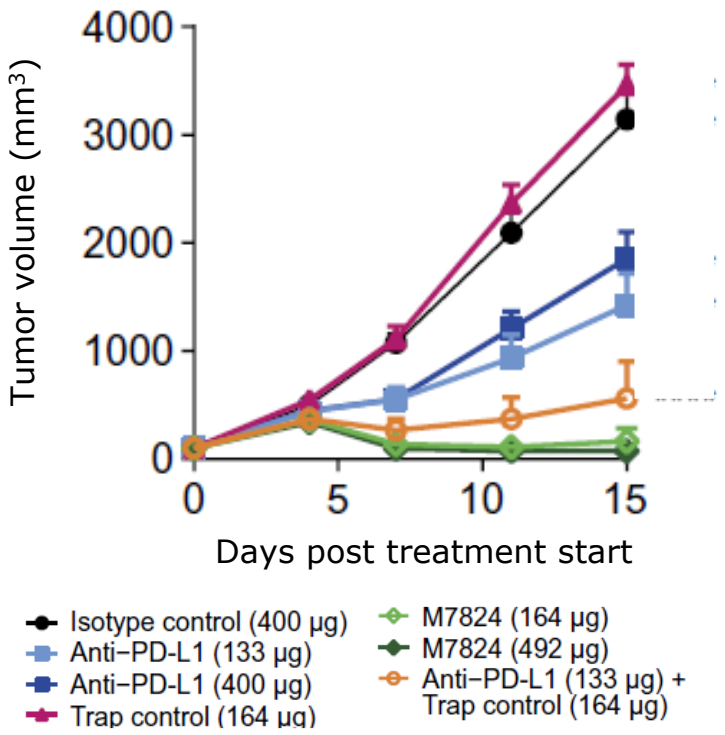
- Expand cohort and/or explore single-arm path-to-registration
- Expand cohorts to confirm signal and/or follow with randomized comparative trial
- Explore biomarker driven pan-tumor opportunities
- De-prioritize cohort

[1] As presented by J. L. Gulley at ASCO Annual Meeting 2017, June 5, 2017.

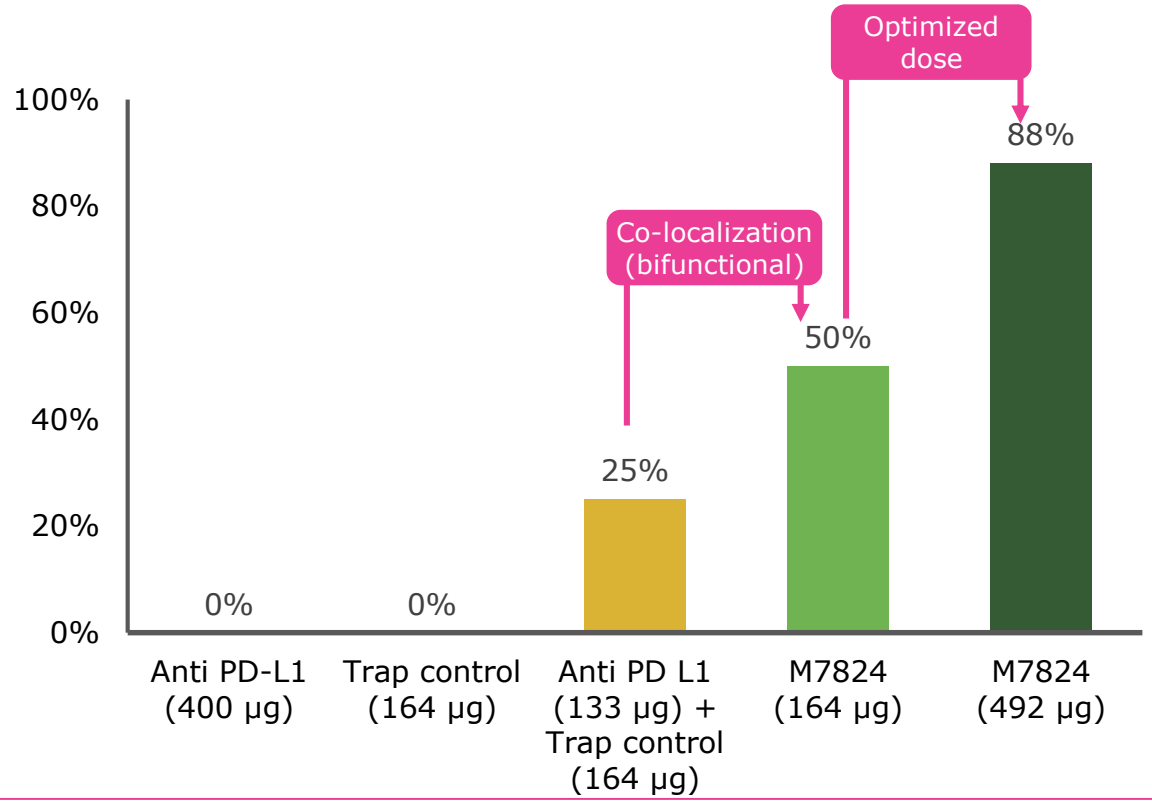
Anti-PD-L1/TGF-ß trap: Pre-clinical model

Bifunctional M7824 superior to co-administration of TGF-ß trap and anti-PD-L1[1]

MC38 Colorectal Cancer[1]



Complete Tumor Regression (%)[1]
(complete tumor regression after 171 days)



(1) Lan et al, Sci Transl Med, Jan 2018

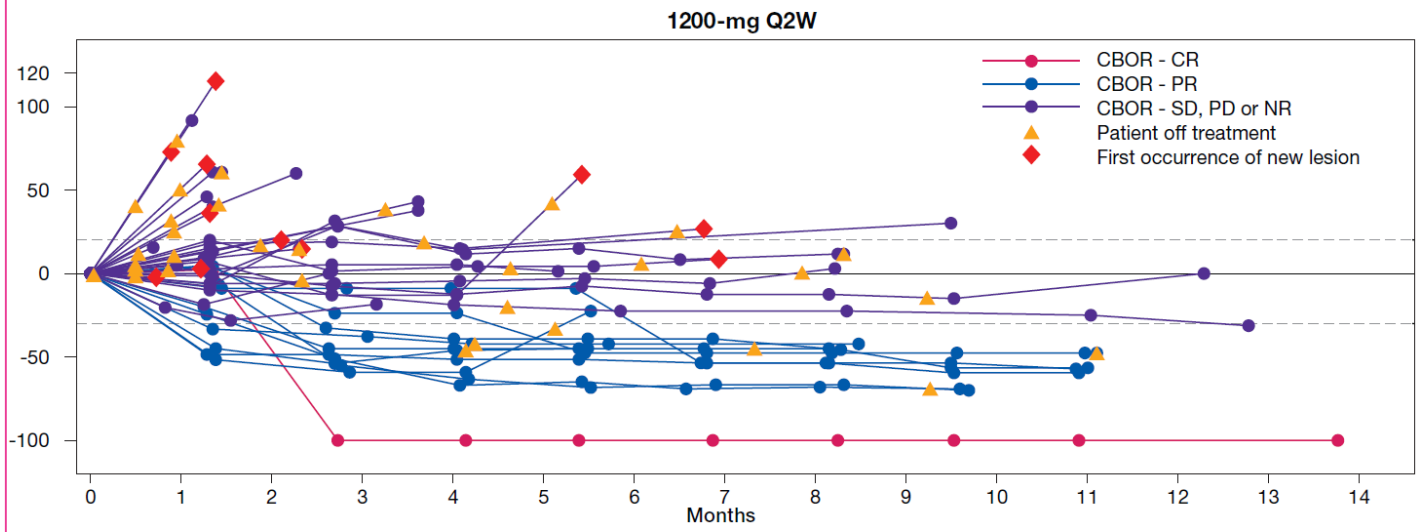
Anti-PD-L1/TGF-ß trap: Phase Ib results (PDx-naïve 2L NSCLC)

Encouraging durable responses seen across PD-L1 expression levels[1]

Phase 1b results

- **PD-L1 expression of ≥80%** comparable to TPS ≥50% (22C3)[1]
- **Encouraging efficacy comparing favorably** with established PDx-inhibitor monotherapy
  - **ORR = 27.5% (all-comer)** vs. ~18%[2]
  - **ORR = 40.7% (PD-L1+)** vs. ~18-27%[2]
  - **ORR = 71.4% (PD-L1 high)** vs. ~29-44%[2]
- **Manageable safety profile:** similar to established PDx-inhibitors (6% keratoacanthomas manageable; did not lead to discontinuation)

Change in sum of diameters (%)[1]



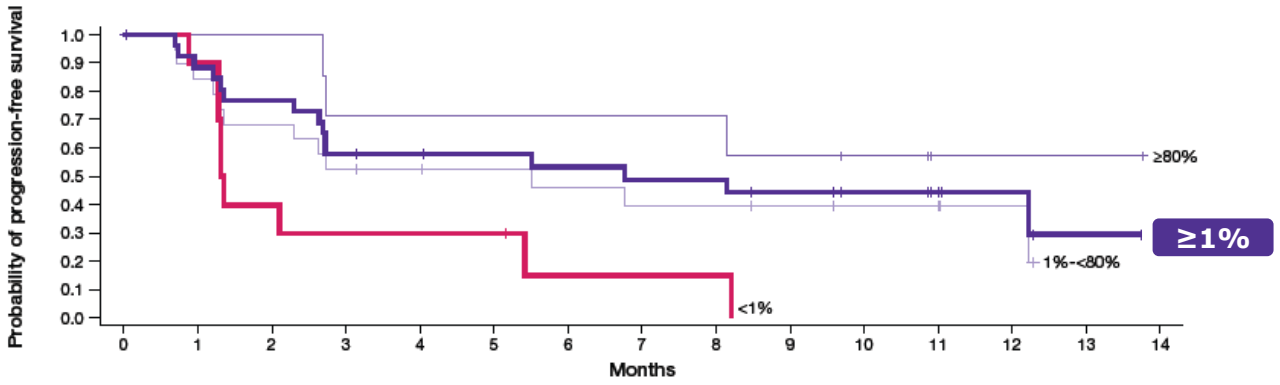
(1) L.G. Paz-Ares et al, ASCO, Jun 2018 (abstract 9017) – data cut-off: March 12, 2018 | (2) Herbst et al; Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): a randomised controlled trial (www.thelancet.com Published online December 19, 2015http://dx.doi.org/10.1016/S0140-6736(15)01281-7) and Garon et al; Pembrolizumab for the Treatment of Non–Small-Cell Lung Cancer (The NEW ENGLAND JOURNAL of MEDICINE) incl. Supplementary Appendix; table S7 (N Engl J Med 2015;372:2018-28. DOI: 10.1056/NEJMoa1501824)

Anti-PD-L1/TGF-ß trap: Focus area NSCLC

Strong PFS signal in ph Ib – Next step randomized ph II trial in NSCLC 1L

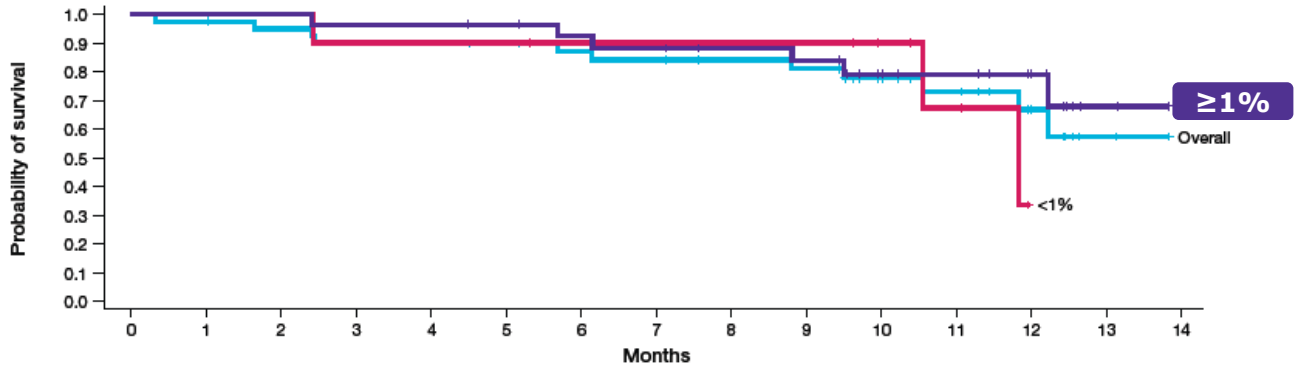
Progression free survival
(PD-L1 ≥ 1%)

- M7824: **mPFS = 6.8 months**[1]
- Leading competitor: 4.0 months[2]



Overall Survival
(PD-L1 ≥ 1%)

- M7824: **mOS not reached**[1]
- Leading competitor: 12.7 months[2]



(1) L.G. Paz-Ares et al, ASCO, Jun 2018 (abstract 9017); data shown for 1200mg Q2W dose | (2) 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)

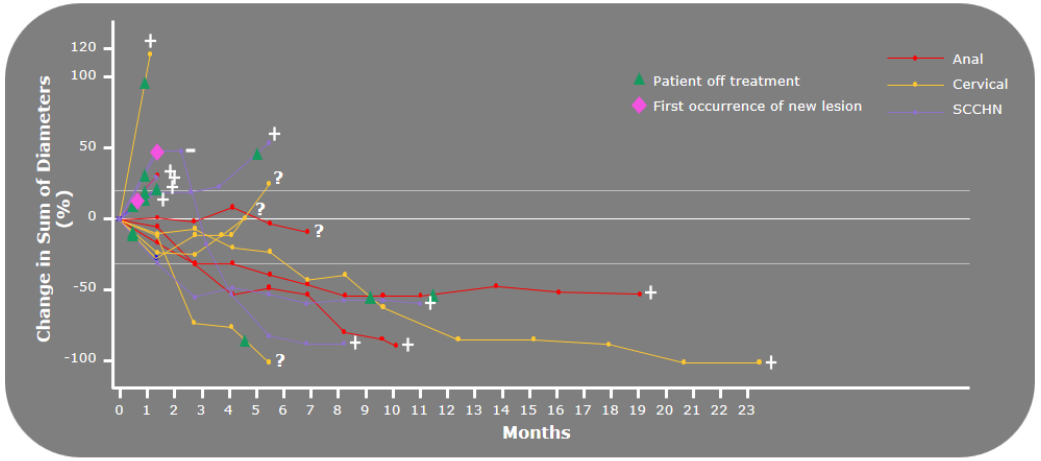
Anti-PD-L1/TGF-ß trap: Phase Ib results (HPV cohort at NCI)

HPV-assoc. cancers as potential pan-tumor therapy – prospective study ongoing at NCI

Patients with HPV-assoc. cancers

- Analyses of HPV+ cervical/SCCHN tumor samples from TCGA/Oncomine show frequent dysregulation of TGF-βR1 signaling – suggesting this **pathway plays a role in HPV-mediated carcinogenesis**
- **HPV associated** with almost all anal and cervical cancer, and some SCCHN[2-4]
- Retrospective subgroup analysis incl. 17 patients with HPV-associated cancers[1]:
  - Activity in all three tumor types
  - **Confirmed ORR = 41.7% (HPV+)[1]**
  - Clinical activity of anti-PD-1 monotherapies in **range of 17–26%**[5-8]
- **Phase II study by NCI** specifically accruing patients with HPV-associated malignancies

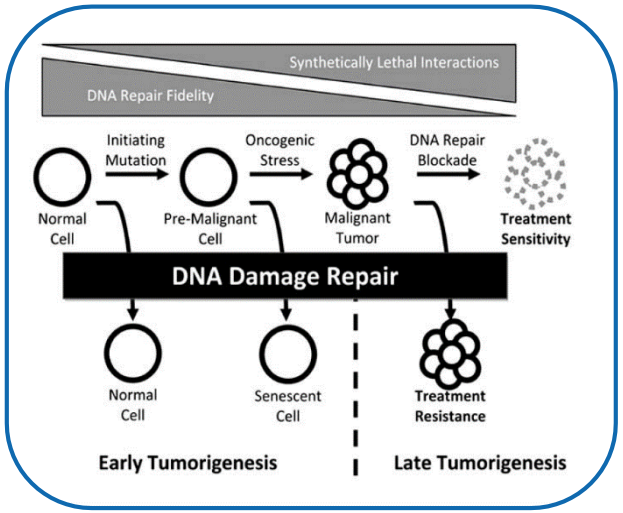
BOR as confirmed by independent radiologist[1]



BOR, n (%)	N=17 (all HPV associated tumors)	N-12 (all HPV-positive)
ORR	6 (35.3)[10]	5 (41.7)[10]
CR	2 (11.8)[9]	1 (8.3)
PR	4 (23.5)[10]	4 (33.3)[10]
SD	4 (23.5)	1 (8.3)
PD	7 (41.2)	6 (50.0)
DCR	10 (58.8)[10]	7 (50.0)[10]

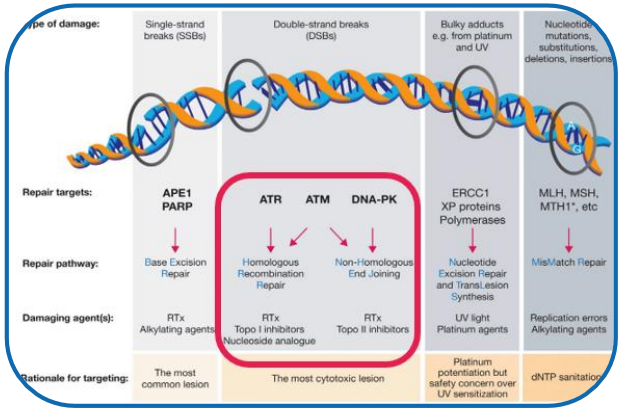
(1) J.L. Gulley et al, ASCO, Jun 2018 (presentation) | (2) De Vuyst et al. Int J Cancer. 2009;124:1626–36 | (3) Ihloff et al. Oral Oncol. 2010;46:705–11 | (4) Mehanna et al. Head Neck. 2013;35:747–55 | (5) Bauml et al. J Clin Oncol. 2015;33 (suppl; abstr TPS3094) | (6) Ferris et al. N Engl J Med. 2016;375(19):1856 | (7) Frenel et al. J Clin Oncol. 2017;35(36):4035 | (8) Ott et al. Ann Oncol. 2017;28(5):1036 | (9) 1 patient had a confirmed BOR or PR and an unconfirmed BOR of CR (10) 1 PR did not meet the RECIST criteria

DNA damage response (DDR)
Complete portfolio supporting leadership in a potentially disruptive class



Genomic instability: a hallmark of late stage cancers[1]

- 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")



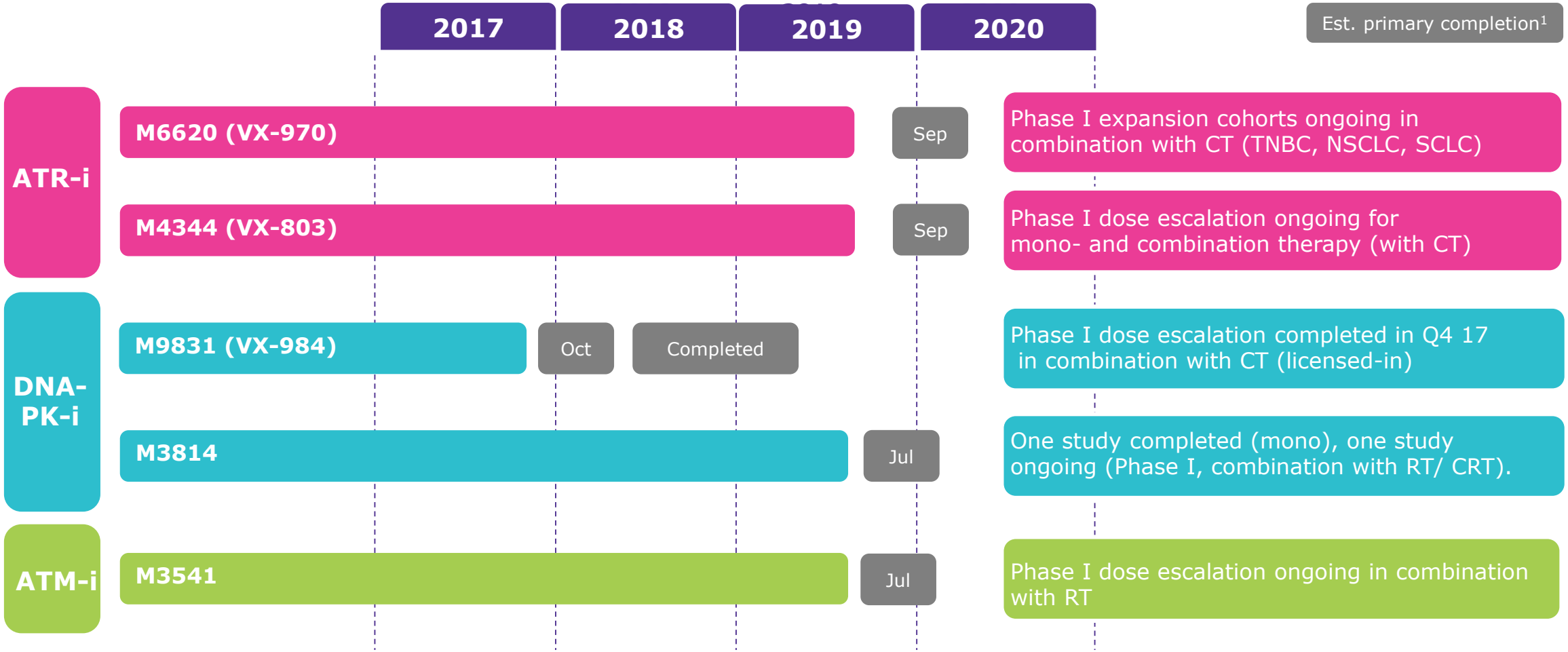
Amplifying cytotoxic effects of conventional and novel cancer treatments potentially bears combination potential

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 |

DNA damage response (DDR)

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



[1] Estimated primary completion date acccording to Clinicaltrials.gov as of July 27, 2018

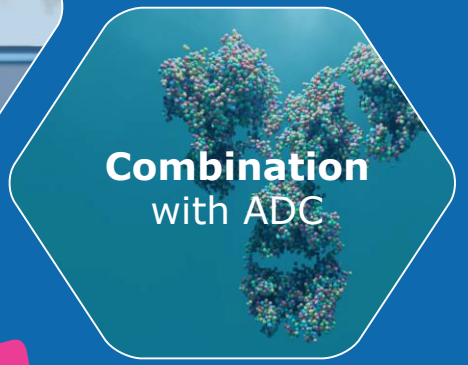
Acronyms: ATM: ataxia-telangiectasia mutated | ATR: ataxia telangiectasia and Rad3 | DNA-PK: DNA-dependent protein kinase | CT: Chemotherapy | RT: Radiotherapy | CRT: chemoradiotherapy | NSCLC: non-small cell lung cancer | SCLC: small cell lung cancer | TNBC: triple negative breast cancer | Note: timelines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

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**



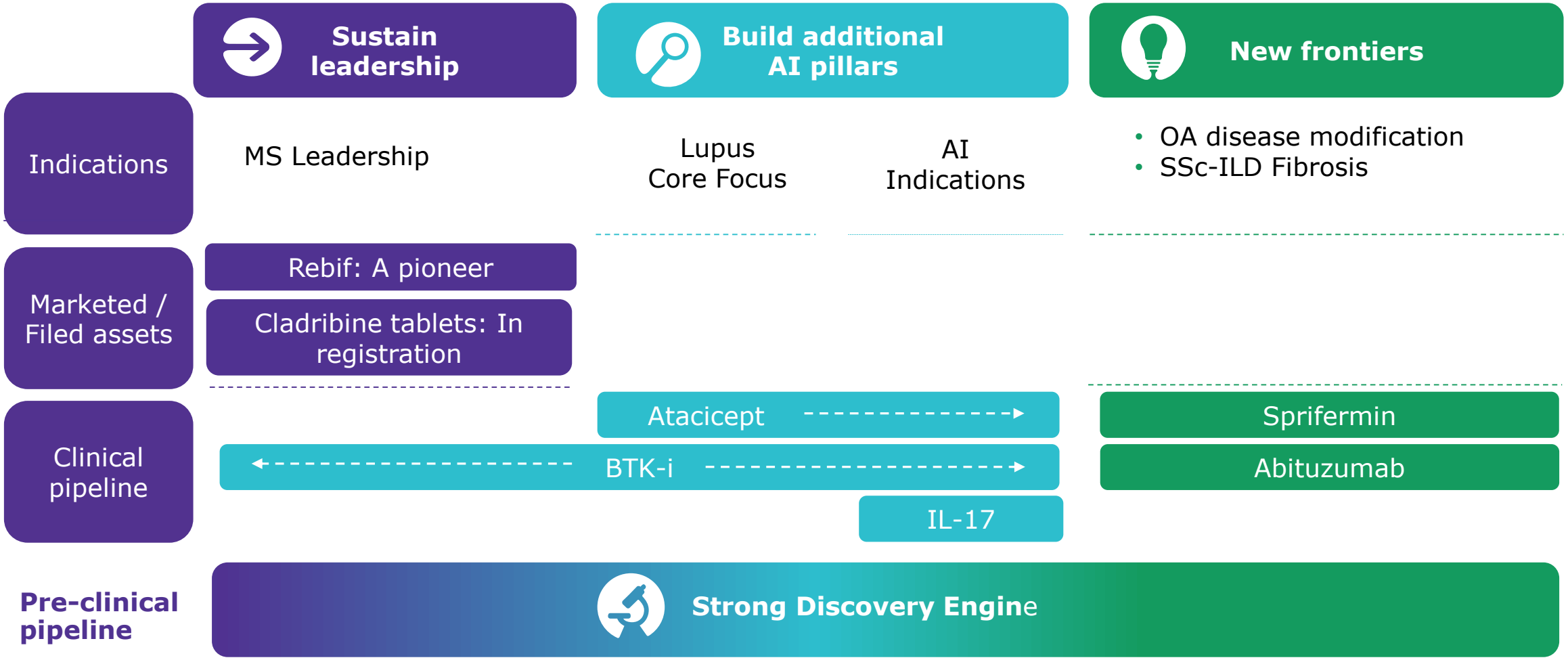
DNA-PK

ATM

ATR

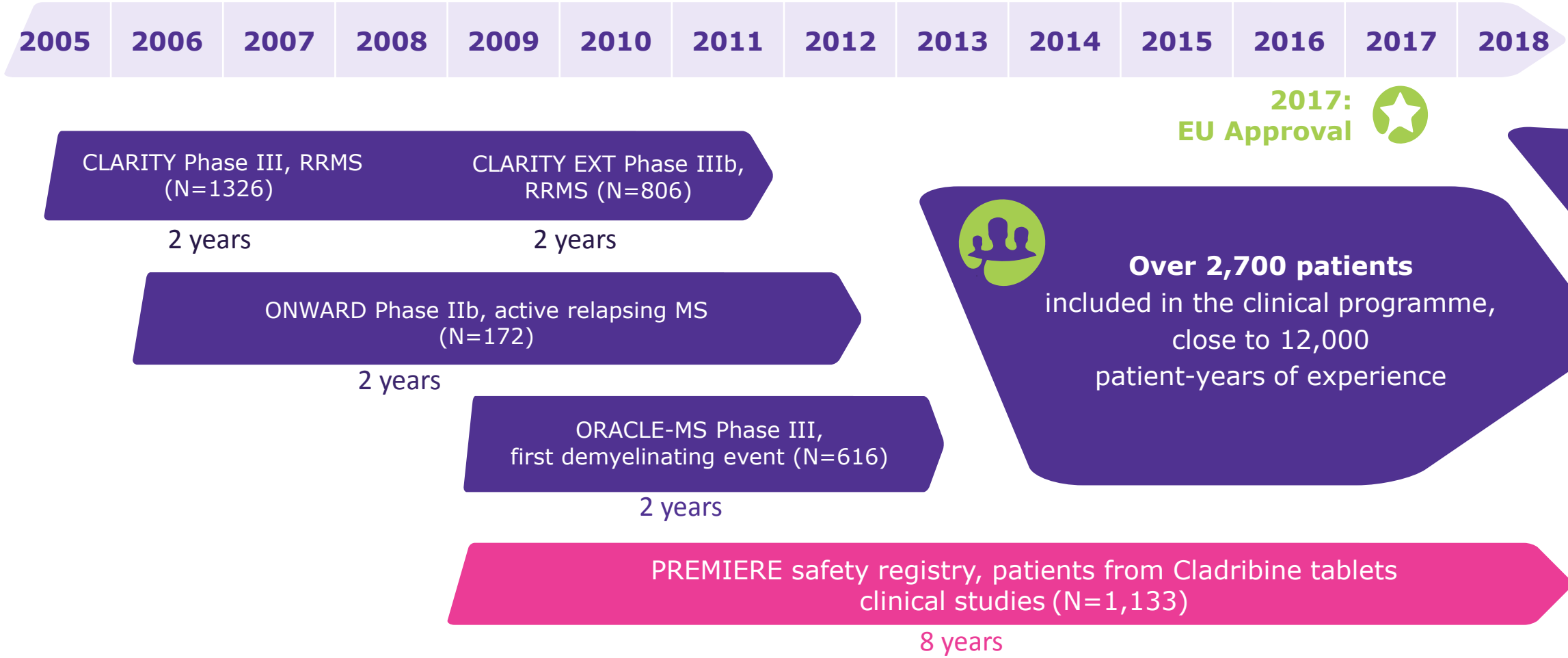
2.3 HEALTHCARE
Immunology

Immunology
Strategy is anchored on leadership in selected disease areas



Immunology

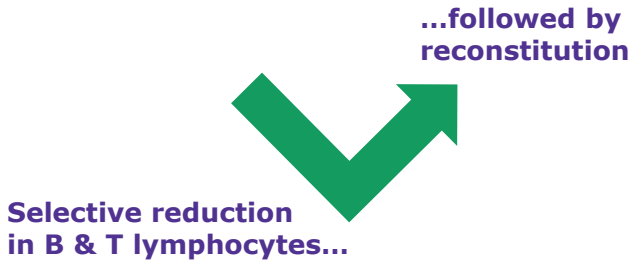
Cladribine tablets supported by close to 12,000 patient years of experience and up to 10 years of safety data

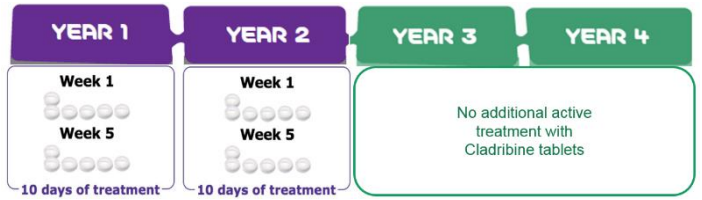


CLARITY: Giovannoni G et al. N Engl J Med 2010;362:416–26; CLARITY EXT: Giovannoni G et al. AAN 2016 [P3.028]; ONWARD: Montalban X et al. AAN; 2016 [P3.029]; ORACLE-MS: Leist TP et al. Lancet Neurol 2014;13:257–67; PREMIERE registry (NCT01013350) [clinicaltrials.gov]

Immunology
Cladribine tablets could change the MS treatment paradigm

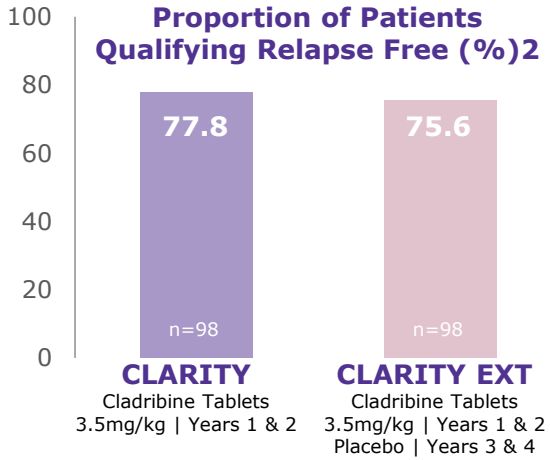
Selective immune reconstitution therapy (SIRT)[1]





Unique posology: max. 20 days of oral treatment[3]

4 years disease control with treatment over 2 years[2]



Low monitoring requirements[4]

[1] Giovannoni G. Neurotherapeutics 2017; Nov 22 [Epub ahead of print] | Wiendl H et al. Neurology 2017;89:1098–100 | Weindl 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

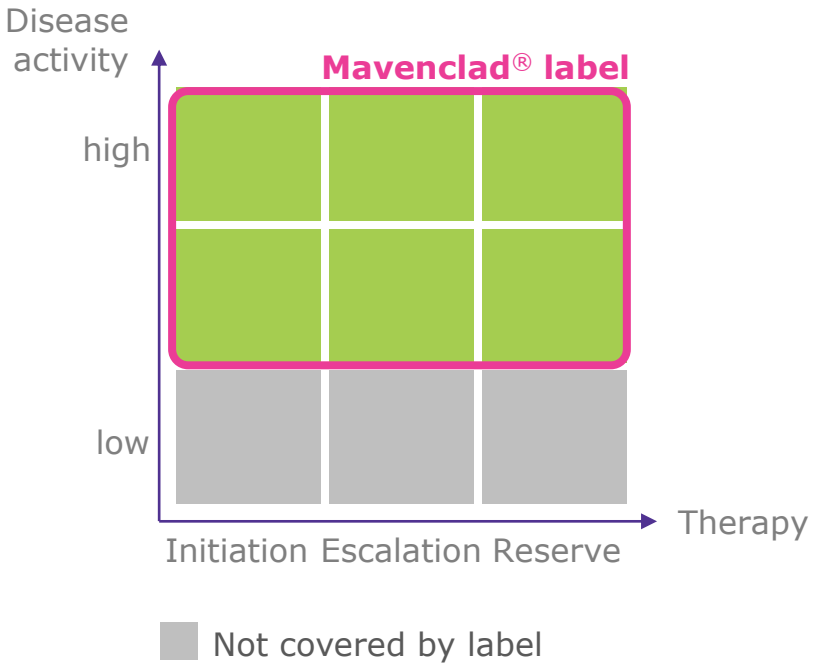
Merck KGaA
Darmstadt, Germany

Immunology

Mavenclad's attractive label[1] in Europe supports integrated franchise strategy

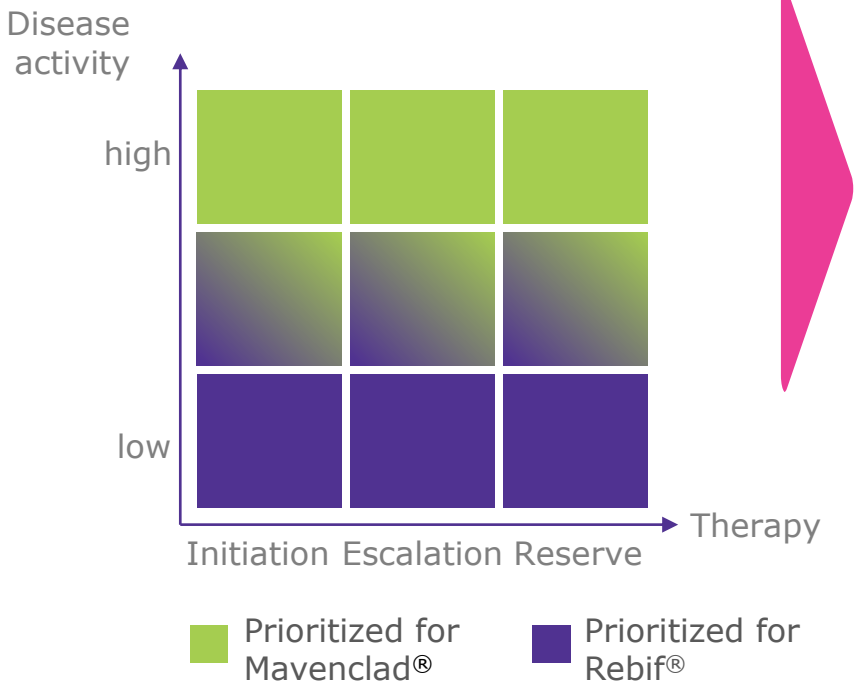
Mavenclad® label covers 60-70% of patients with RRMS[2] within the MS[1] patient population in Europe

MS patient population[3]



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

RRMS patients, EU-5[4]



Integrated franchise strategy

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

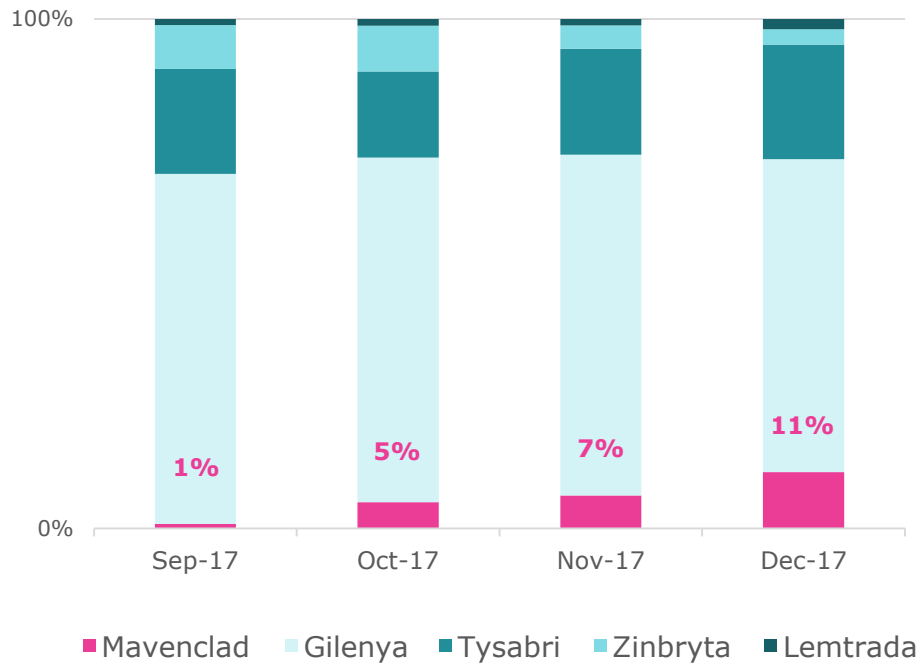
[1]Mavenclad® label covers: RRMS+rSPMS+rPPMS; [2]Abbreviations: RRMS relapsing-remitting multiple sclerosis, MS = multiple sclerosis, rSPMS = replapsing secondary progressive MS, rPPMS = relapsing primary progressive multiple sclerosis; [3]Source: Merck KGaA, Darmstadt, Germany ; [4]Source: Merck KGaA,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

Merck KGaA
Darmstadt, Germany

Immunology

Early commercial performance in Europe demonstrates Mavenclad's ability to deliver innovation

Gaining market share in HE dynamic segment (Germany)[1]



Targeting high double-digit €m sales in 2018

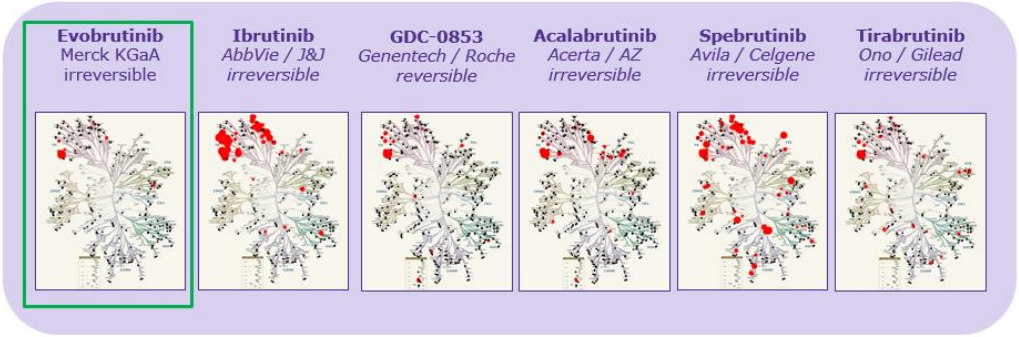
- **Germany:** continuously rising patient numbers
- **UK:** positive NICE recommendation; together with healthcare authorities secured immediate access and funding for patients
- Lowest-cost high-efficacy agent in multiple sclerosis
- Further submissions in planning
- **US:** Acceptance of NDA for cladribine tablets by the US FDA announced on July 30 2018

expected peak sales ~€500 – 700 M in EU

[1]Source: IQVIA LRx data ("High efficacy dynamic segment" defined as "Naïve or switch patients who are starting one of the mentioned high efficacy therapies during the month.").

Evobrutinib
Highly selective BTK-i to be explored as chronic therapy

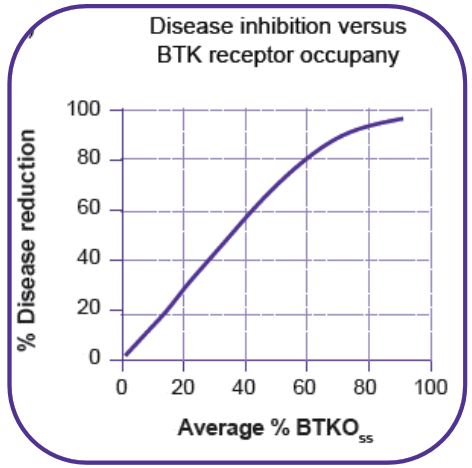
Safety: Promising kinase selectivity minimizing off-target effects[1]



- 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 models[1]

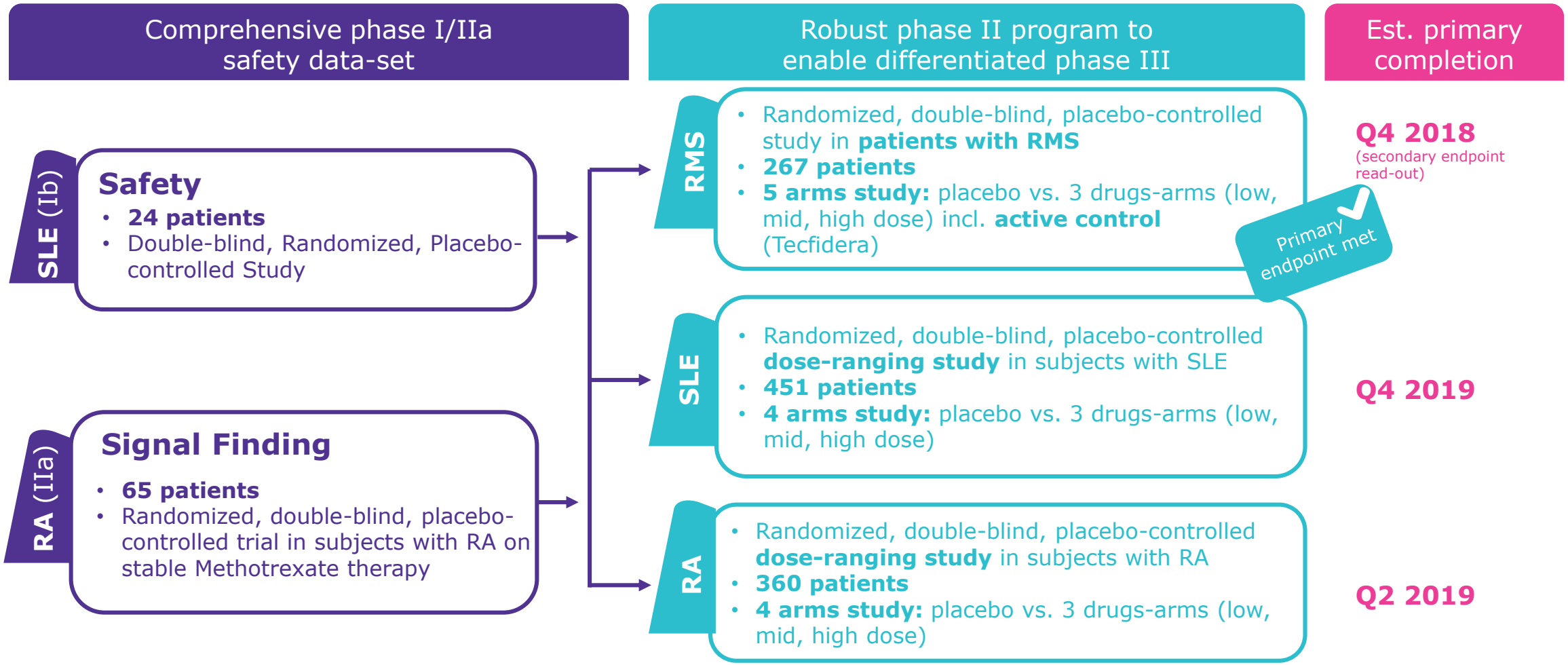
- Evobrutinib (irreversible antagonist) inhibiting signal transduction until protein is naturally degraded (no B-cell depletion)
- Occupancy/efficacy correlation: average BTK occupancy of >80% correlated with near complete inhibition of disease activity[1]
- Clinical benefit of addressing B cell biology 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)



[1] "Pharmacodynamic Modelling of BTK Occupancy versus Efficacy in RA and SLE Models Using the Novel Specific BTK Inhibitor M2951" Abstract #4342; EULAR 2016

Evobrutinib

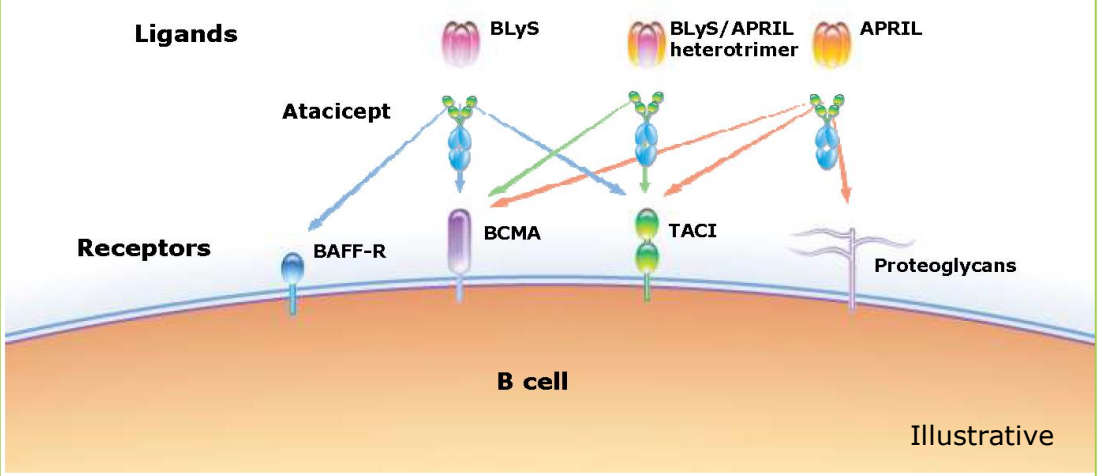
Comprehensive development plan across immune-mediated diseases



Atacicept

Predefined subpopulation with high disease activity demonstrated statistically significant treatment effects

Mode of Action[1]



- Binds to receptors of two cytokines regulating maturation, function, and survival of B cells (B-lymphocyte stimulator (BLyS) & a proliferation-inducing ligand (APRIL))

Study Outcomes and Next Steps

- **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

[1] Dillon S, et al. Arthritis Res Ther. 2010. Dillion SR et al, Nature reviews, Drug Discovery, March 2006; timelines are event-driven and may change and graphics are only illustrative

2.4 HEALTHCARE

Outlook

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

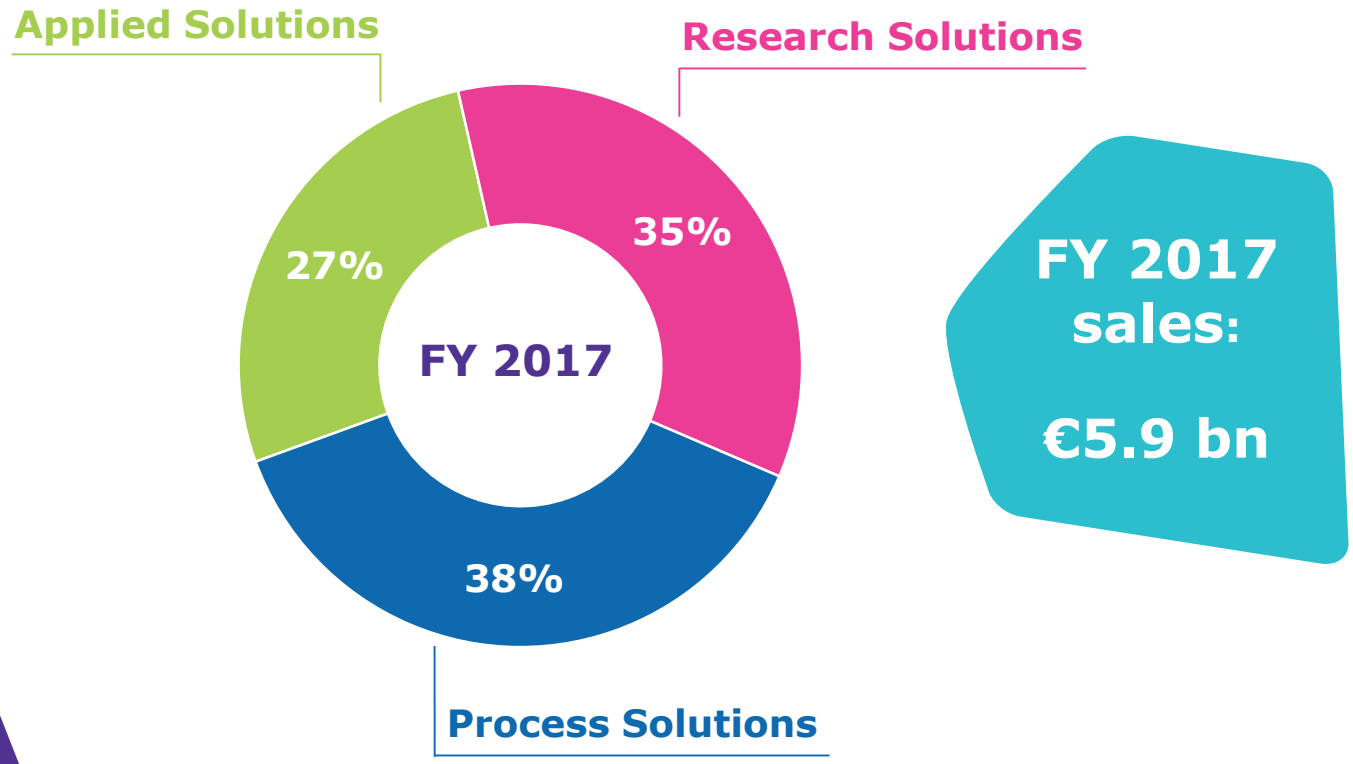
innovative partnerships → Joint investments and innovative deal models to maximize potential of assets and maintain focus

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

03 LIFE SCIENCE

A balanced portfolio and geographic presence

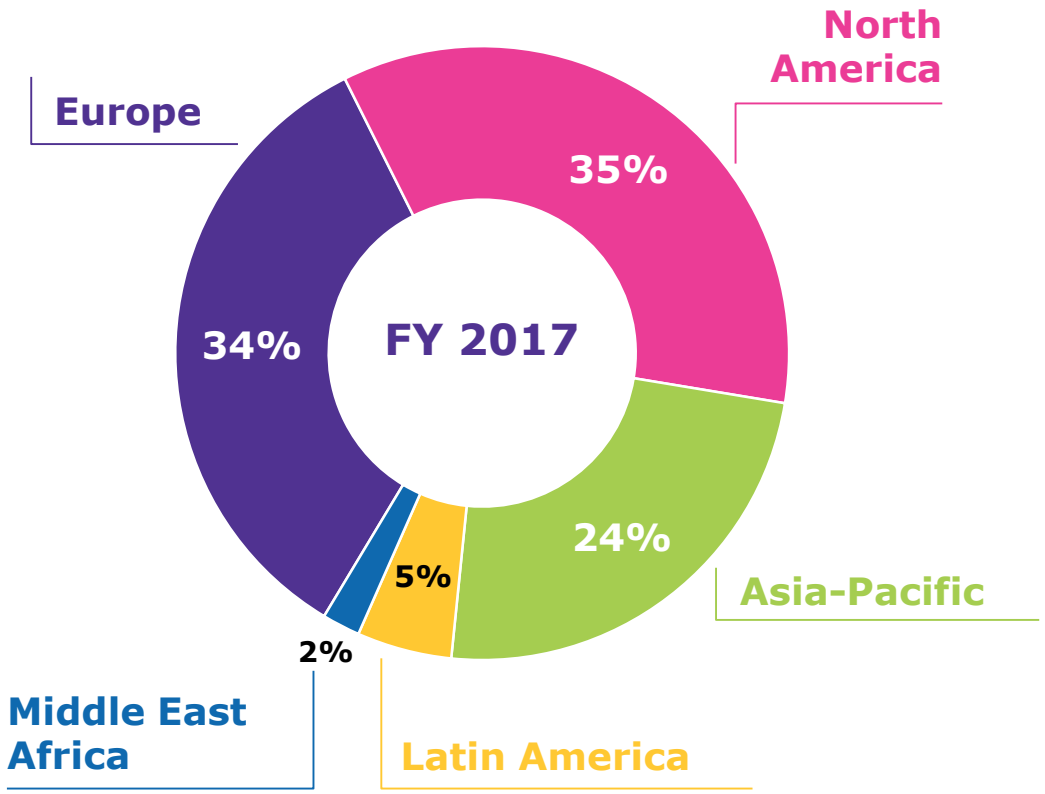
Sales by business unit



FY 2017 sales:

€5.9 bn

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

Research Solutions

Robust E-commerce capability

customer experience

Hundreds of thousands of products

SEARCH

Articles, protocols and peer reviewed papers

SCIENTIFIC CONTENT

Real-time pricing and availability

ORDER

IN 2017…

81% of visitors come from **search engines**

#1 with **>100 Million** unique visits*

>€1.5B sales

*Alexa report

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

Merck KGaA
Darmstadt, Germany

Innovation

Focus on strategic growth initiatives will secure long-term growth

Evolutionary

Developing offerings to further existing platforms

Breakthrough

Developing new platforms and product categories

	SINGLE-USE	END TO END	GENE EDITING & CELL THERAPY
Strategic initiative			
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

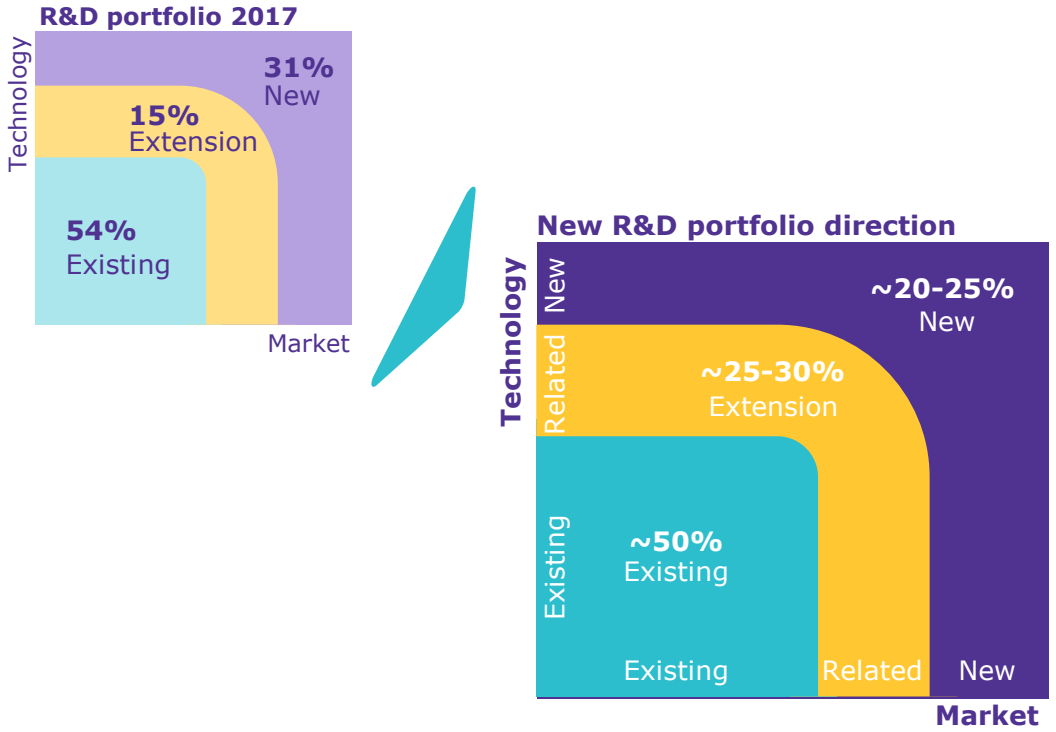
Performance Materials

New R&D approach addresses evolving end-market requirements

1 Central portfolio management

- Stage gated project assessment (go/no go)
- Central resource allocation
- End-market driven decision process
- New risk adjusted pipeline assessment approach

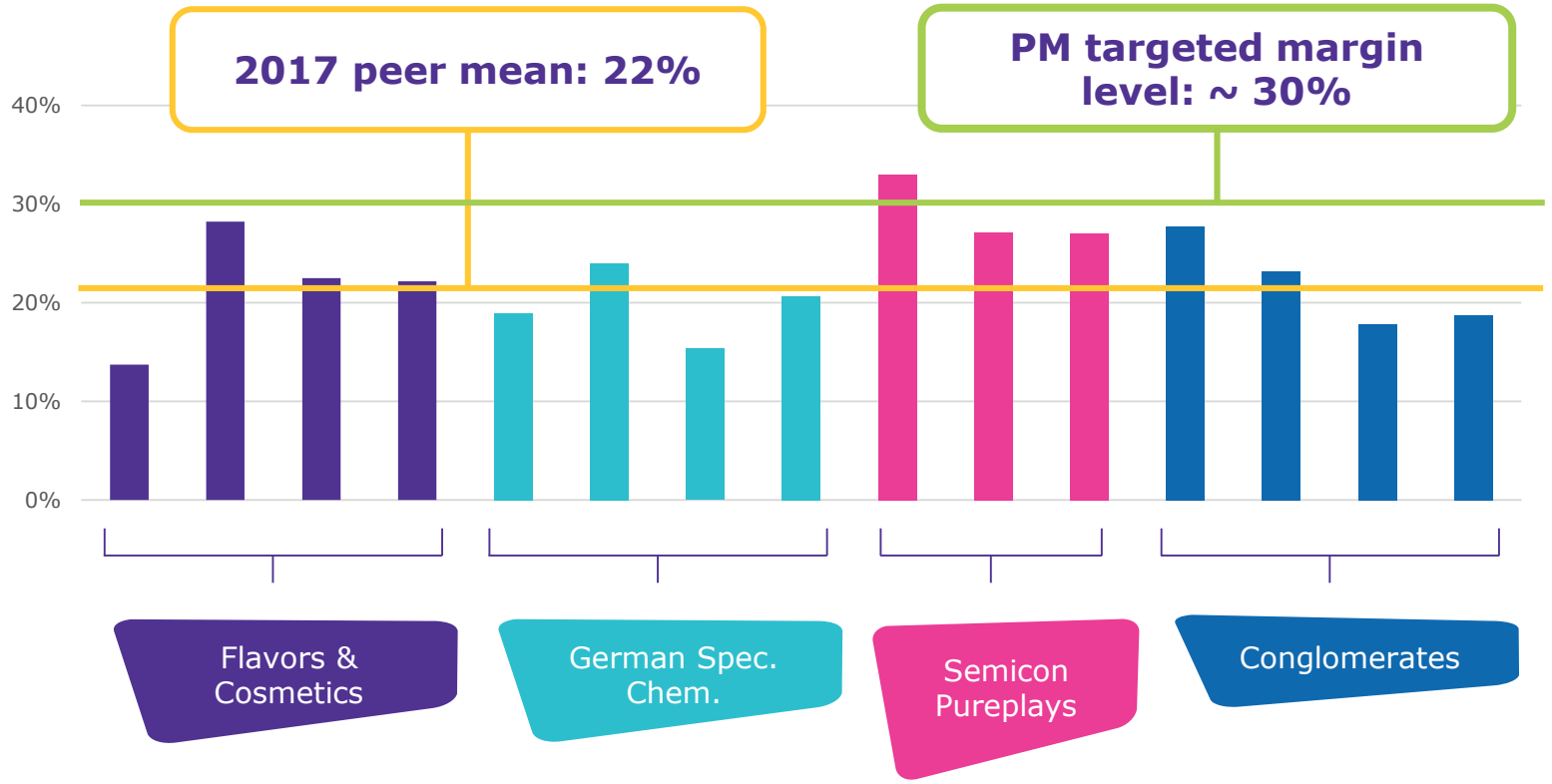
2 Adjusting R&D investments towards extensions



Improve reliability and transparency for external communication

Performance Materials
Margins significantly above industry average

2017 EBITDA margins of various peer groups



Peer benchmark

- Extraordinary situation of past years is adjusting
- Future profitability will remain very attractive compared to specialty chemicals
- Benchmarks well against several peer groups

Profitability will remain above specialty chemicals average

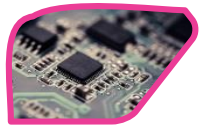
Semiconductor Solutions
Leading market positions in profitable niches supported by technology trends

Sales by end use

Product portfolio

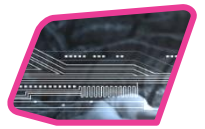

Lithography materials


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)

[1] 3rd party semiconductor production

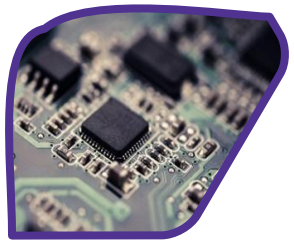
Semiconductor Solutions
Enabler of key technology trends

Lithography materials

Innovation focus: Enabling structures in nodes smaller than 14 nm

Dielectric materials

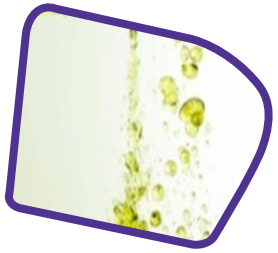
Enabling cost-efficient production of the newest memory generations



Conductive Pastes

Electrically conductive materials for use in the manufacture of advanced electronic devices

- **Smaller structures by materials enabling Moore's law**
- **Higher memory capacity, faster processing speed, less power consumption**
- **Improved yield and lower processing costs**

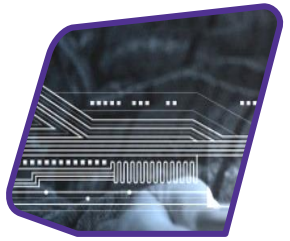


Process materials

Supporting the manufacturing process for all kinds of IC devices, e.g. IoT

Silica materials

Innovation focus: High removal rate in CMP without defects



Deposition Materials

Next Generation Deposition materials for ALD and CVD

Newest generation of smartphones

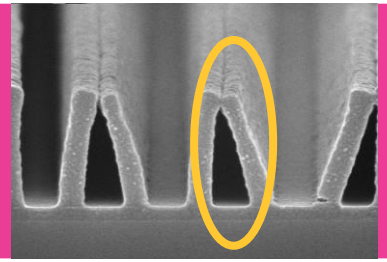
Servers enabling Big Data

Wearables and other devices for Internet of Things

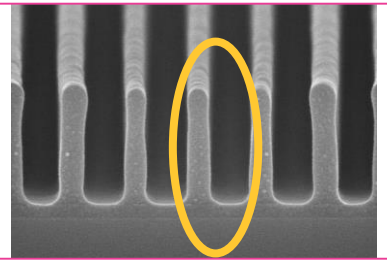
Semiconductor Solutions

Developing dedicated solutions for customer challenges, enabling cutting edge innovation

Pattern collapse

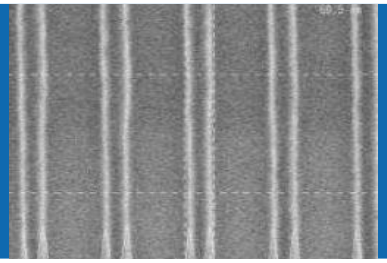


Firm® rinse materials

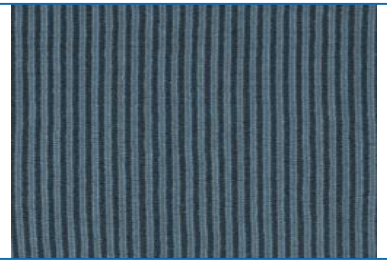


- As lines get narrower and closer together in advanced chip generation, they tend to "stick" due to surface tension.

Lithography limitation

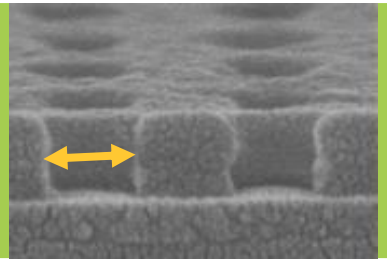


Directed self assembly (DSA)

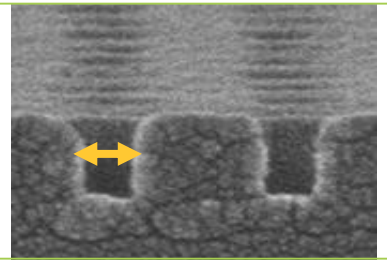


- Block Copolymer can generate small lines or contact holes by self-assembly. This allows miniaturization without expensive new equipment.

Wide features



Relacs® shrink materials



- Shrink materials "shrink" the gap between lines and, hence, allow the manufacture of narrower features otherwise not possible

Semiconductor Solutions

Overcoming technology barriers – supporting continued progression of technological mega 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

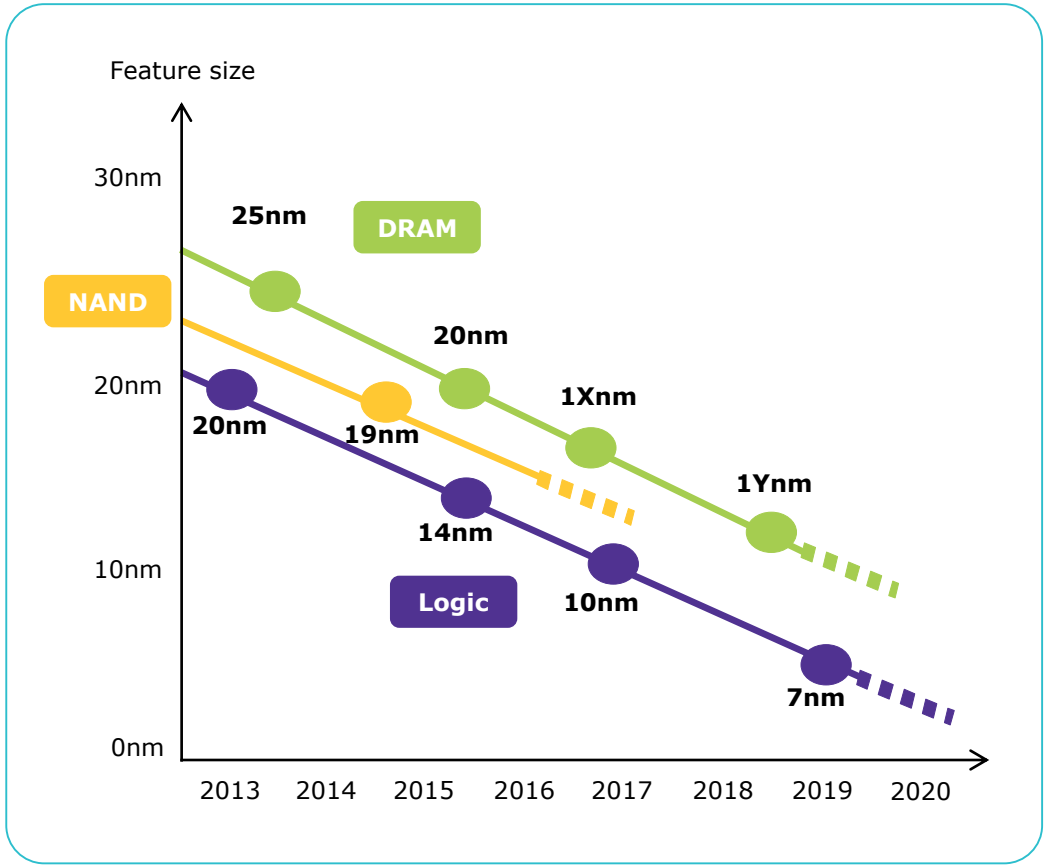
Internet of Things: Everything is continuously connected
- More gadgets and devices that include chips
- Increasing amount of communication and sensor chips

Big Data: Increasing need for intelligent data storage
- Switch from hard disk drives (HDD) to solid state drives (SSD)

Selected competitors

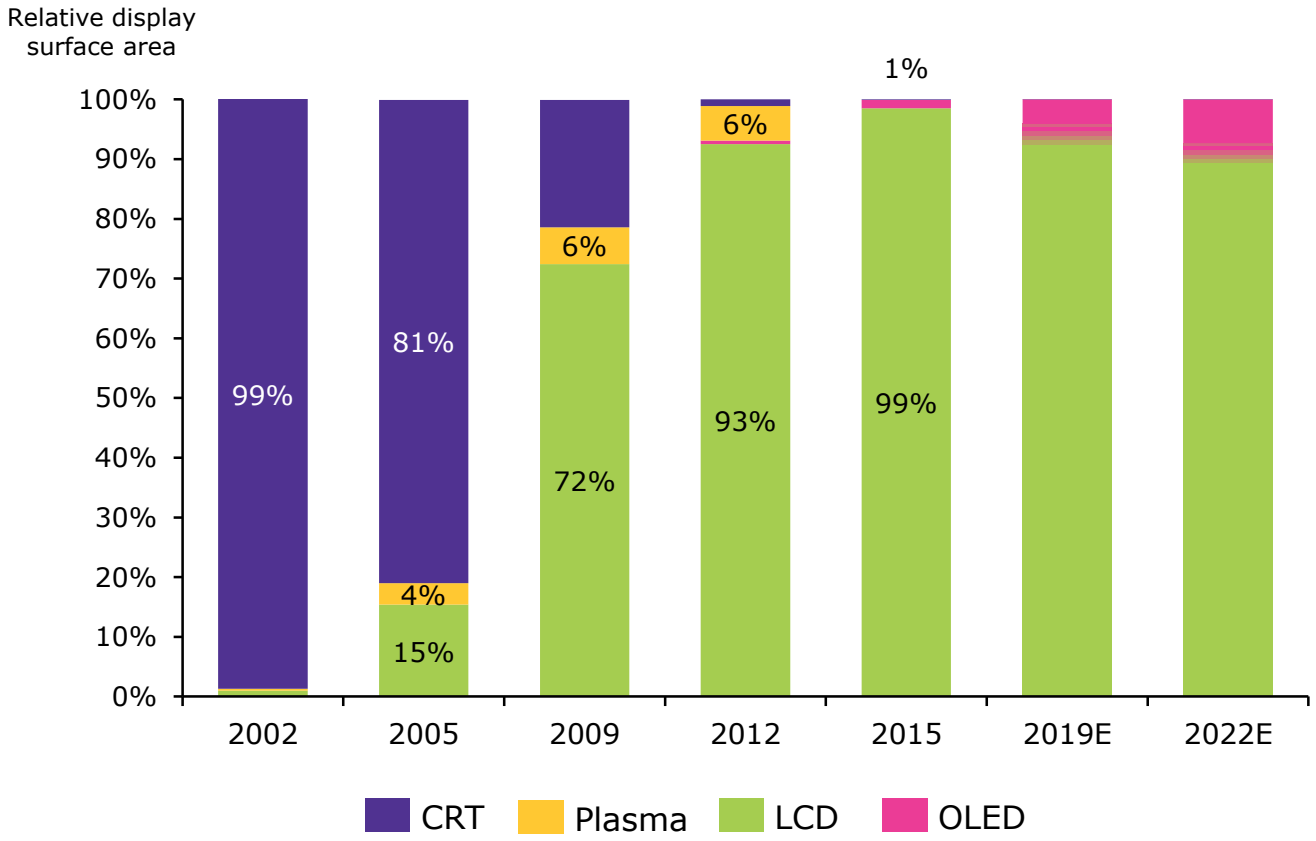
- Tokyo Ohka Kogyo
- Nissan Chemicals
- Dow Electronic Materials
- JSR

Feature sizes develop as predicted by Moore's law



Display Solutions
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 techno-logical and commercial entry barriers

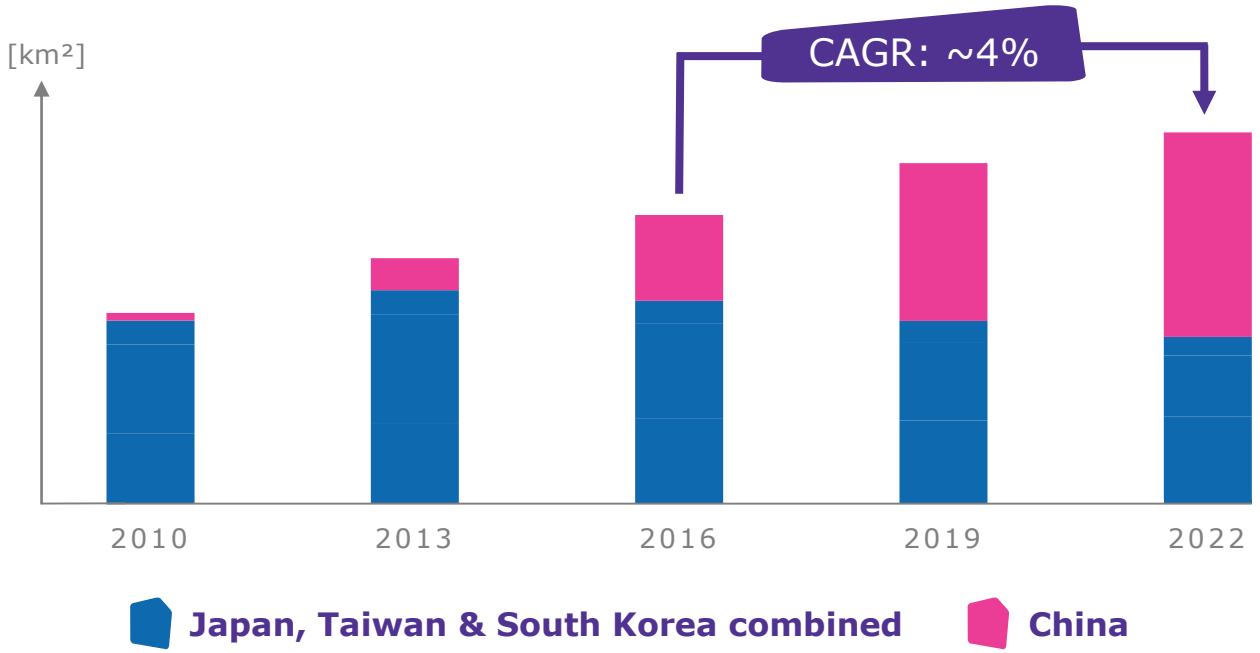
OLED share will increase in mobile applications

Source: IHS display long term demand forecast tracker Q4 '17

Display Solutions

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

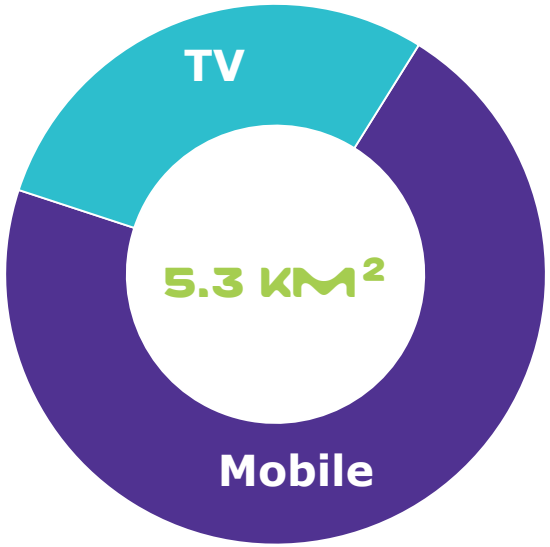
Source: IHS; Merck KGaA, Darmstadt, Germany estimates
*Capacity estimation based on 100% utilization and 100% yield

Display Solutions

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

*Merck KGaA, Darmstadt, Germany estimate

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

Market position

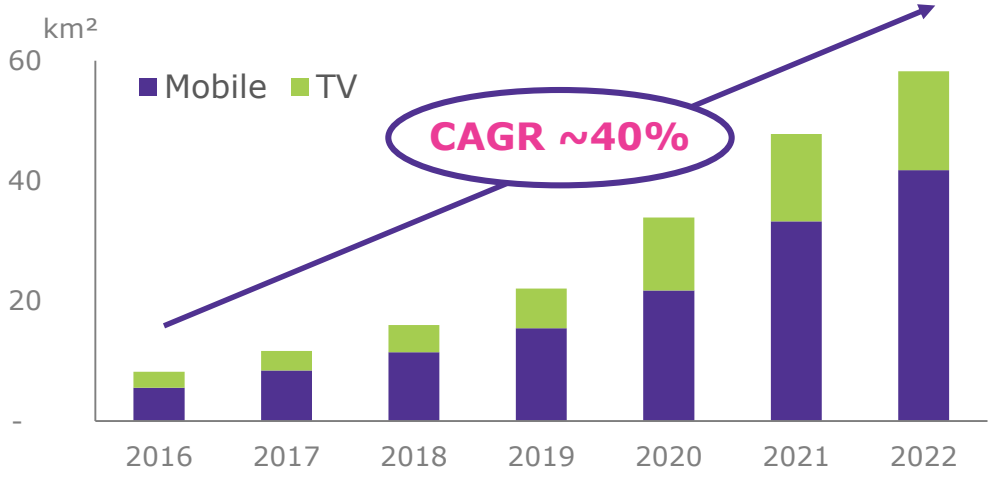
- Among top 3 OLED material provider
- Unrivaled experience and expertise in displays
- Long & intimate relationships with all display producers
- Recent capacity expansion to serve growing demand

our ambition

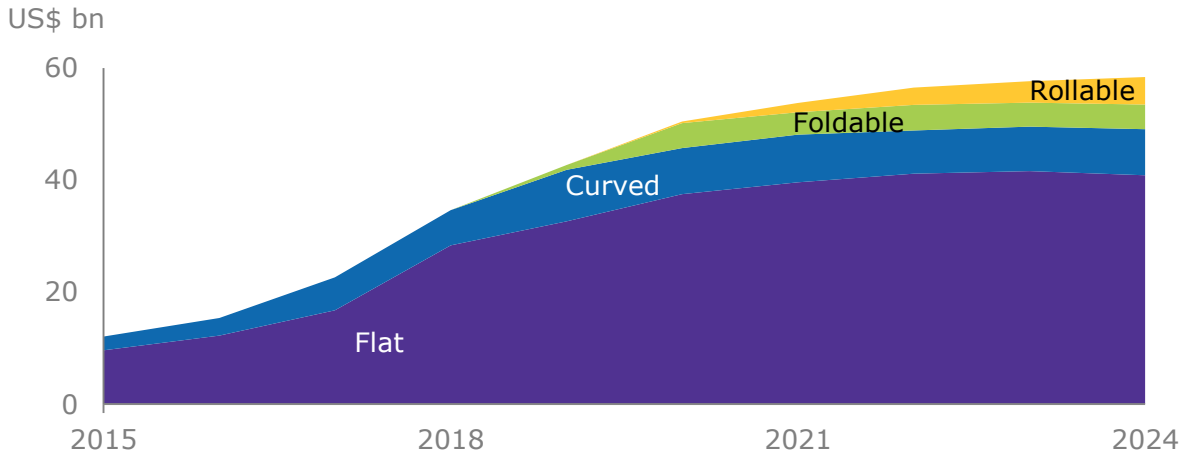
solution provider

- Expand into further stack layers
- Excellence in vapor materials
- In-house testing of materials
- Tailor-made solutions for customers

Announced OLED capacity expansion



OLED display market development

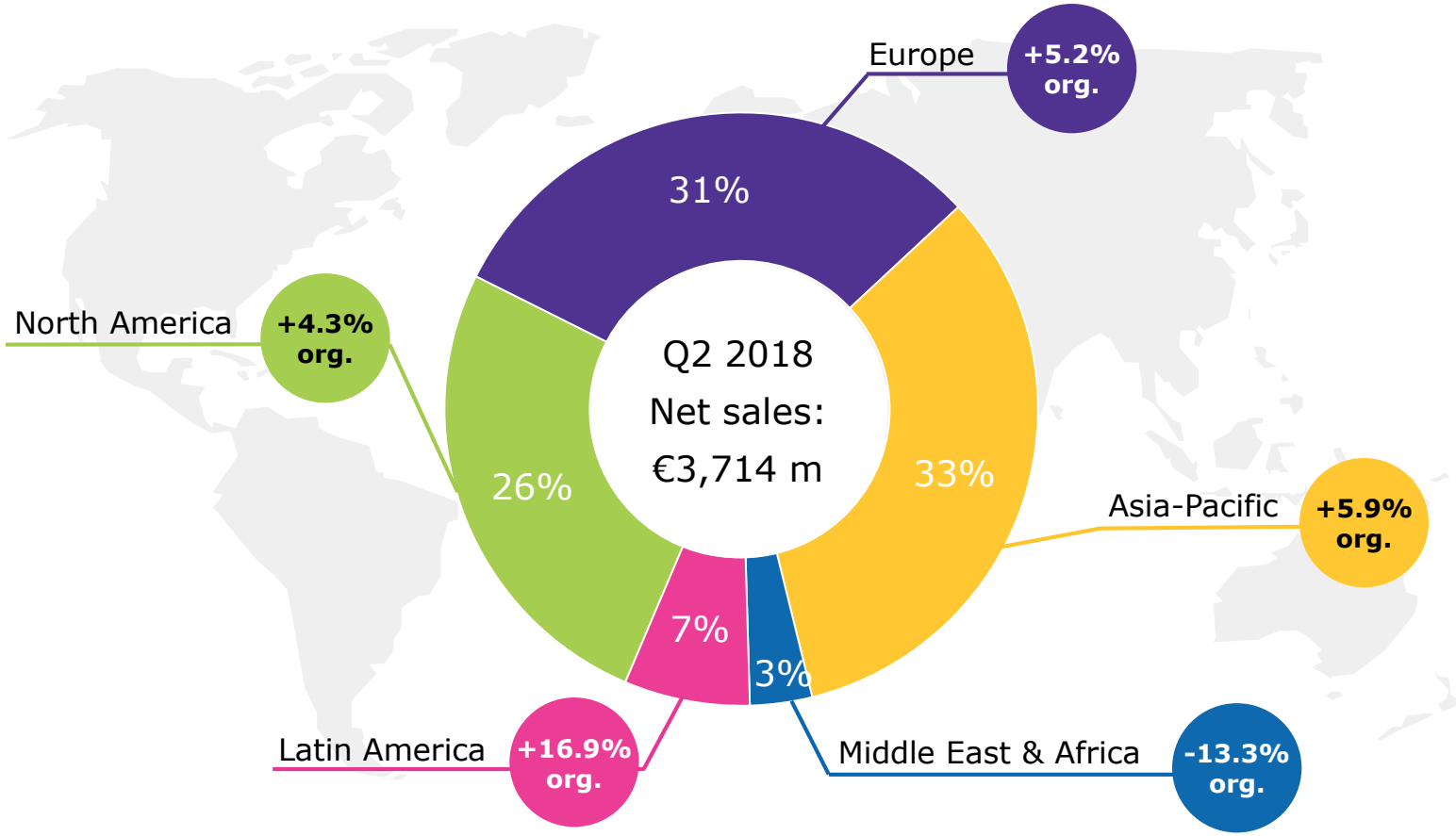


Source: IHS AMOLED and LCD supply demand equipment tracker Q1 '18;

05 FINANCIAL OVERVIEW

Organic growth driven by LATAM, APAC, Europe and North America

Regional breakdown of net sales [€ m]



Regional organic development

- Solid growth in Europe reflects Mavenclad ramp up, Fertility resilience, and solid demand in Life Science
- Solid growth in North America from Life Science; Bavencio and Fertility overcompensating declining Rebif
- Solid growth in APAC due to strong Life Science and Glucophage in China, Semiconductor outweighing LC decline
- Strong performance in LATAM across all major businesses
- MEA reflects flat LS, PM and decline in HC

Acronyms: MEA – Middle East & Africa; LATAM – Latin America

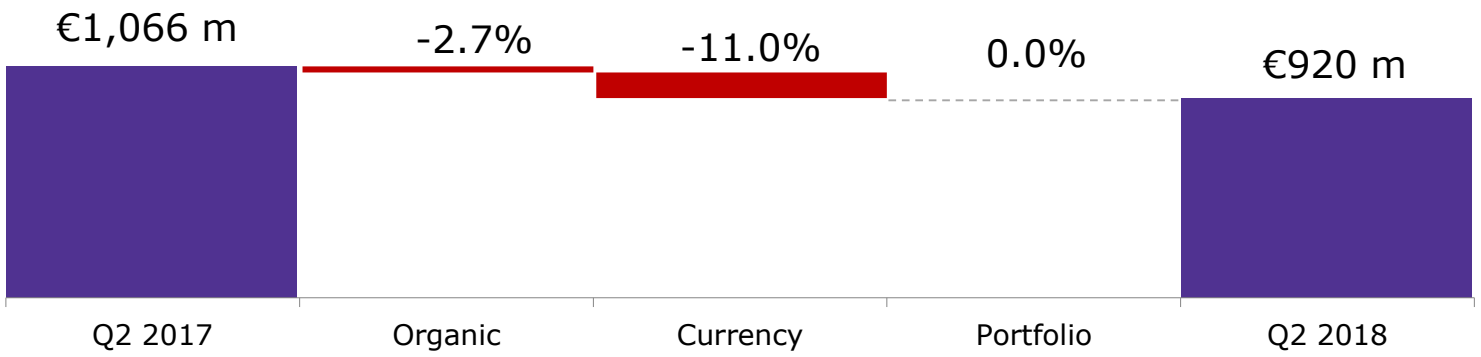
Strong organic growth in Life Science and Healthcare almost offset by FX

Q2 2018 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	4.7%	-4.9%	0.0%	**-0.2%**
Life Science	7.7%	-4.6%	0.0%	**3.2%**
Performance Materials	0.4%	-4.6%	0.0%	**-4.2%**
Group	5.2%	-4.7%	0.0%	**0.5%**

- Healthcare driven by solid growth of core business and increasing contribution from Mavenclad and Bavencio launches
- Life Science's above-market growth driven by all business segments
- Flat Performance Materials due to growth of Semiconductor, compensating declining Display

Q2 YoY EBITDA pre



- Organic decline of EBITDA pre explained by Healthcare's LY one time effect, higher launch and R&D investments and PM business mix
- Currency effects mainly related to EUR/USD development

Totals may not add up due to rounding

Q2 2018: Overview

Key figures

[€m]	Q2 2017	Q2 2018	Δ
Net sales	3,695	**3,714**	0.5%
EBITDA pre *Margin (in % of net sales)*	1,066 *28.9%*	**920** *24.8%*	-13.7%
EPS pre	1.51	**1.23**	-18.5%
Operating cash flow	520	**367**	-29.3%

[€m]	Dec. 31, 2017	June 30, 2018	Δ
Net financial debt	10,144	**10,674**	5.2%
Working capital	3,387	**3,677**	8.5%
Employees*	52,941	**54,009**	2.0%

Comments

- EBITDA pre & margin reduction mainly driven by LY milestone in Healthcare and ongoing LC decline
- Lower EPS pre driven by EBITDA pre decline
- Operating cash flow impacted by higher working capital
- Net financial debt increase reflects lower operating cash flow amid dividend payment
- Working capital reflects organic sales growth

*Thereof CH Headcount ~3.400;
Totals may not add up due to rounding

Healthcare: Solid organic performance offsets FX headwinds; Profitability burdened by LY's favorable one-time effect

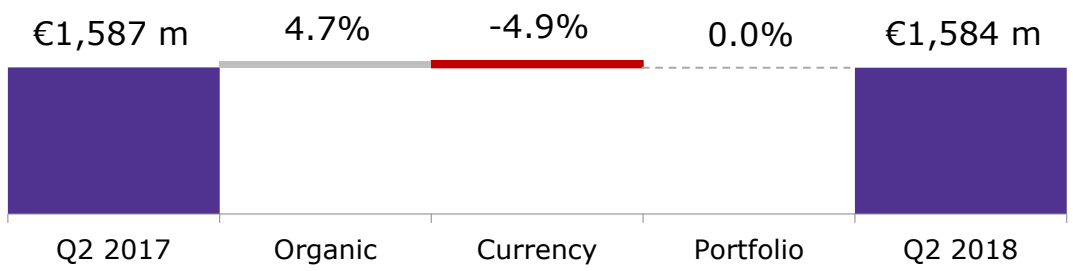
Healthcare P&L

[€m]	Q2 2017	Q2 2018
Net sales	1,587	**1,584**
Marketing and selling	-617	**-592**
Administration	-70	**-79**
Research and development	-381	**-407**
EBIT	326	**155**
EBITDA	439	**338**
EBITDA pre	450	**379**
Margin (in % of net sales)	*28.4%*	***23.9%***

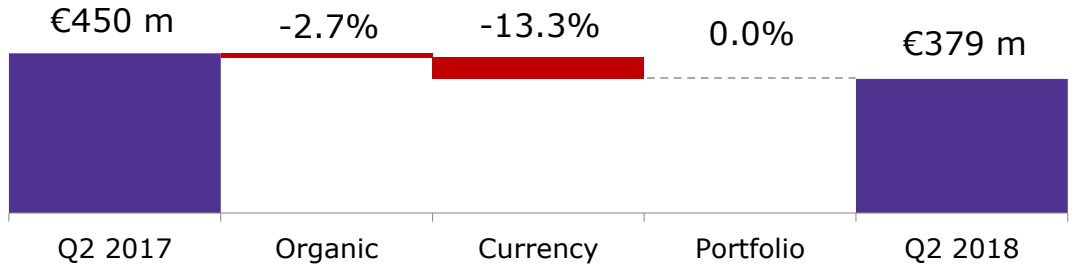
Comments

- Organic growth supported by strong Fertility, Glucophage (China) as well as Mavenclad and Bavencio launches
- Erbitux facing ongoing competition and price pressure in major markets
- Rebif showing stable market share in Interferons in North America, growing competition in Europe
- Lower M&S mainly due to favorable FX; higher M&S for Mavenclad and Bavencio offset by lower investment in declining products
- R&D investment picking up, expected further ramp-up in H2
- EBITDA pre reflects FX headwinds and higher investments; LY EBITDA pre contained Bavencio milestone payment (+ €36 m)

Net sales bridge



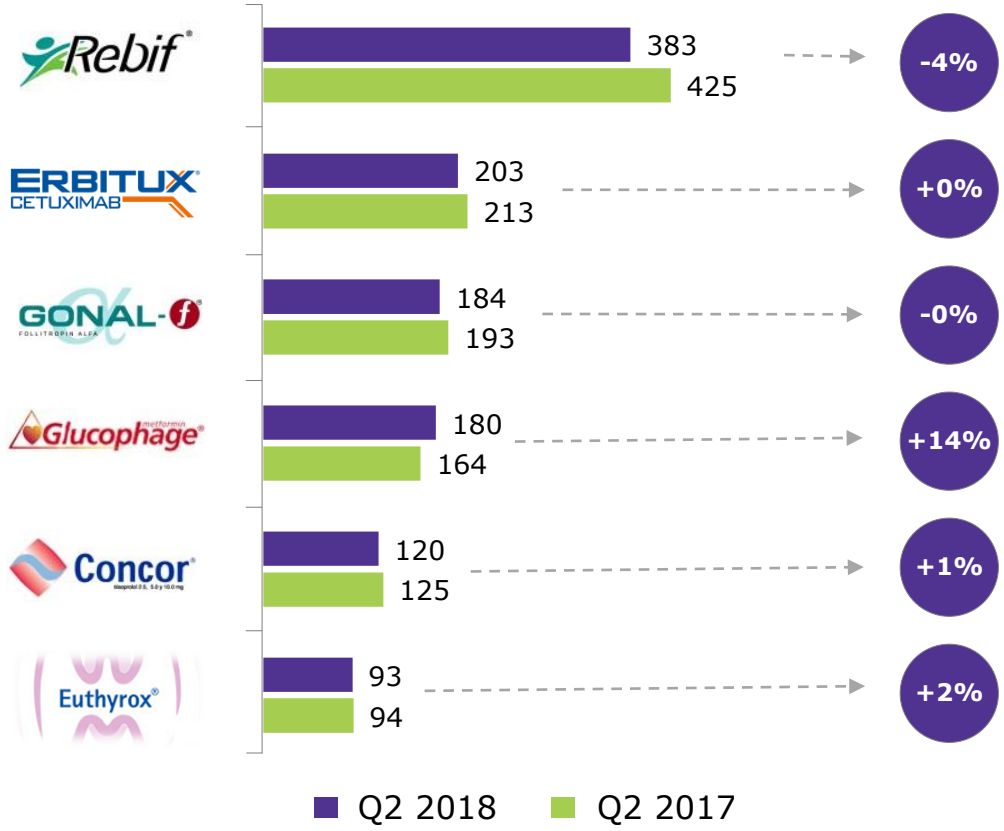
EBITDA pre bridge



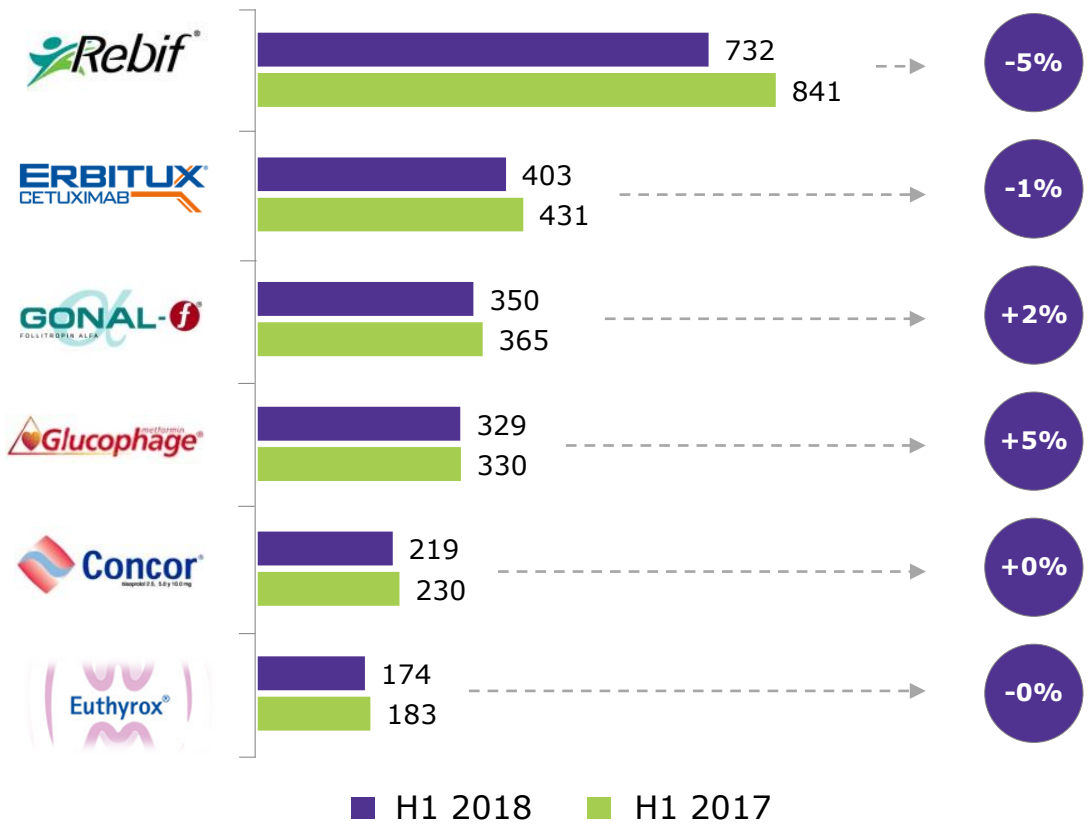
Totals may not add up due to rounding

Healthcare organic growth by franchise/product

Q2 2018 organic sales growth [%] by key product [€ m]



H1 2018 organic sales growth [%] by key product [€ m]

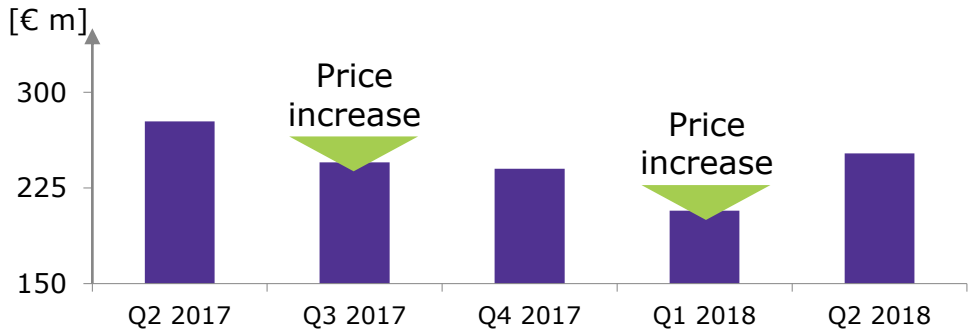


Totals may not add up due to rounding

Rebif: Ongoing decline in line with interferon market

Rebif sales evolution

North America



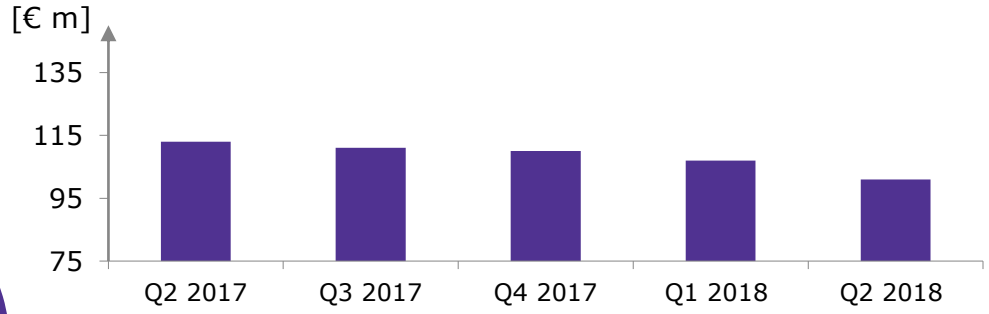
Trend

Q2 drivers

-2.5% org.

- Price
- Volume
- FX

Europe



Trend

Q2 drivers

-9.7% org.

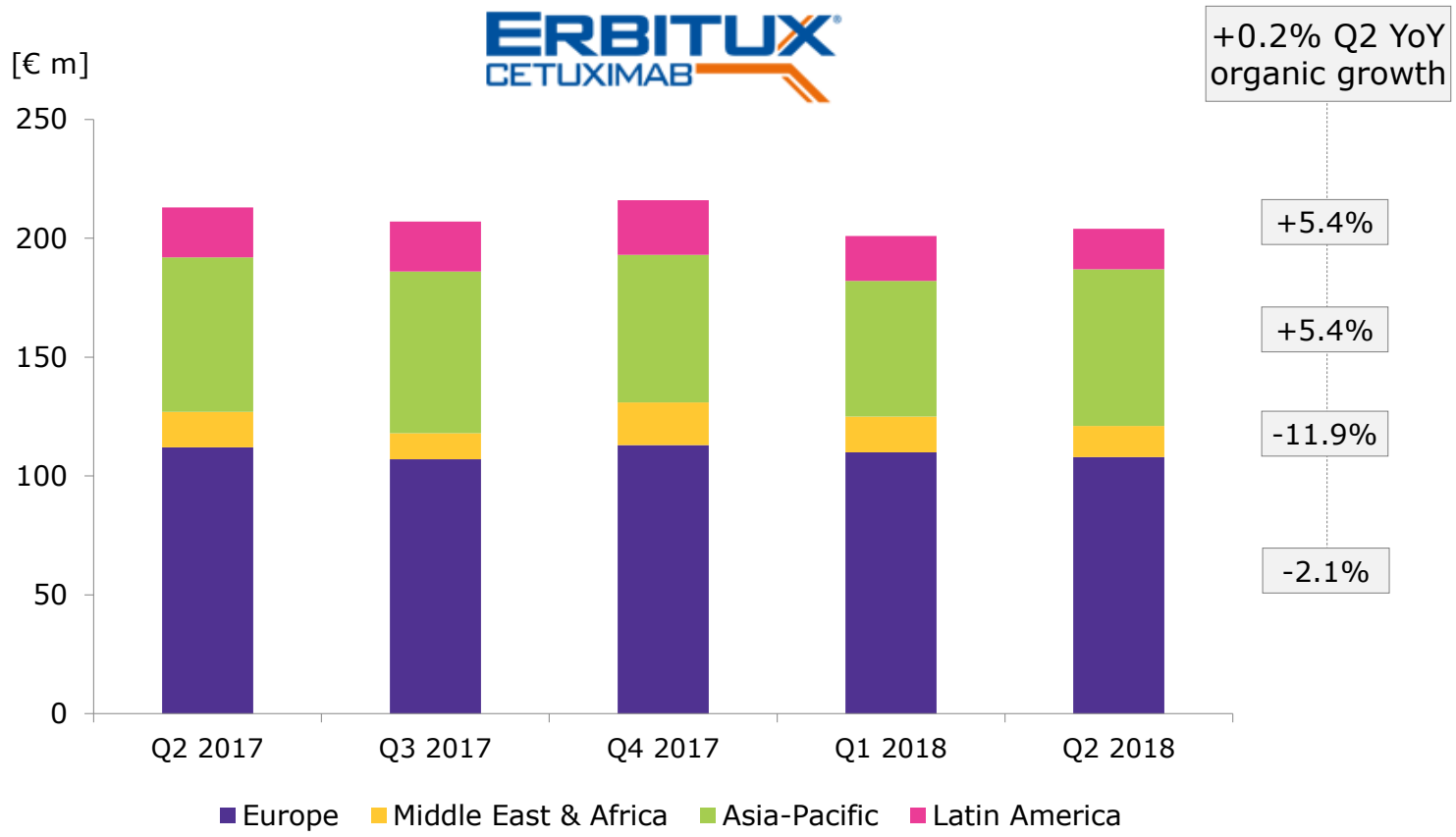
- Price
- Volume
- FX

Q2 2018 Rebif performance

- Rebif sales of €383 m in Q2 2018 reflect organic decline of 4.2% and negative FX effect of -5.7%
- Market shares within interferons stable due to high retention rates and known long-term track record
- Ongoing organic decline in Europe driven by competitive environment incl. competition from orals

Erbitux: A challenging market environment

Erbitux sales by region



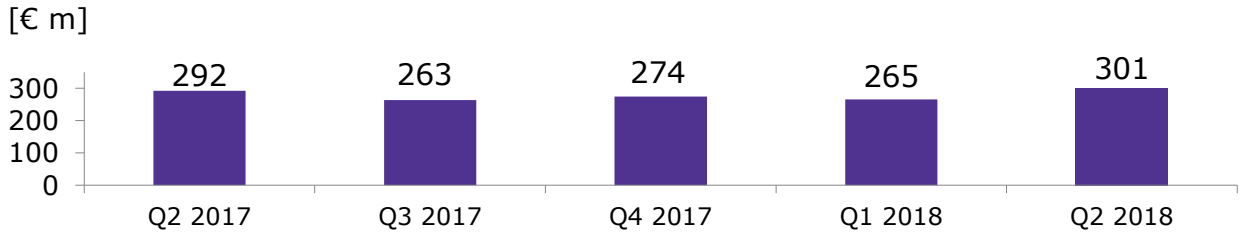
Q2 2018 Erbitux performance

- Sales organically about stable, absolute decrease to €203 m due to FX headwinds mainly from LATAM and APAC
- Europe impacted by competition, price reductions and shrinking market size due to increasing immuno-oncology trials
- APAC with solid organic growth especially in Japan, last year impacted by inventory destocking
- LATAM solid, while MEA affected by tender phasing from Q1 2018

Solid organic growth of Fertility, General Medicine and Endocrinology

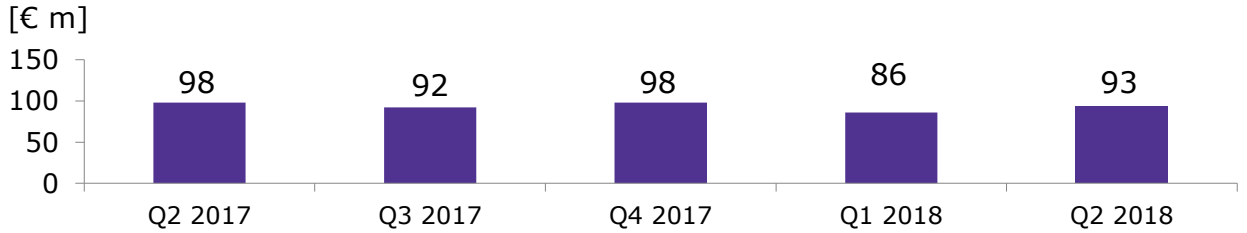
Sales evolution

Fertility



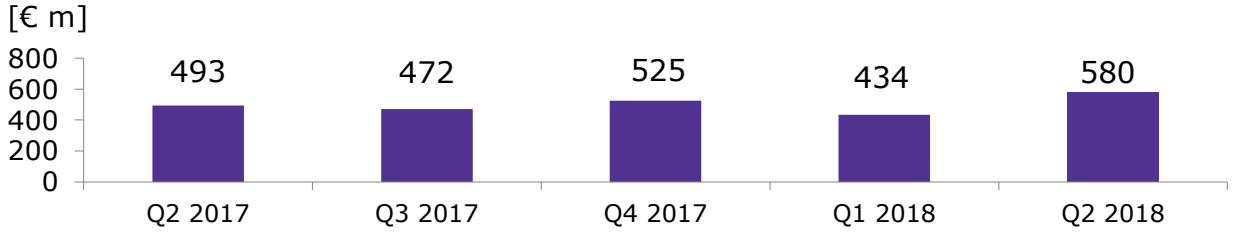
Organic
+8.0% org.

Endocrinology



Organic
2.0% org.

General Medicine*



Organic
2.9% org.

Q2 2018 organic drivers

- Fertility with strong growth across all major regions, especially in Europe, North America and APAC
- Gonal-f shows slight growth, supported by increasing demand in North America and China, mitigated by competition from biosimilars in the EU
- Rest of Fertility portfolio shows further increases, especially in China and Europe
- General Medicine reflects solid growth of Glucophage (China)
- Endocrinology posts slight growth driven by organic growth in major markets, mitigated by lower demand in U.S.

*includes "CardioMetabolic Care & General Medicine and Others

Life Science: Strong organic sales growth across all businesses, profitability reflects phasing and unfavorable one-time effects

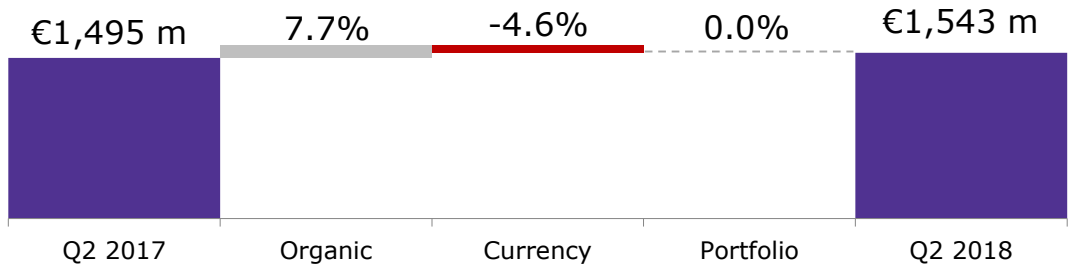
Life Science P&L

[€m]	Q2 2017	Q2 2018
Net sales	1,495	**1,543**
Marketing and selling	-443	**-451**
Administration	-65	**-60**
Research and development	-67	**-61**
EBIT	221	**254**
EBITDA	411	**442**
EBITDA pre	454	**452**
Margin (in % of net sales)	*30.4%*	***29.3%***

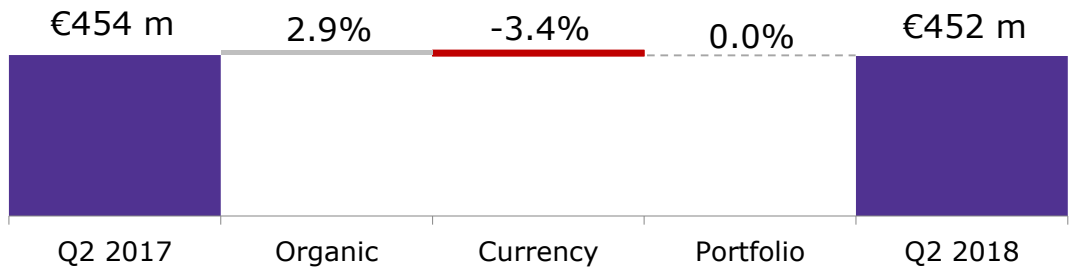
Comments

- Double-digit growth of Process Solutions driven by all major businesses, especially strong demand for single-use, cell culture media and filters
- Continued momentum in Applied Solutions with mid-single digit growth, reflecting solid demand for lab water and reference materials
- Solid organic growth of Research Solutions driven by all businesses across all regions, especially reagents and laboratory
- Profitability reflects unfavorable portfolio mix, one-time effects of startup costs on innovation projects and dissolving Sigma Aldrich regional operating model

Net sales bridge



EBITDA pre bridge



Totals may not add up due to rounding

Life Science: Phasing and unfavorable one-time effects have visible impact on Q2 margin

1

Portfolio mix effect ~ €5 m

- During H1 2018 strong growth of single-use & hardware with lower margin
- Consumables with higher margin to follow in H2 2018 after initial hardware investment

2

Start-up costs on strategic initiatives ~ €5 m

- Higher spend on capacities related to Gene-editing and E2E Solutions
- Different phasing between revenue recognition (milestones based) and spending (running costs)

3

Dissolving of regional operating models ~ €10 m

- Supply chain consolidation led to inventory write downs
- Synergy realization on track

Full year guidance confirmed

Abbreviation: E2E Solutions = End-to-end Solutions

Performance Materials: Organic growth of Semiconductor Solutions and OLED compensates ongoing LC decline

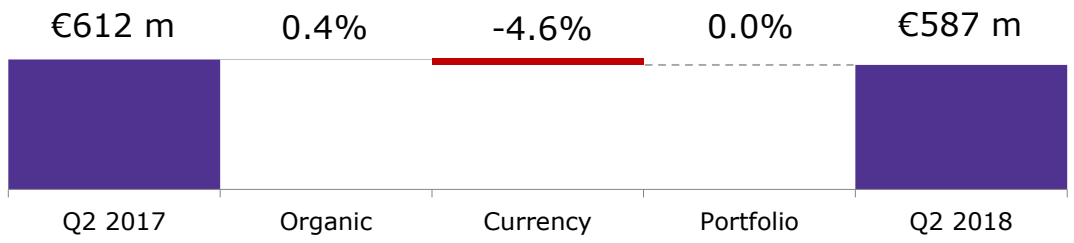
Performance Materials P&L

[€m]	Q2 2017	Q2 2018
Net sales	612	**587**
Marketing and selling	-64	**-61**
Administration	-19	**-23**
Research and development	-59	**-59**
EBIT	167	**131**
EBITDA	231	**192**
EBITDA pre	239	**196**
Margin (in % of net sales)	*39.1%*	***33.4%***

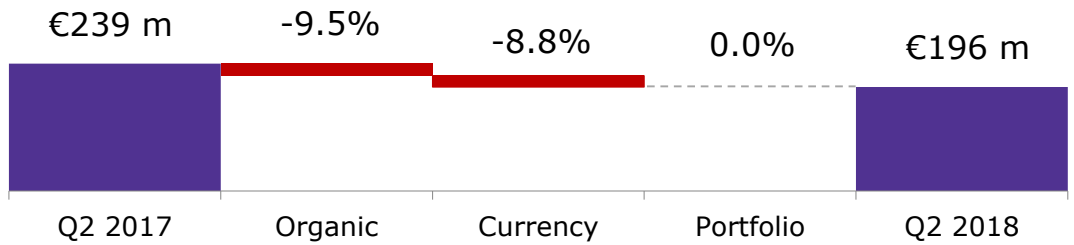
Comments

- Flat PM due to strong growth of Semiconductor Solutions and OLED compensating LC decline
- Above-market growth of Semiconductor Solutions reflects strong demand of dielectrics, lithography and deposition materials
- Stronger demand for innovative UB-FFS technology
- Profitability reflects business mix and ongoing LC price development

Net sales bridge



EBITDA pre bridge



Totals may not add up due to rounding

Reported figures

Reported results

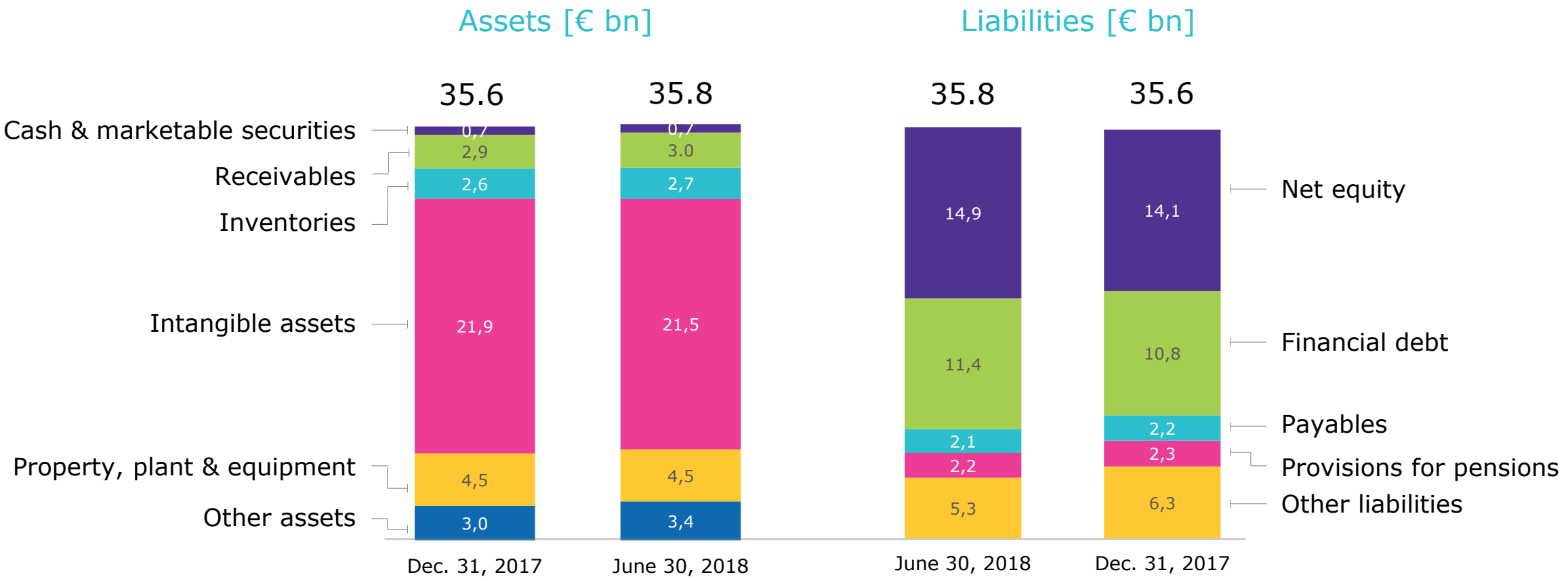
[€m]	Q2 2017	Q2 2018	Δ
EBIT	608	**392**	-35.4%
Financial result	-66	**-65**	-1.8%
Profit before tax	542	**328**	-39.5%
Income tax	-130	**-84**	-35.4%
Effective tax rate (%)	*23.9%*	***25.5%***	
Net income*	426	**247**	-42.0%
EPS (€)*	0.98	**0.57**	-41.8%

Comments

- Lower EBIT in line with EBITDA pre decrease; LY EBIT included Vevey write-up (~ €70 m)
- Profit before tax in line with EBIT decrease
- Effective tax rate within guidance range of ~24-26%

*From continuing and discontinued operations;
Totals may not add up due to rounding

Balance sheet – deleveraging remains focus



- Total assets about stable, with an increased equity ratio of 41.6%
- Decrease in intangible assets reflects D&A (-€0.6 bn), FX (+€0.4 bn) and reallocation of CH (-€0.3 bn) to assets held for sale

- Higher financial debt due to weaker operating cashflow and dividend payments
- Other liabilities decrease driven by profit transfer to E. Merck KG KGaA, Darmstadt, Germany as well as incentive payments

Operating cash flow impacted by higher working capital

Q2 2018 – cash flow statement

[€m]	Q2 2017	Q2 2018	Δ
Profit after tax	427	**251**	-176
D&A	380	**448**	68
Changes in provisions	21	**34**	13
Changes in other assets/liabilities	-333	**-243**	90
Other operating activities	-15	**25**	40
Changes in working capital	40	**-148**	-188
Operating cash flow	520	**367**	-153
Investing cash flow	-302	**-200**	102
thereof Capex on PPE	-172	**-168**	4
Financing cash flow	-184	**-295**	111

Cash flow drivers

- D&A increase due to low base LY related to write up of Vevey site (~ €70 m)
- Changes in other assets/liabilities driven by incentive and higher tax payments, mitigated by Peg-pal milestone
- Changes in working capital reflects uptake of receivables in line with business dynamics, LY contained higher payables
- Investing cash flow LY was driven by F-star licensing deals
- Financing cash flow reflects higher dividend payment than LY

Adjustments in Q2 2018

Adjustments in EBIT

[€m]	Q2 2017		Q2 2018	
	Adjustments	thereof D&A	Adjustments	thereof D&A
Healthcare	-56	-68	40	0
Life Science	46	3	26	16
Performance Materials	16	7	5	1
Corporate & Other	16	-3	26	0
Total	22	-61	97	17

Financial calendar

Date	Event
November 14, 2018	Q3 2018 Earnings release
March 7, 2019	FY 2018 Earnings release
April 26, 2019	Annual General Meeting
May 14, 2019	Q1 2019 Earnings release

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