MERCK KGAA, DARMSTADT, GERMANY – 2017 WELLS FARGO HEALTHCARE CONFERENCE

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

Agenda

01 BUSINESS OVERVIEW

Group

Portfolio of three high-tech businesses

Leading in specialty pharma markets

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

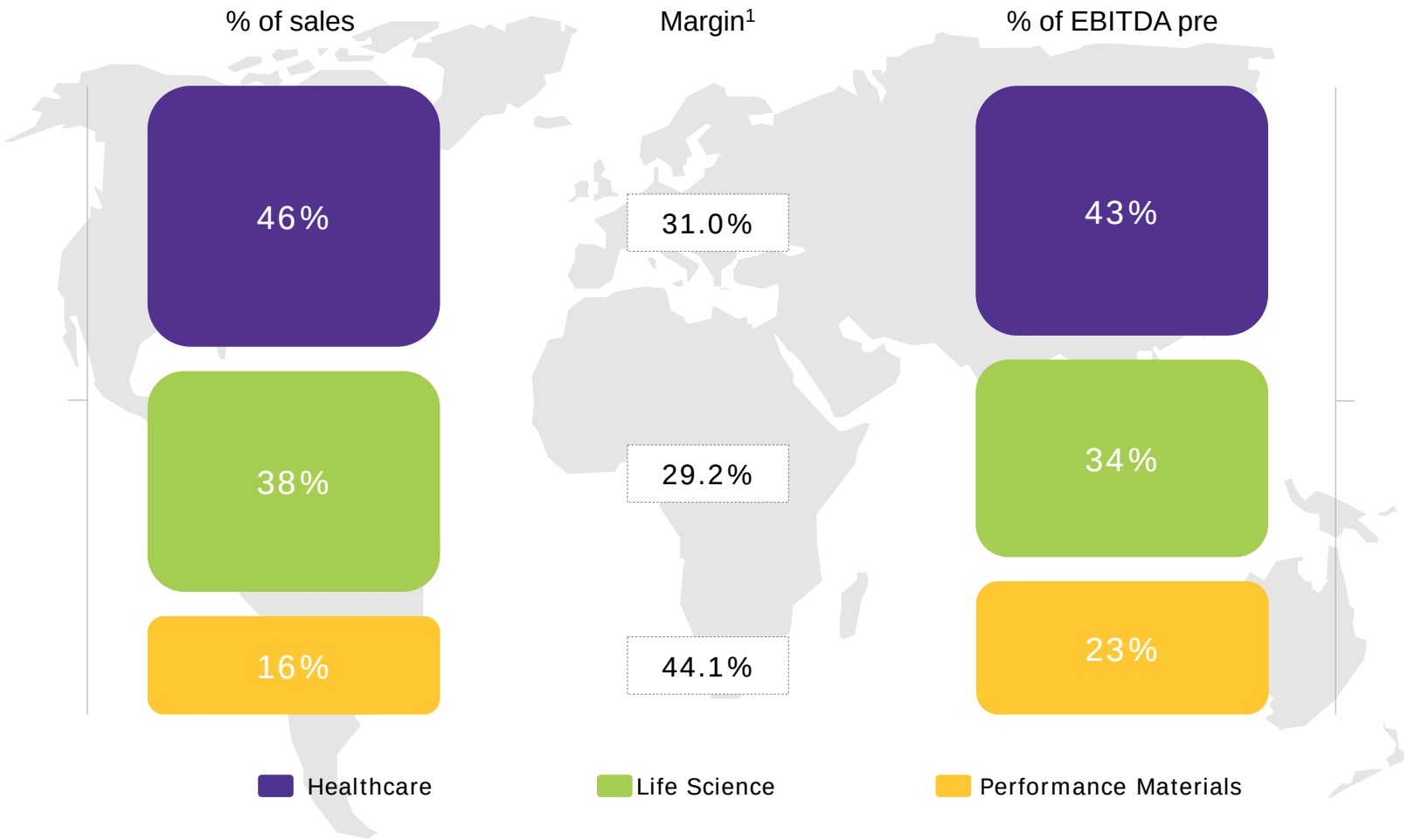
Leading life science company

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

Market leader in specialty materials

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

Group
Strong businesses with attractive margins



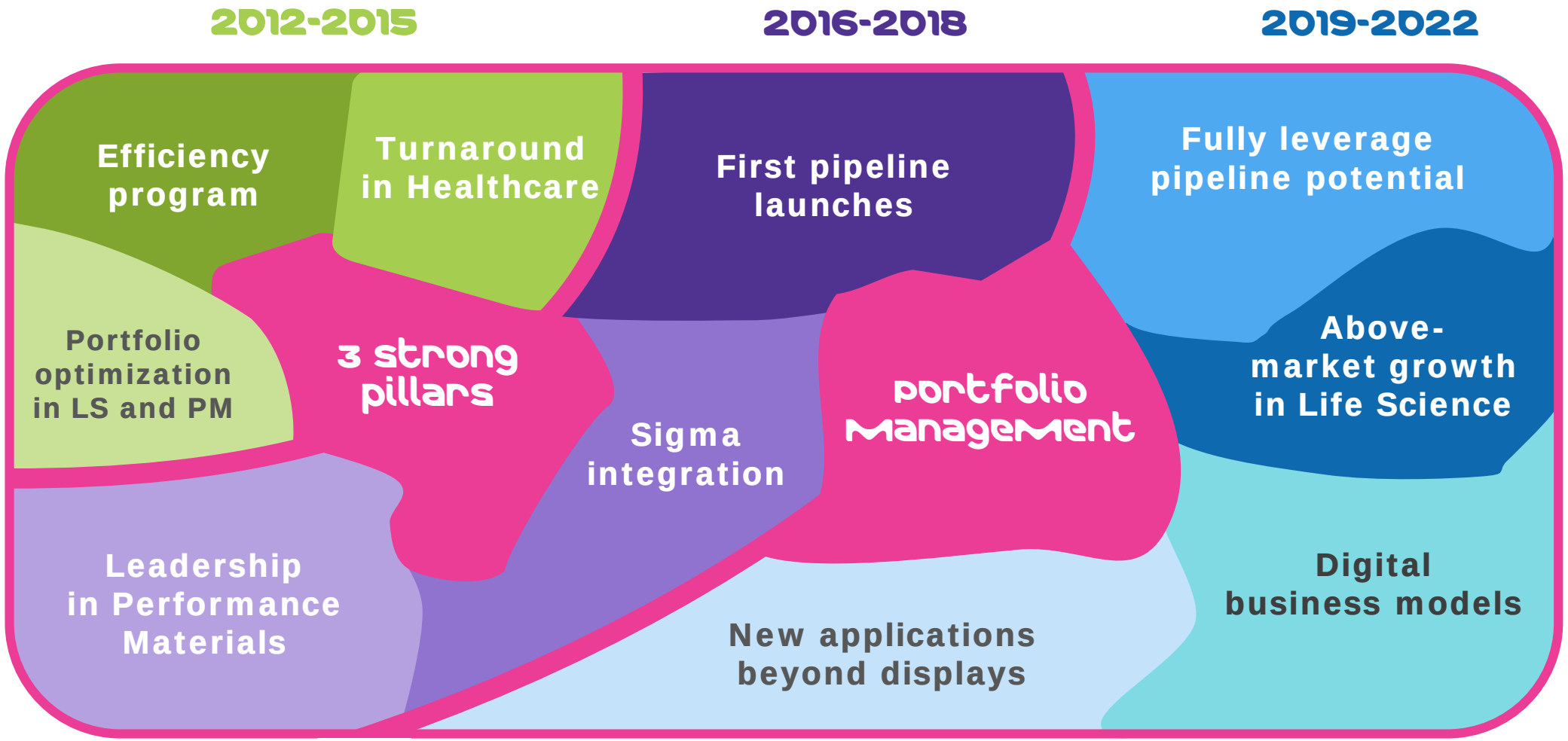
FY 2016
Sales:
€15,024 m

FY 2016
EBITDA pre[2]:
€4,490 m

[1]EBITDA pre margin in % of net sales; [2]Including Corporate/Others (-€396 m)

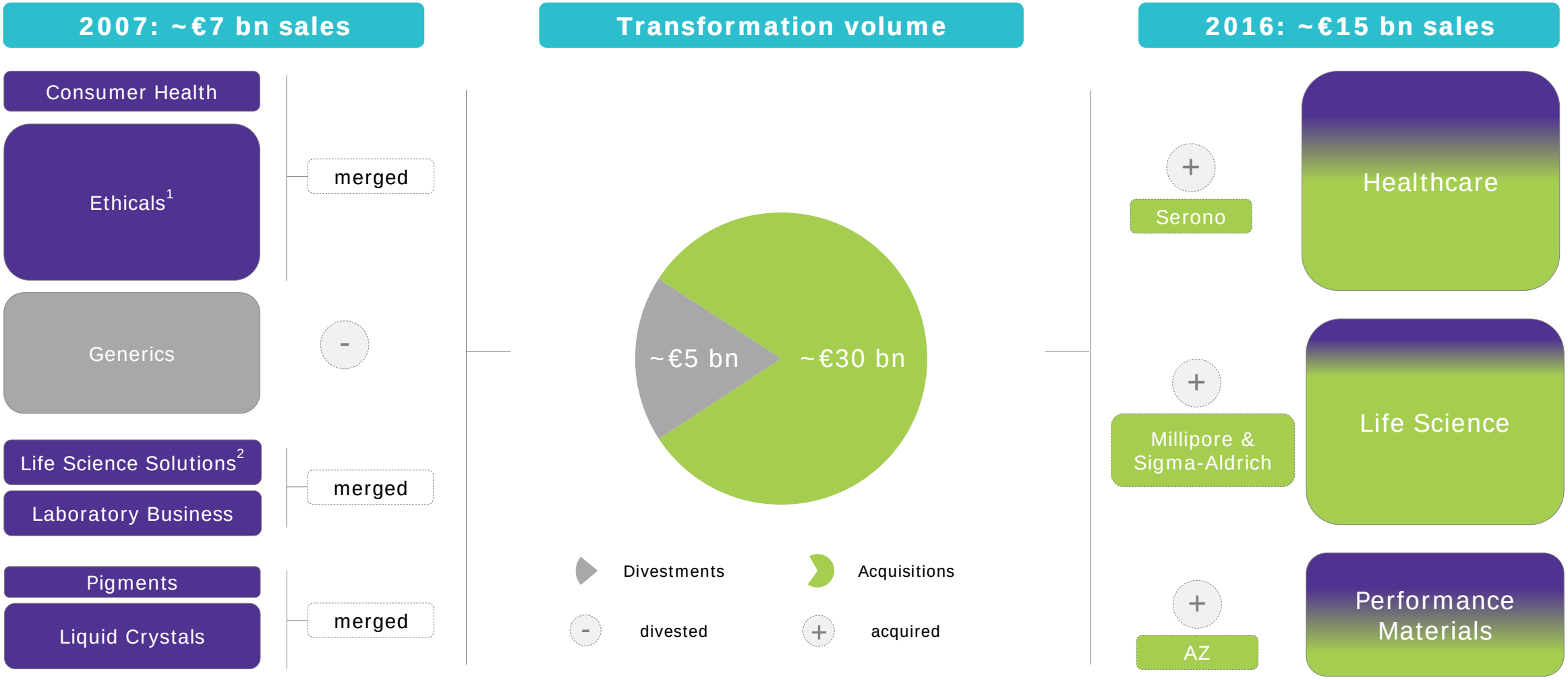
02 TRANSFORMING THE COMPANY

Group
Strategic roadmap 2016-2022



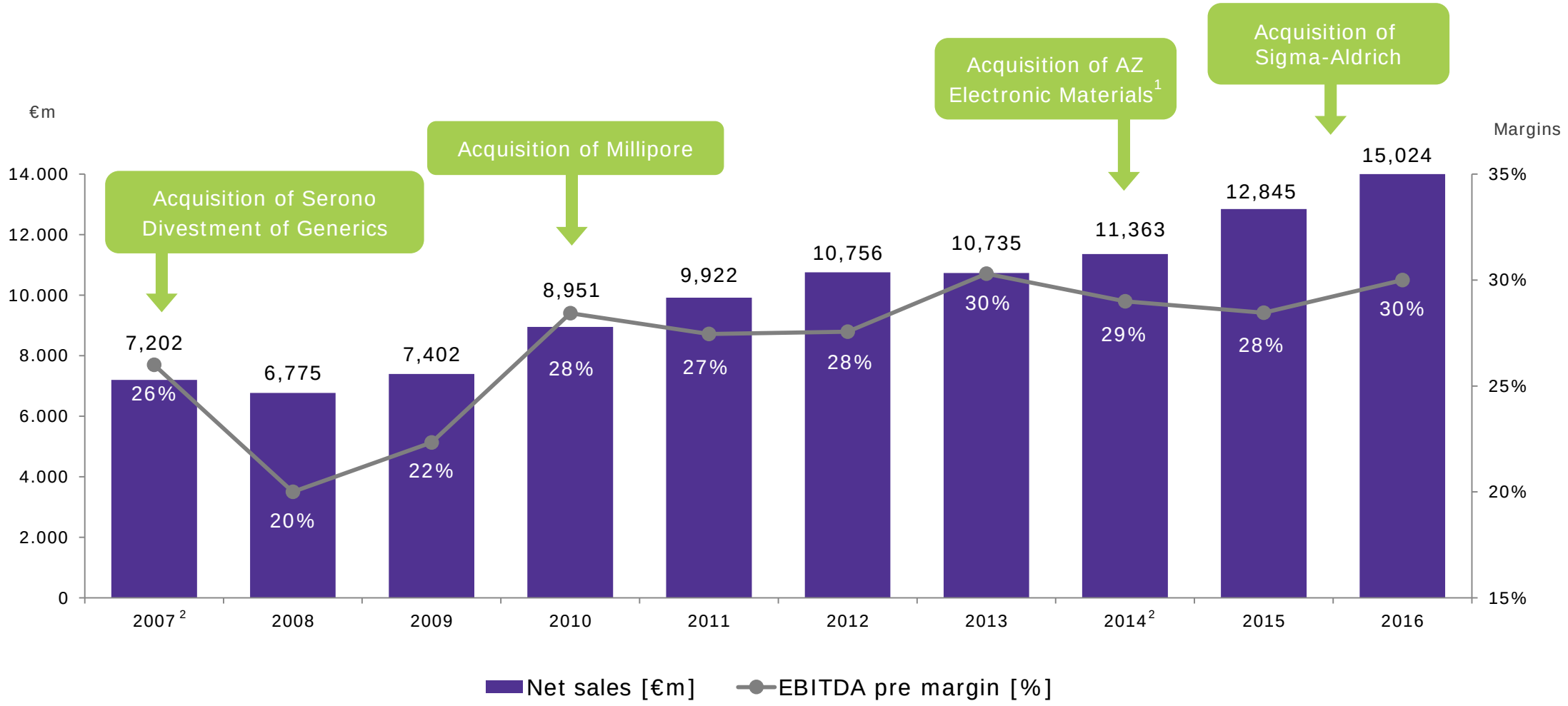
Group

We have added scale and strengthened the attractiveness of our portfolio



[1]Excluding “Theramex”, which was divested; [2]Excluding “Crop Bioscience”, which was divested

Group
Profitability improved fundamentally



[1]Included since 2 May 2014; [2]2007 and 2014 EBITDA pre margin adjusted for comparability

Group

We have created three leading businesses

Healthcare

+ Serono

- Leading biotech company
- Global footprint
- Strong presence in growth markets
- Solid underlying business
- Promising pipeline assets

Life science

+ Millipore
+ Sigma

- No. 3 in the world market
- Broad and global product portfolio
- Leading eCommerce platform
- Best-in-class supply chain management

Performance Materials

+ AZ

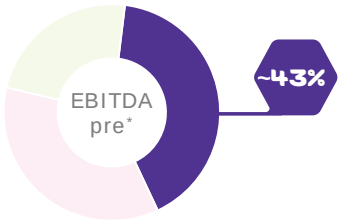
- World market leader
- Technology and innovation leader

Science Technology Innovation Specialties Quality Customer focus

Group

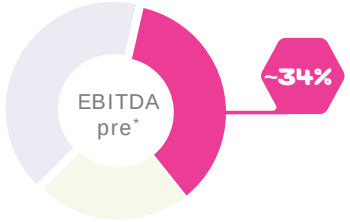
Clear set of priority goals to be realized by 2018

Healthcare



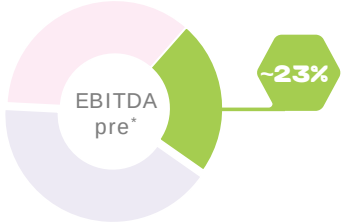
- **Maximize growth of existing franchises**
- **Deliver pipeline: one product launch or indication p.a. from 2017**

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) for the next 2 years (unless financed by divestments)**
- **Dividend policy reflects sustainable earnings trend**

*based on FY 2016 reported EBITDA pre, excluding Corporate & Other

Group

Our successful regular portfolio optimization will continue

DNA

- Acquisitions and divestments are part of company's history
- Licensing transactions remain on our agenda

Regular portfolio review and active capital allocation will continue

prerequisites

- Merck KGaA, Darmstadt, Germany is highly cash-generative with free cash flow[1] ~€2 bn p.a.
- Financial flexibility is a prerequisite for transactions

Larger transactions will return once financial flexibility is restored

experience

- 28 transactions since 2002 for ~€38 bn[2]
- Track record of value-generating integration

All prior transactions earned their required cost of capital

clear criteria

- Supporting mid-term strategy and strengthening core business
- Growing in attractive markets
- Proven track record: strong ability to win
- Compelling financials

Disciplined approach to portfolio management will persist

[1]Free cash flow incl. capex excl. M&A, excl. dividends; [2]As measured by EV = enterprise value

03 HEALTHCARE – FUNDING FOR SUCCESS

Healthcare is set to deliver on promising pipeline candidates

Deliver
on organic growth

Focus
on pipeline

- At least stable existing business
- Solid pipeline of oncology, immuno-oncology and immunology molecules
- Transformation of R&D operating model ongoing
- Competitive R&D funding in our focus areas
- Cost discipline and efficient execution

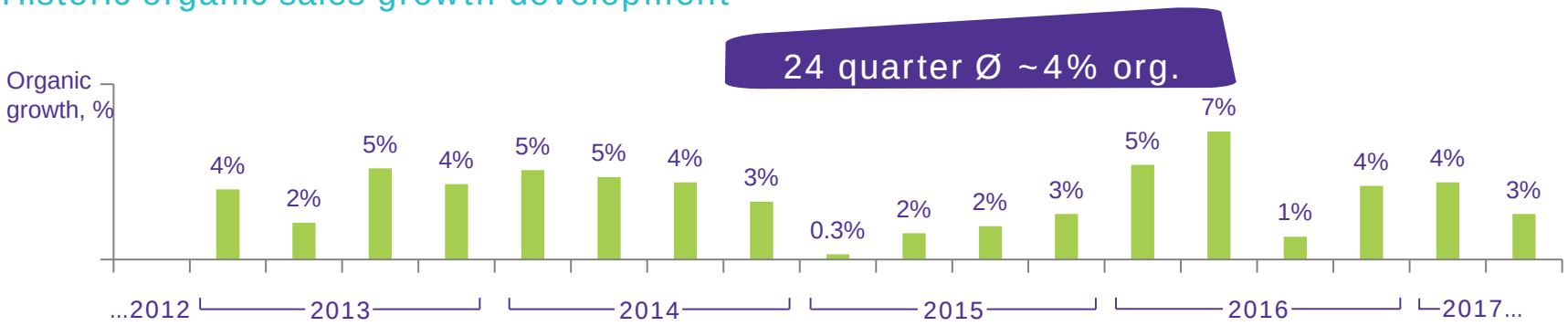
Healthcare

Operational excellence drives healthy growth of existing businesses

Organic growth for 24 consecutive quarters

Commitment to at least stable organic sales until 2018

Historic organic sales growth development



Qualitative organic sales growth guidance per product/franchise until 2018

Rebif®: Sales decline in line with interferon market

Oncology: Stable sales

Fertility: Mid single-digit growth

Endocrinology: Low single-digit growth

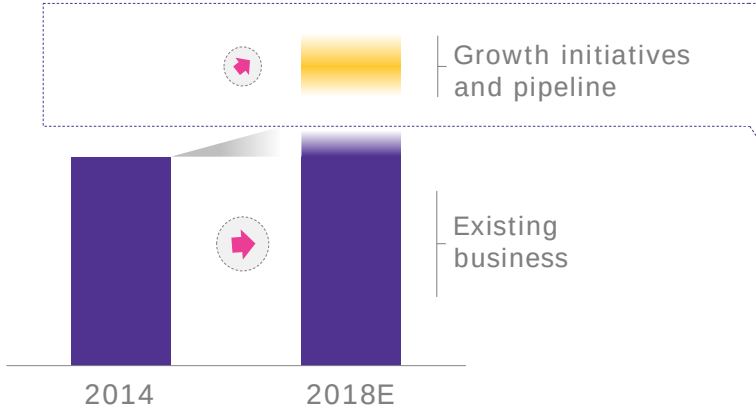
General Medicine: Mid to high single-digit growth

Consumer Health: Mid single-digit growth

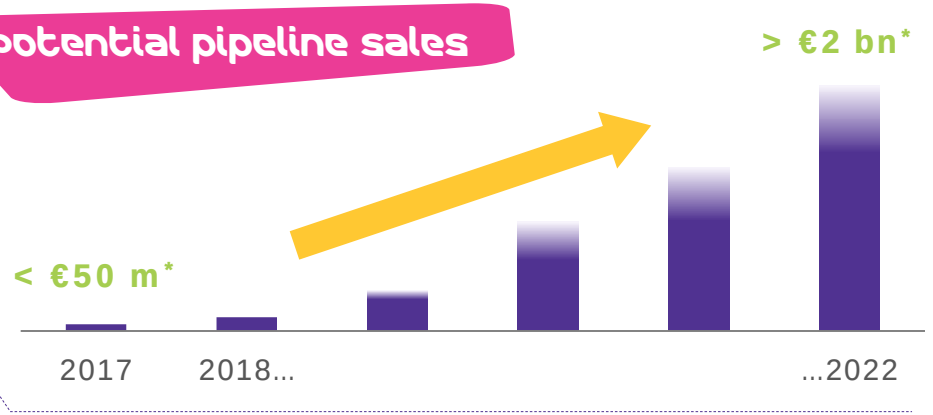
Healthcare

Well on track to deliver the pipeline

Deliver the pipeline

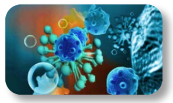


potential pipeline sales

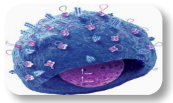


Increase R&D spending

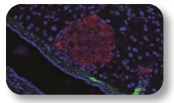
Key investments



Avelumab



BTK – inhibitor



TGF-beta trap

~€150 – 200 m higher R&D costs in 2017 vs. 2016

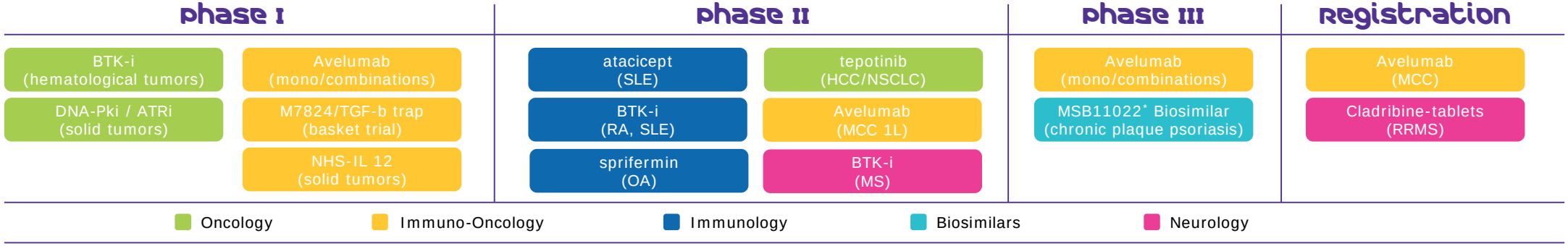
Main moving parts:

- Phase III progress of avelumab
- Dynamics of ramp-up for TGF-beta and BTK-i
- Regular prioritization in view of market dynamics

Illustrations; *risk adjusted

Healthcare

Increasing R&D productivity with focus on potentially transformative assets



Avelumab
- 30 clinical programs ongoing (>6,200 patients in >15 tumor types)
- Nine phase III trials and various Phase I cohorts ongoing
- For MCC, decision by EMA expected in H2 2017

TGF-b trap
- Enrolling in phase Ib cohorts (14 indications); >600 patients enrolled
- Preliminary data for selected cohorts expected end of 2017

BTK inhibitor
- Three immunology phase IIb trials initiated (RA, SLE, MS)
- One phase I trial in Oncology ongoing (different molecule)

DDR-Program
- Transition of in licensed ATRi and DNA-PKi compounds ongoing
- Analysis of M3814 Phase I data for RT combination expected in H2 2017

Cladribine Tablets
- Positive CHMP opinion, decision by EC expected in Q3 2017

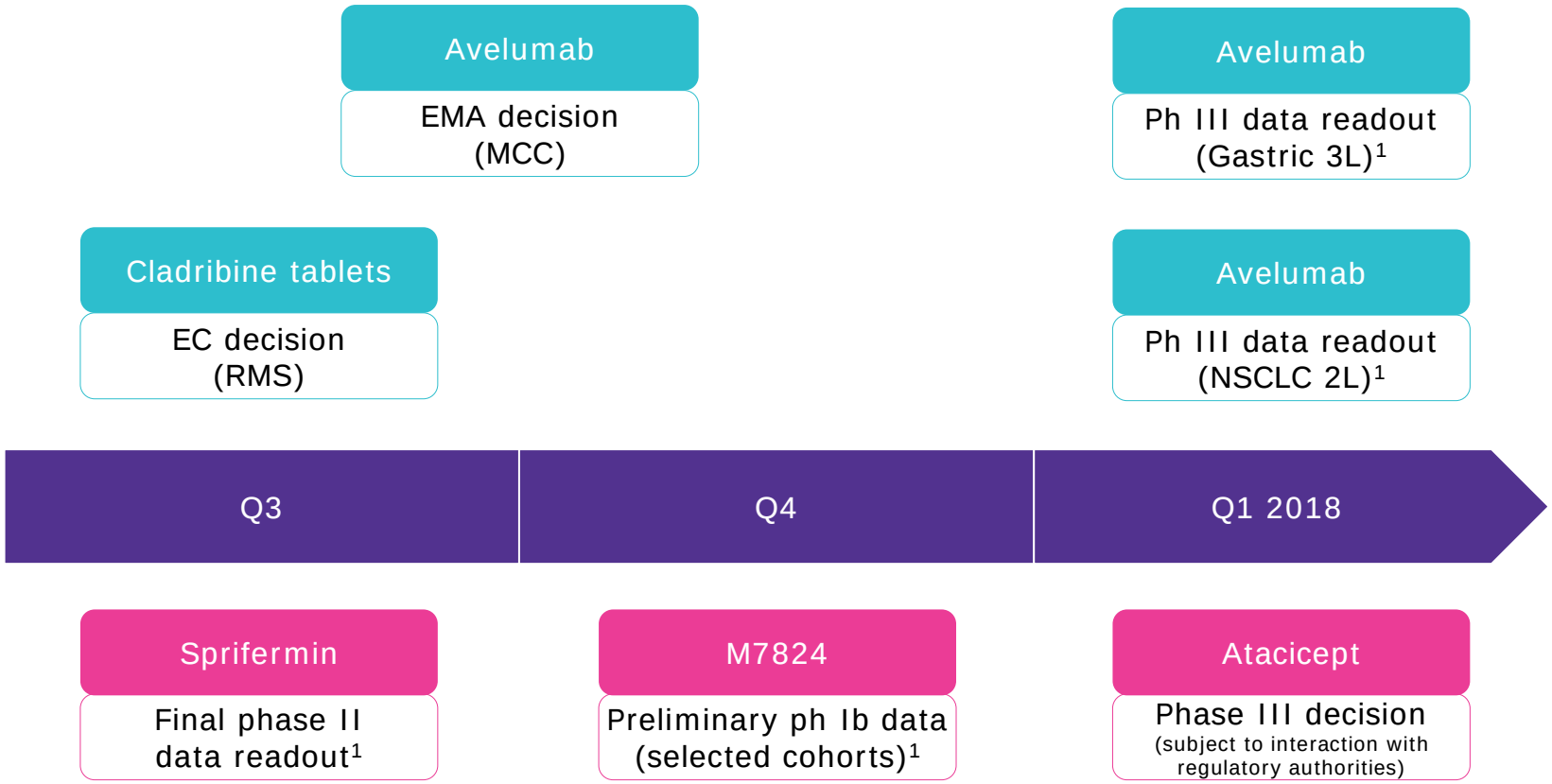
2017 Milestones:

- **Bavencio successfully launched in MCC and mUC in the U.S.**
- **Positive CHMP opinion for Cladribine tablets & avelumab (MCC)**
- **Major trial updates**

*On April 24, 2017 Merck KGaA, Darmstadt, Germany announced the divestment of its Biosimilars business to Fresenius, closing is expected in H2 2017, subject to regulatory approvals and other conditions

Merck KGaA
Darmstadt, Germany

Outlook
2 potential launches, 4 pivotal catalysts and major value inflection points



[1] Data-read out is the internal date. Data to be presented at upcoming scientific congress | Acronyms: MCC = Merkel cell carcinoma | RA: Rheumatoid Arthritis | NSCLC: Non small cell lung cancer | RMS = remitting multiple sclerosis | Note: timelines are event-driven and may change

04 LIFE SCIENCE – FOCUSING ON PROFITABLE GROWTH

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 is an attractive market

RESEARCH
~€44 bn
Low single digit

- Academic funding
- Industry R&D investment

PROCESS
~€47 bn
High single digit

- Biologics volume growth
  - from biologics
  - from emerging modalities
- Shift to single-use

APPLIED
~€49 bn
Mid single digit

- Population growth
- Regulations and testing needs

Good margin profile driven by success factors

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

EBITDA pre margin of Top 3 Life Science players

Q1 2017

MilliporeSigma	~30%
Company 1	~25%
Company 2	~22%

We have strengthened our position with the Sigma-Aldrich acquisition

1668

ANGEL PHARMACY founded
in Darmstadt, Germany by Friedrich Jacob Merck

1951
ALDRICH

1935
SIGMA CHEMICAL COMPANY

1975
SIGMA-ALDRICH

2015
MILLIPORE SIGMA*

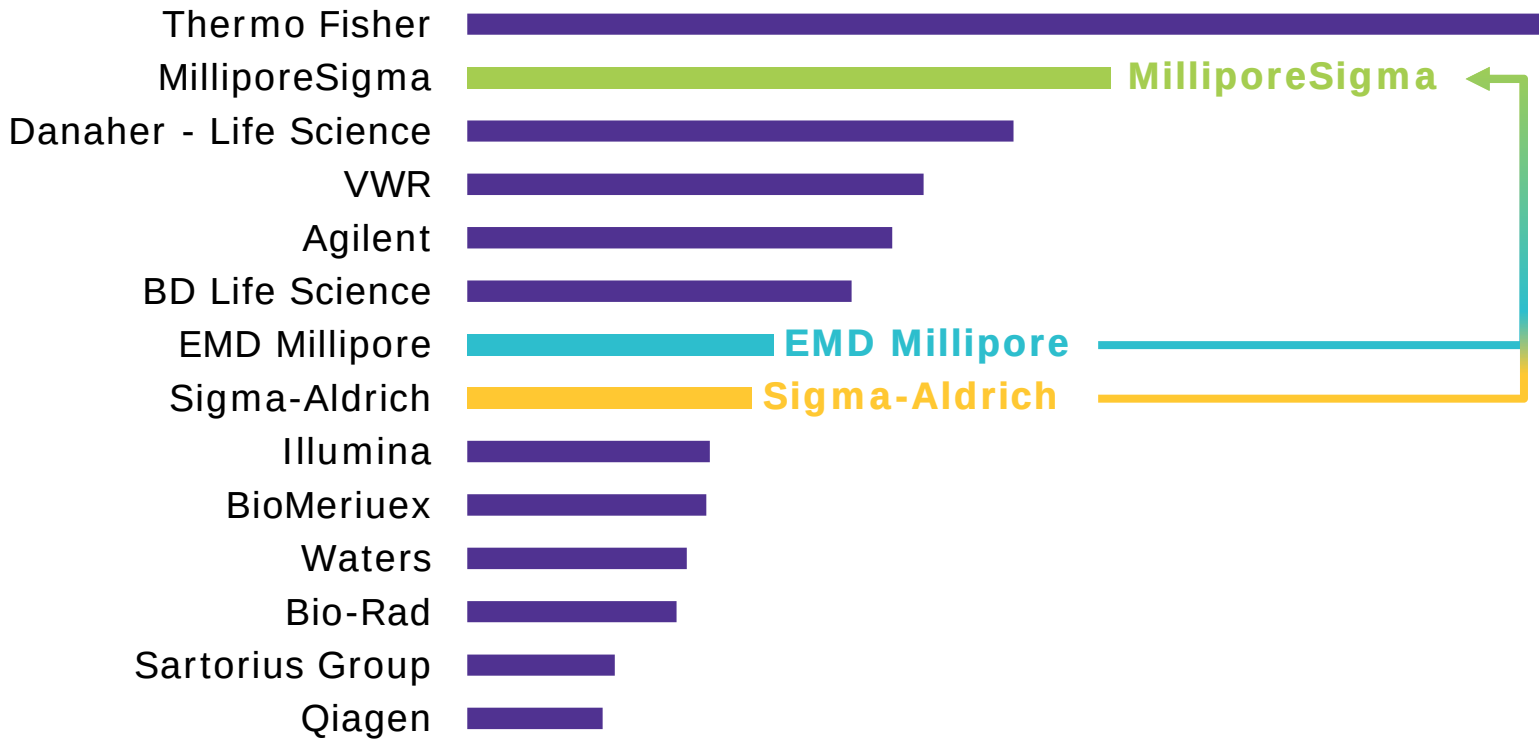
1954
MILLIPORE

2010
EMD MILLIPORE

*The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

And became a scale Life Science business

Market landscape* - pre and post acquisition



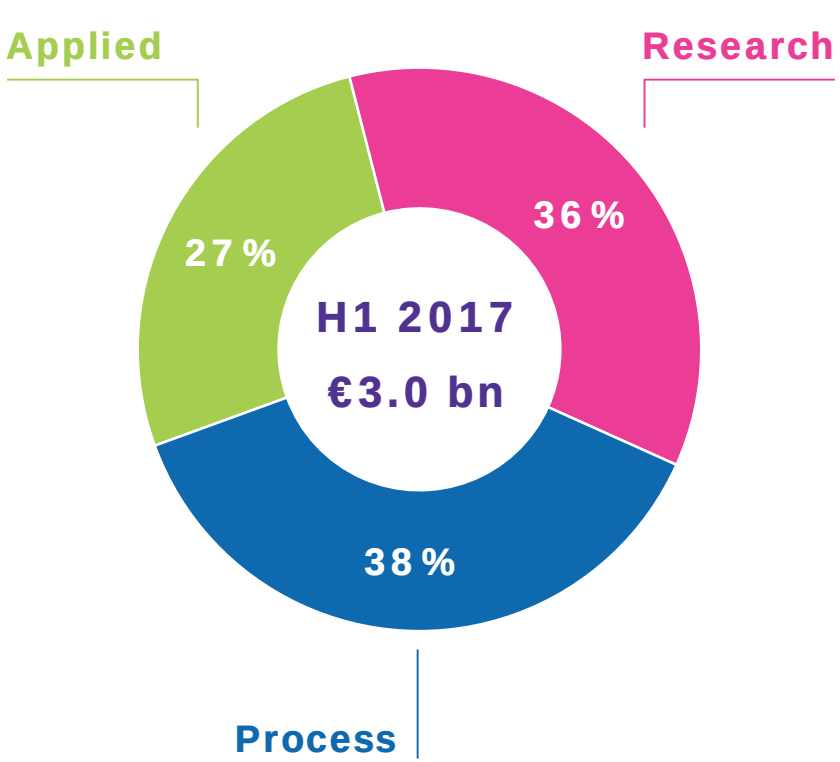
Leading position in lab consumables and Bioprocessing

NO. 1-3

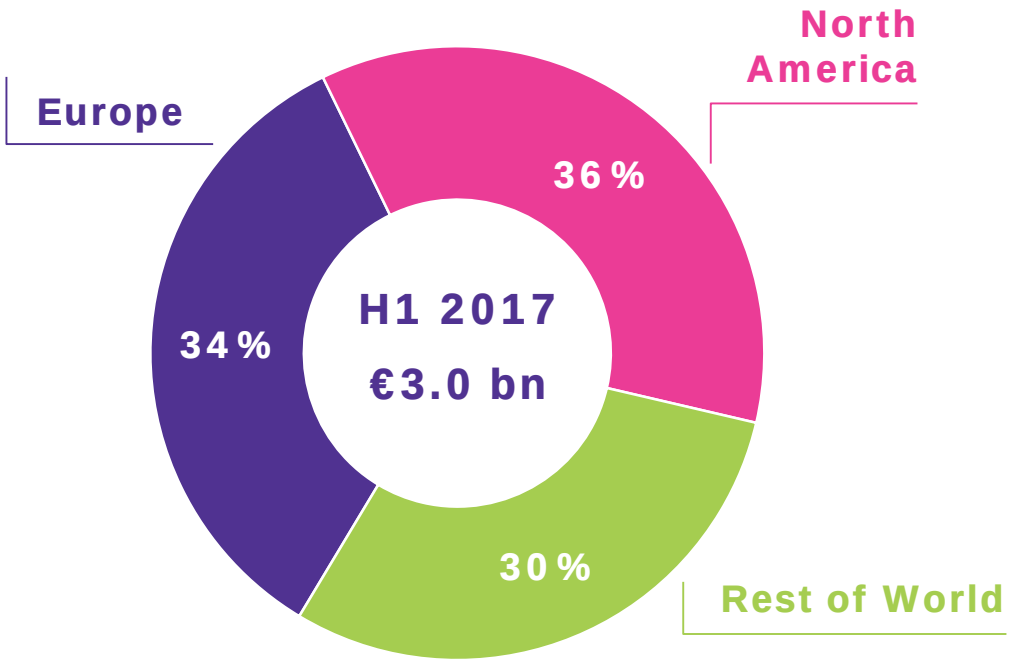
Illustration; Source: Capital market research, company estimates
*Ranked by sales to lab and drug production customers in comparable markets, excludes diagnostic sales

A balanced portfolio and geographic presence

Sales by business unit



Sales by region



Totals may not add up due to rounding

Integration on track

Value

- Leading growth and margins during an integration
- On track to deliver synergies

Organization

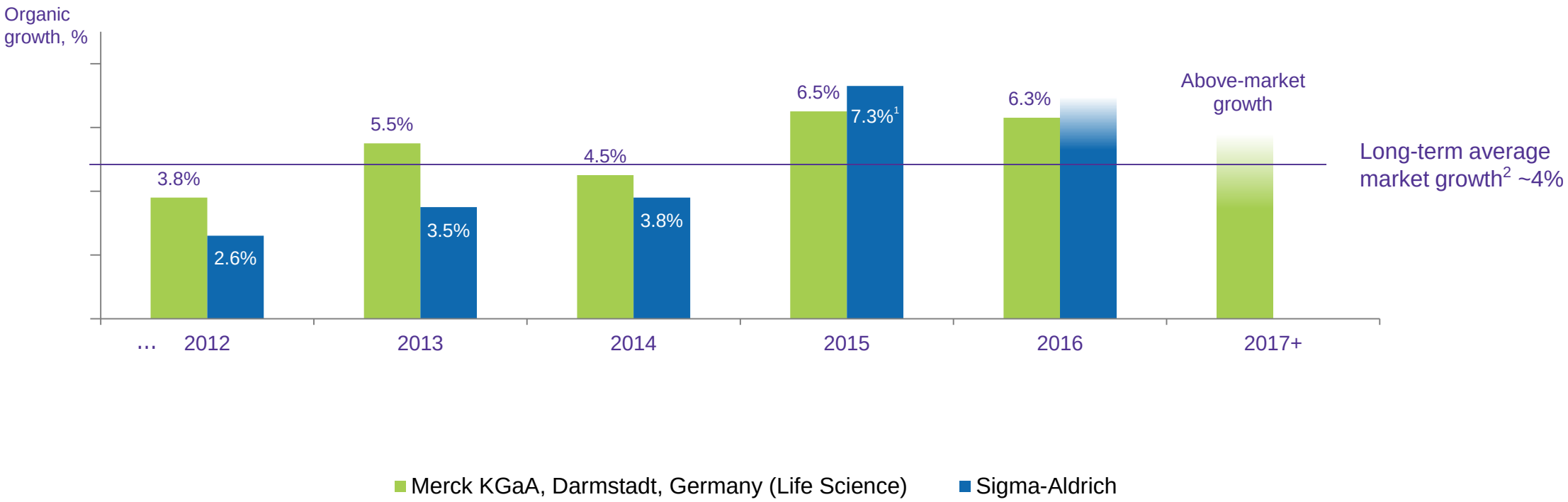
- One organization
- Solid engagement during integration

Processes

- E-commerce integrated in North America and Western Europe
- Operational excellence to deliver synergies

We have delivered at or above market growth during integration

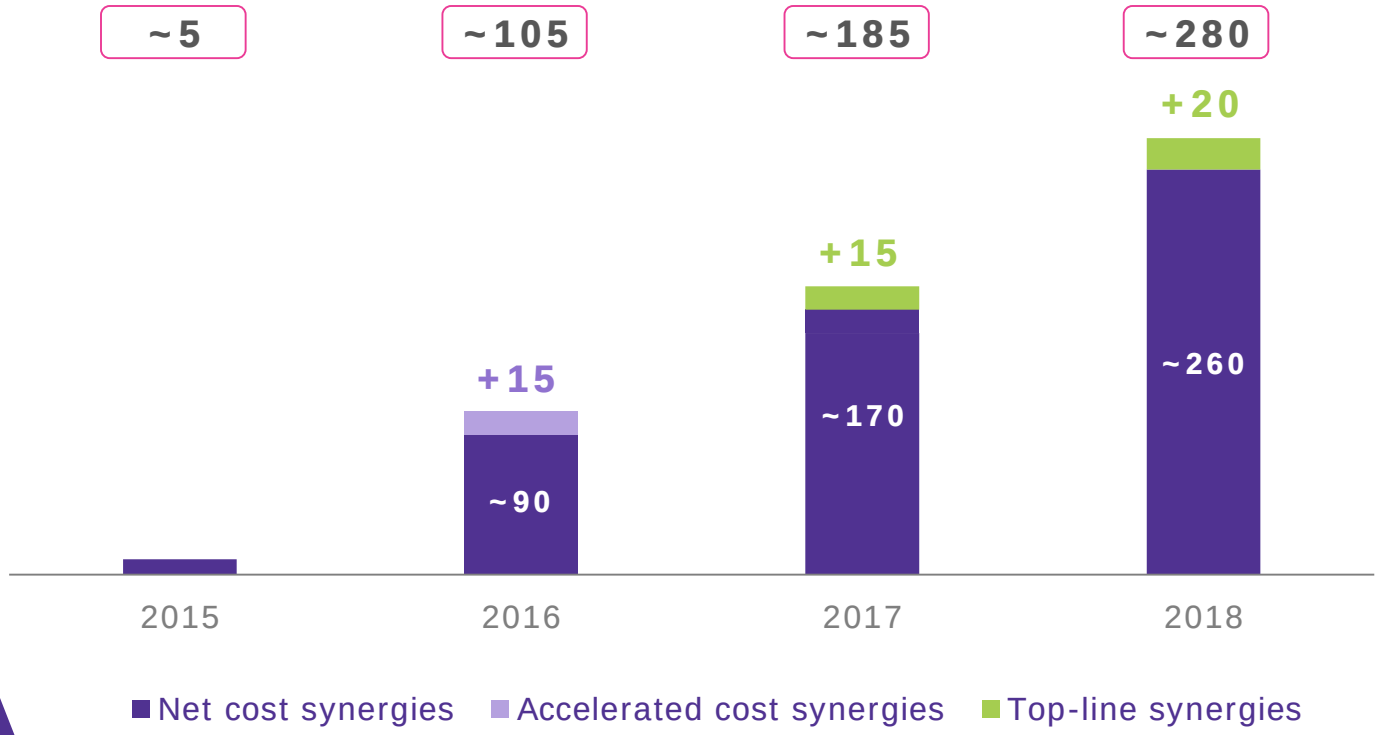
Merck KGaA, Darmstadt, Germany and Sigma-Aldrich organic growth rates versus market growth



[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

Synergy upgrade reflects fast execution and top-line synergies

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



Sources

Cost synergy update (for 2016)

- Faster implementation of synergy measures in all areas
- 2016: Total cost synergies of ~€105 m
- Integration costs remain unchanged at ~€400m

Top-line synergies (from 2017)

- Comprehensive biologics production portfolio
- Best in class eCommerce
- Global reach

Our strategy to maintain industry leadership

- Capture value from revenue and cost synergies
- Drive organizational engagement
- Harmonize and transform processes

- Revitalize Research portfolio
- Next generation bioprocessing
- Excellence in Lab Water launch
- …

- eCommerce
- End-to-end bioprocessing
- Gene editing and novel modalities
- …

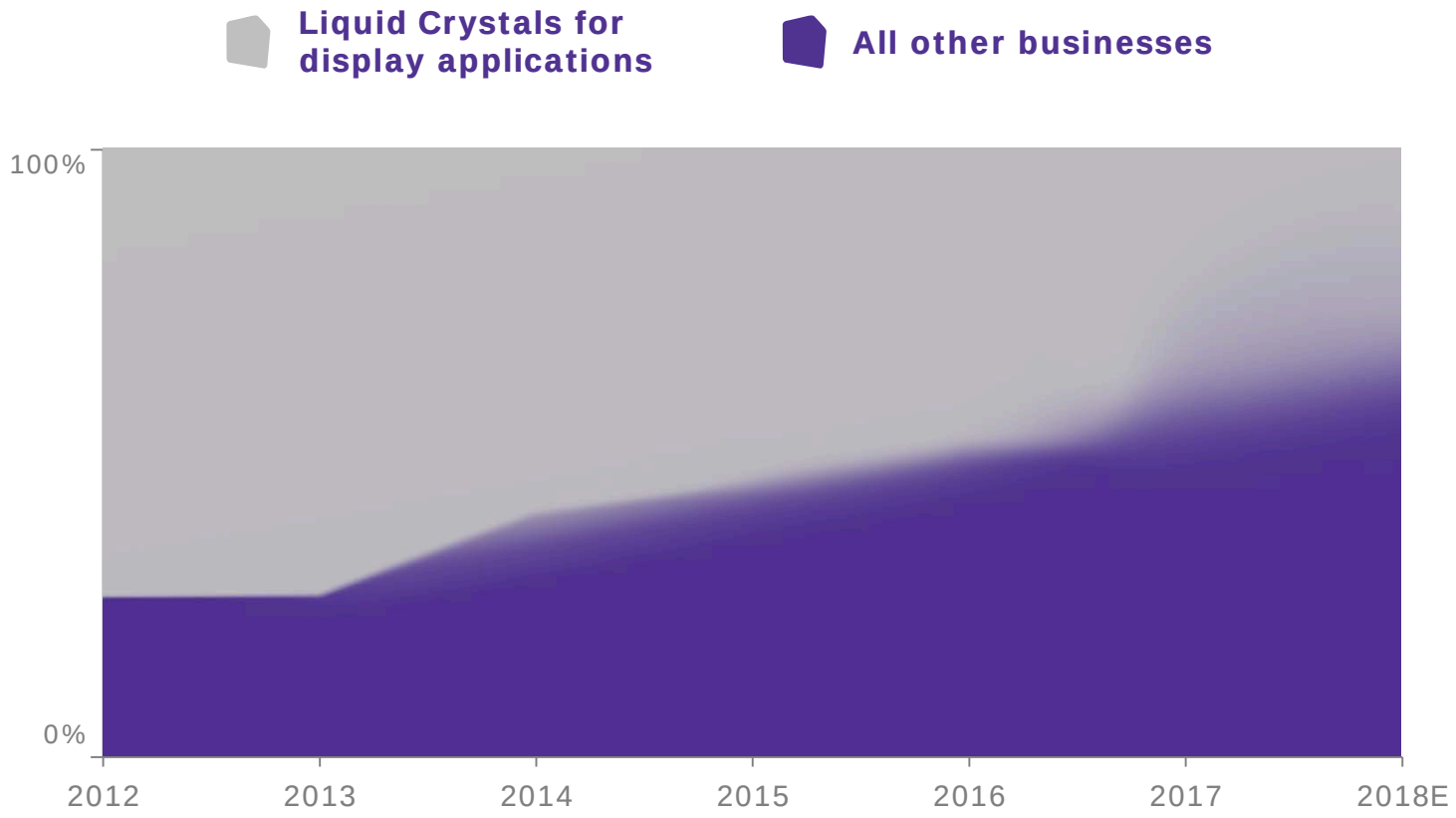
Key takeaways for today

- Leading position in an attractive market
- Integration progressing well
- Comprehensive strategy in place to strengthen leadership

05 PERFORMANCE MATERIALS – EXPANDING LEADERSHIP AND INNOVATION

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

Sales share of Liquid Crystals for displays versus all other businesses



Diversification of Performance Materials increased due to

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

Illustration

Performance Materials

Four-pillar strategy and innovation power strengthen our earnings profile

Ongoing innovation

Launch of innovative products and new business models continues

Four strong pillars

Combination of four highly profitable businesses raises diversification

Market leadership

Strong market position is based on innovation power and differentiation

1 **Superior profitability**

2 **Strong earnings resilience**

3 **Low single-digit mid-term growth**

Market shares are returning to normal levels

Merck KGaA, Darmstadt, Germany global liquid crystal market share development

Reasons for elevated levels

- Expanding market opportunity due to China emerging to an important display market
- Merck KGaA, Darmstadt, Germany with premium quality and technology used as preferred sole supplier in China
- Further adoption of PS-VA technology

Market share normalization

- Established manufacturing processes in China
- Increasingly multiple supplier strategies
- Advancing competition from China

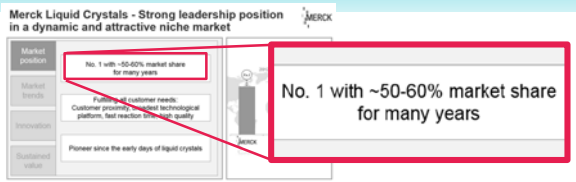
Market share

2-3 years

Market share corridor of 50-60 %

Up to 2 years

Capital Market Day 2013:



2010 2014 2016 2018

Illustration

Market share normalization will have financial implications

sales:

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

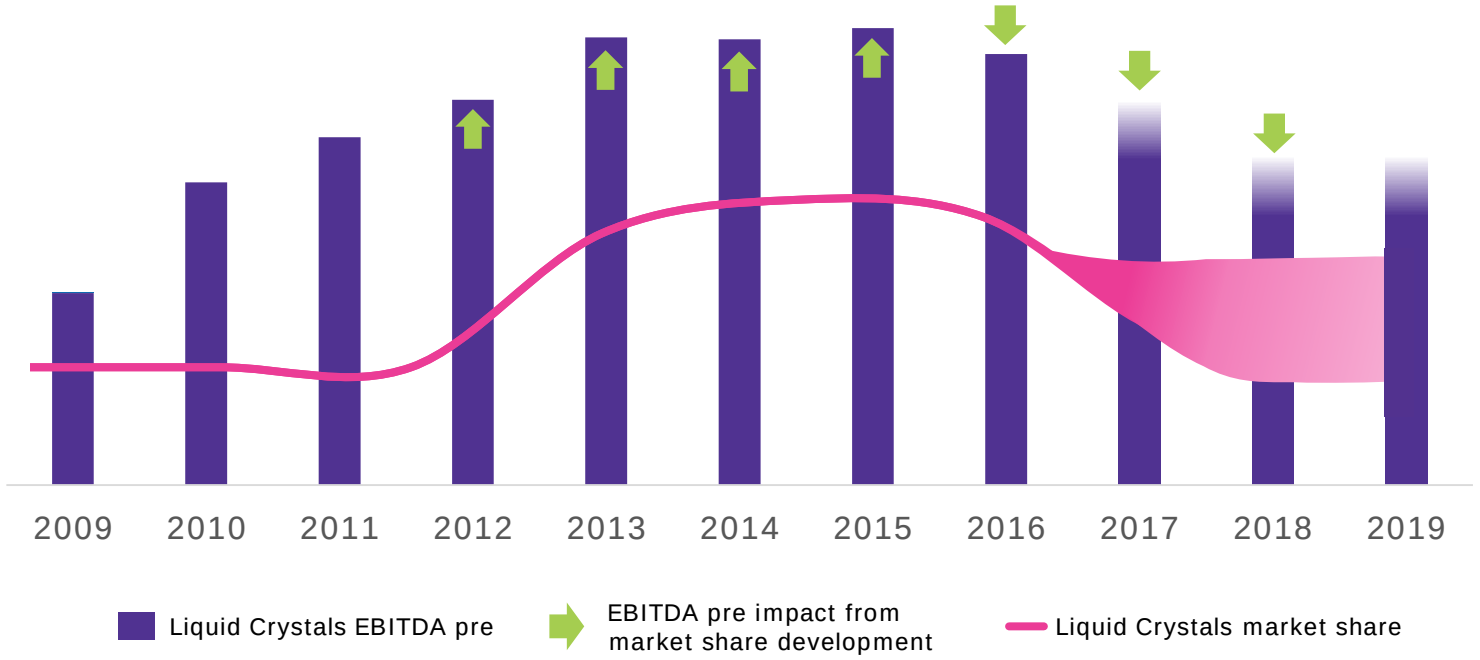
profitability :

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

earnings:

- Significant EBITDA pre impact

Liquid Crystals: Organic EBITDA pre and market share illustration

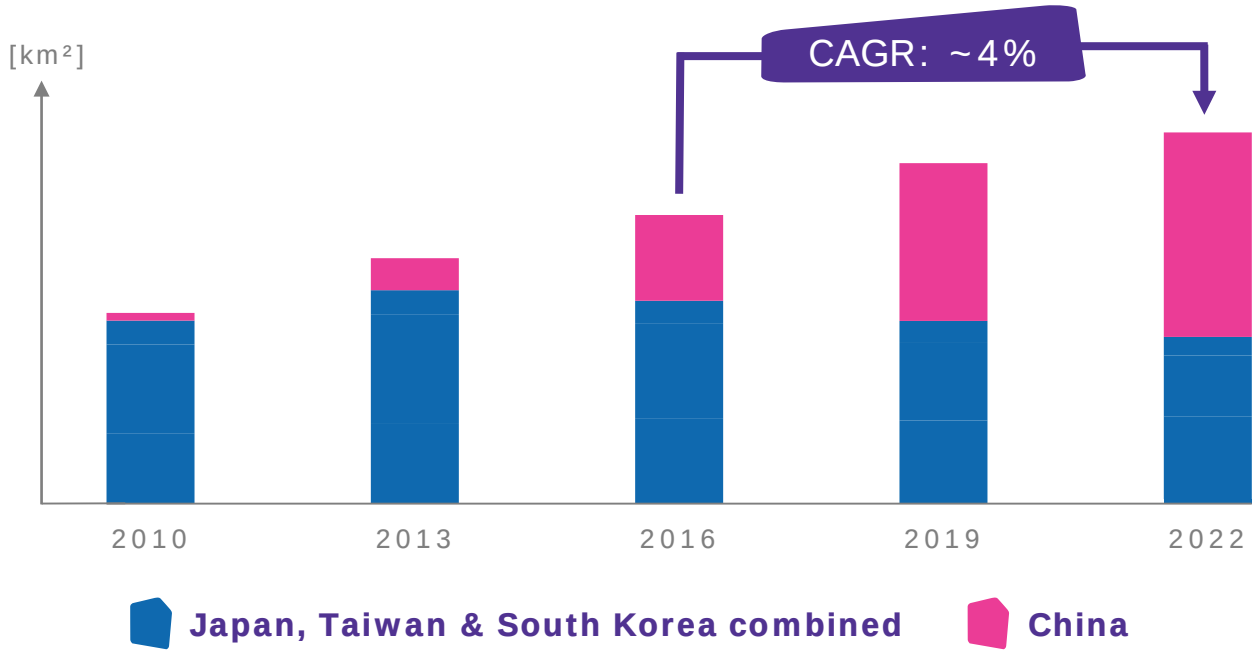


Strong sales and EBITDA pre contribution from 2012-2015 to reverse from 2017 onwards

Illustration

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 Company's competitive advantage

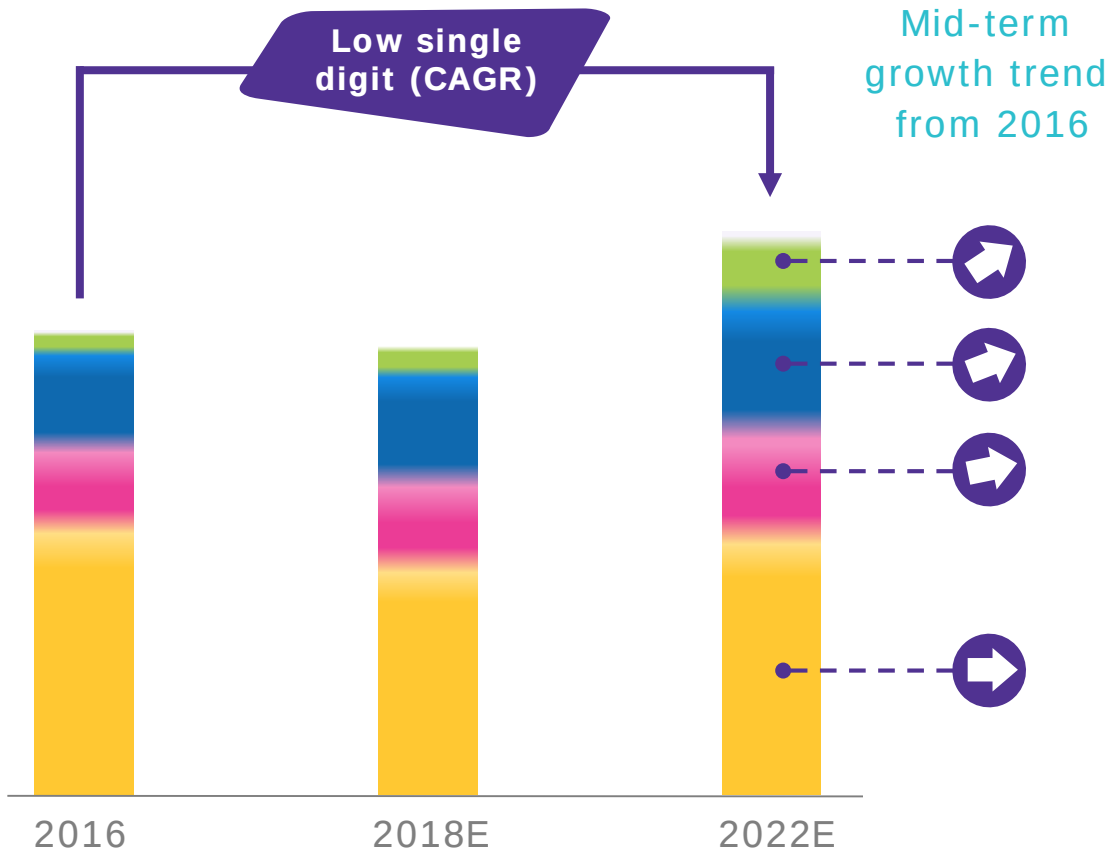
- *Customer proximity:* Reallocate resources to improve specific customer support
- *Application and production know-how:* Develop technologies that translate into commercial value
- *Continuous innovation:* Investments in Shanghai R&D hub to support local customers

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

Performance Materials on track to achieve solid growth path

Performance Materials mid-term sales development and drivers



Advanced Technologies
Enhance and exploit leading position in OLED

Integrated Circuit Materials
Outpace market growth with specialty materials assisting miniaturization

Pigments & Functional Materials
Expansion into larger functional material markets

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

Illustration

06 EXECUTIVE SUMMARY AND GUIDANCE

Group

We are well on track to deliver on our promises

Group

Net debt reduced by ~€1.4 bn[1]
Strict financial discipline supports rating

Healthcare

Base business growing
2 avelumab indications launched

Life Science

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

Performance Materials

Market challenges well managed
New technologies in test phase

Important Milestones reached to deliver on our promises

CMD[2] December 2015

Q2 2017 Results

2018

Illustration; [1]Net financial debt ex pension provisions as of June 30, 2017 versus December 31, 2015; [2]Capital Markets Day

Group

We have clear financial priorities for the next two years

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 the next two years (or financed by divestments)
- **Dividend policy** reflects sustainable earnings trend

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 Company's profitable growth path

Full-year 2017 guidance broadly confirmed

Net sales: ~ €15.3 – 15.7 bn

EBITDA pre: ~ €4,400 – 4,600 m

EPS pre: ~ €6.15 – 6.50

Appendix

01 GUIDANCE DETAILS

2017 business sector guidance

Net sales

- Slight organic growth
- Ongoing organic Rebif decline
- Other franchises growing; repatriation of Glucophage/China supportive

EBITDA pre

~ €1,900 – 2,000 m

Net sales

- Organic growth slightly above market, driven by Process Solutions
- First minor contribution of top-line synergies

EBITDA pre

~ €1,780 – 1,850 m

Net sales

- Slight to moderate organic decline
- Volume increases in all businesses
- Continuation of Liquid Crystal market share normalization in China

EBITDA pre

~ €950 – 1,050 m

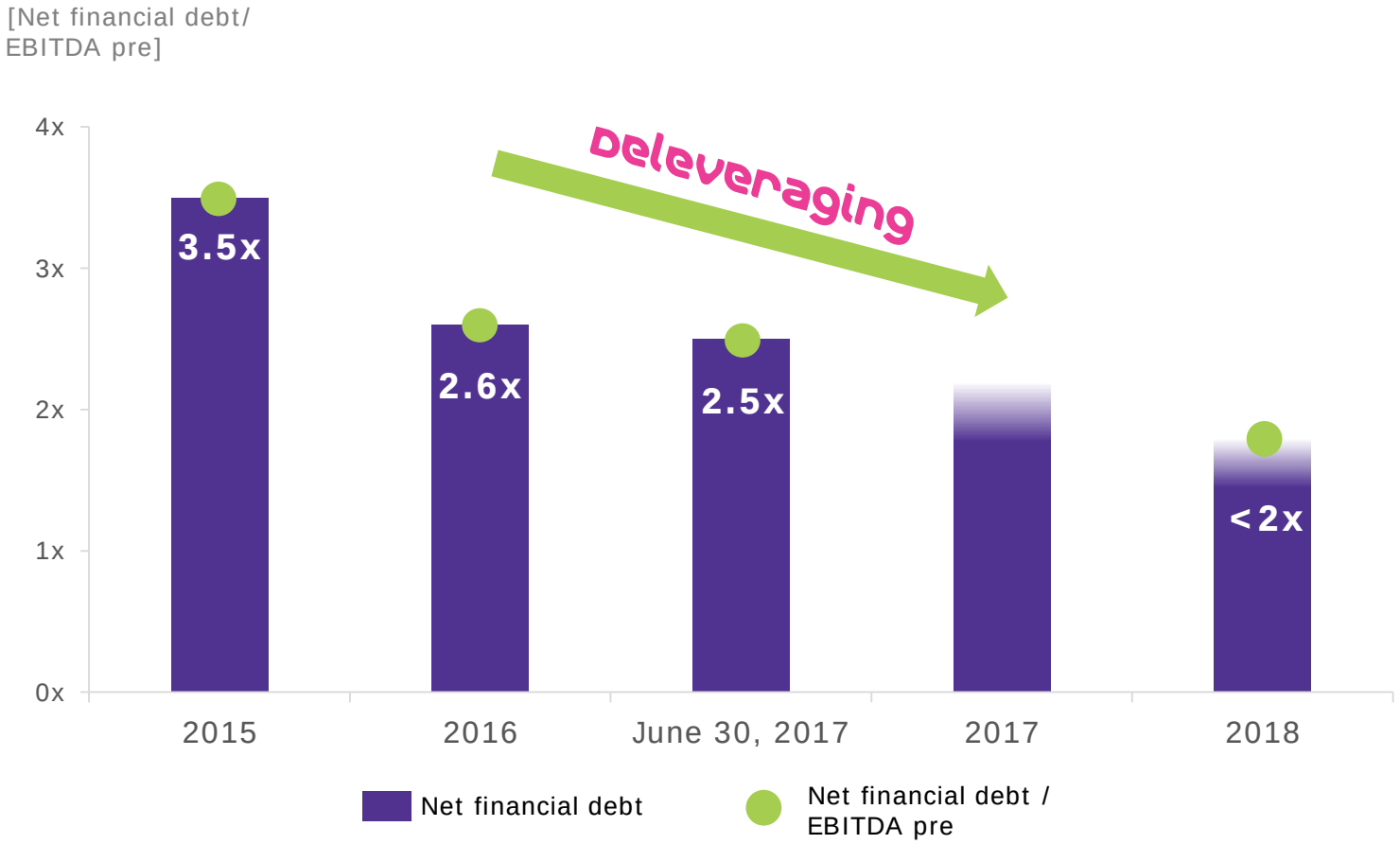
Additional financial guidance 2017

Further financial details

Corporate & Other EBITDA pre	**~ -€350 – -400 m**
Interest result	**~ -€250 – -260 m**
Effective tax rate	**~ 23% to 25%**
Capex on PPE	**~ €850 – 900 m**
Hedging/USD assumption	**2017 hedge ratio ~60% at EUR/USD ~ 1.11 to 1.13**
2017 Ø EUR/USD assumption	**~ 1.09 – 1.13**

Strong focus on cash generation to ensure swift deleveraging

Net financial debt* and leverage development



Focus on deleveraging

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

*Net financial debt (without pensions); EBITDA pre (except FY) reflects last twelve months value

Life Science and Healthcare with natural hedge, while Performance Materials affected by currency swings

Sales
- Global presence
- ~40% of sales in Europe

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

FX Impact

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

FX Impact

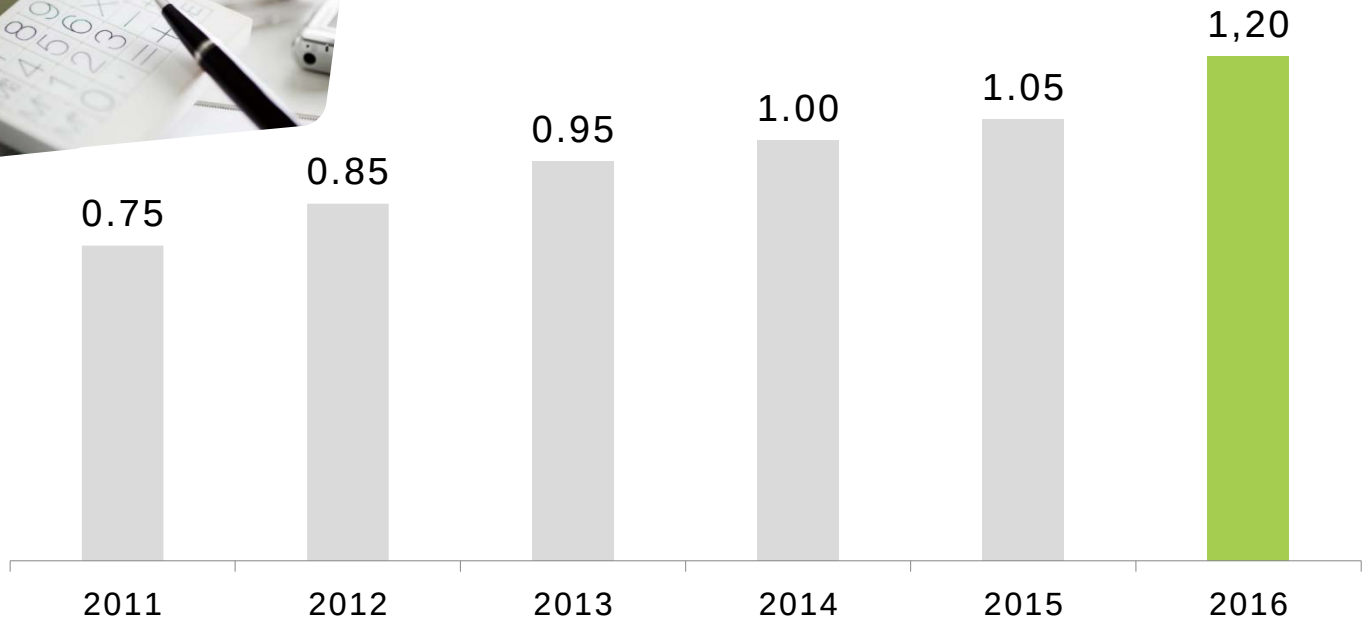
Sales
- ~80% of sales in Asia-Pacific
- Industry is USD-driven

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

FX Impact

Sustainable dividend development

Dividend[1] development 2011-2016



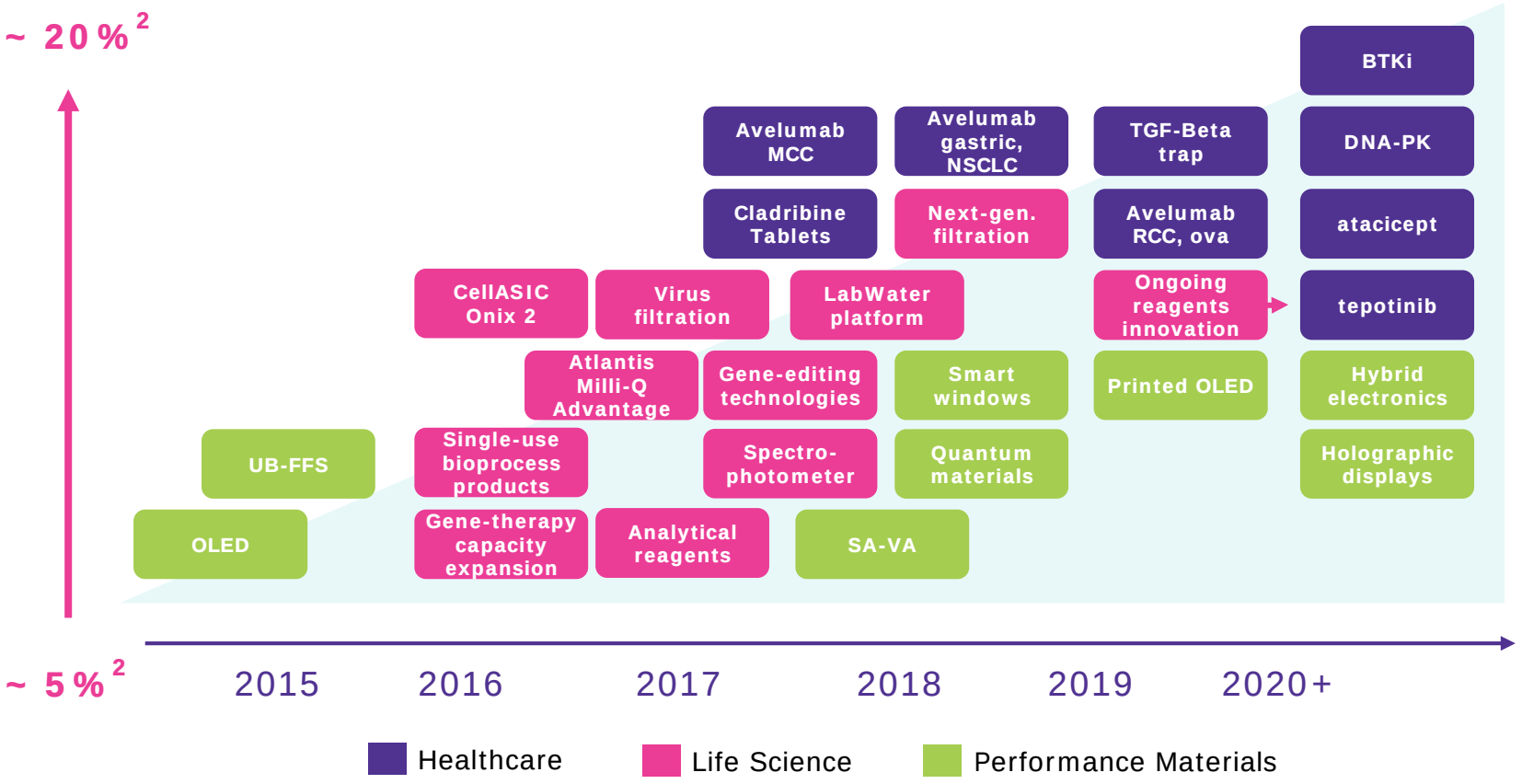
2016 dividend

- Dividend of €1.20 per share for 2016, reflecting 19.3% of EPS pre
- Dividend development in line with business performance and earnings progression
- Dividend yield[2] of 1.21%

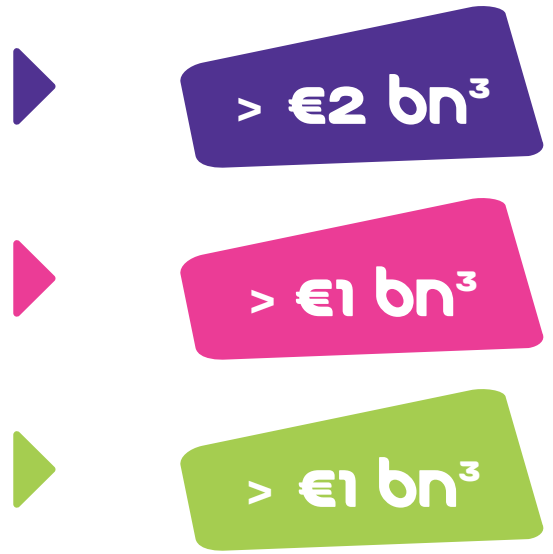
[1]Adjusted for share split, which has been effective since June 30, 2014; [2]Calculated with 2016 year-end share price of 99.15€ per share

Our strong innovation capabilities will drive growth

New product launch cadence[1] by business sector



New product sales[3] potential 2022



Our rich 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

Portfolio management: Differentiating across diverse business models

General Medicine portfolio

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

Biologicals portfolio

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

Oncology & Immunology innovation portfolio

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

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

The road to maximizing Healthcare's existing franchises is clear

ERBITUX CETUXIMAB

Continue to drive mCRC* share by increasing patient testing and expanding head and neck coverage

consumer health

Ongoing 3x3 growth strategy implementation to strengthen sales and marketing activities delivering above-market organic sales growth

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* 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

Glucophage Concor Euthyrox Saizen

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

*Abbreviations: mCRC = metastatic colorectal cancer, ART = Assisted Reproductive Technology

Clinical pipeline

Phase I

M2698 – p70S6K & Akt inhibitor
Solid tumors

M3814 – DNA-PK inhibitor
Solid tumors

M9831 (VX-984) – DNA-PK inhibitor
Solid tumors

M6620 (VX-970) – ATR inhibitor
Solid tumors

M4344 (VX-803) – ATR 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)[6]
Cancer immunotherapy
Solid tumors

M7824 - anti-PD-L1/TGF-beta trap
Solid tumors

M1095[8] (ALX-0761)
Anti-IL-17 A/F nanobody
Psoriasis

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 carcinoma 1L[1]

Sprifermin
Fibroblast growth factor 18
Osteoarthritis

Atacicept
Anti-Blys/anti-APRIL fusion protein
Systemic lupus erythematosus

Atacicept
Anti-Blys/anti-APRIL fusion protein
IgA nephropathy

Abituzumab
anti-CD 51 mAb
Systemic sclerosis with interstitial lung disease

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
Non-small cell lung cancer 2L[2]

Avelumab – Anti-PD-L1 mAb
Gastric cancer 1L[1M]

Avelumab – Anti-PD-L1 mAb
Gastric cancer 3L[3]

Avelumab – Anti-PD-L1 mAb
Urothelial cancer 1L[1M]

Avelumab – Anti-PD-L1 mAb
Ovarian cancer platinum resistant/refractory

Avelumab – Anti-PD-L1 mAb
Ovarian cancer 1L[1]

Avelumab - Anti-PD-L1 mAb
Renal cell cancer 1L[1]

Avelumab - Anti-PD-L1 mAb
Locally advanced head and neck cancer

MSB11022[7]
Proposed biosimilar of Adalimumab
Chronic plaque psoriasis

Registration

Cladribine[4] Tablets – Lymphocyte targeting agent
Relapsing-remitting multiple sclerosis

Avelumab[5] – Anti-PD-L1 mAb
Merkel cell carcinoma

- Neurology
- Oncology
- Immunology
- Immuno-Oncology
- Biosimilars

Pipeline as of July 28th , 2017
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.

[1] 1st line treatment; [1M] First Line maintenance treatment; [2] 2nd line treatment; [3] 3rd line treatment; [4] European Medicines Agency (EMA) accepted Marketing Authorization Application (MAA) from Merck KGaA, Darmstadt, Germany in July 2016; [5] EMA accepted MMA from Merck KGaA, Darmstadt, Germany in July 2016 and on March 23, 2017, the US FDA has approved avelumab for the treatment of adults and pediatric patients 12 years and older; [6] Sponsored by the National Cancer Institute (USA); [7] On April 24, 2017 Merck KGaA, Darmstadt, Germany announced the divestment of its Biosimilars business to Fresenius, closing is expected in H2 2017, subject to regulatory approvals and other conditions; [8] As announced on March 30, 2017 in a agreement with Avillion, anti-IL-17 A/F nanobody will be developed by Avillion for plaque psoriasis and commercialized by Merck KGaA, Darmstadt, Germany

Merck KGaA
Darmstadt, Germany

Oncology
Strategy anchored on four foundational pillars

1	**Avelumab**	1. Monotherapy as a basis for combinations 2. Establish immunogenic priming in combination or sequence with CT/RT[1] 3. Proprietary novel combinations 4. Establish value of unique molecular characteristics (ADCC)	1. MCC, UC 2L, Gastric 3L, NSCLC 1L/2L, 2. Maintenance in UC 1L, gastric 1L, ovarian 1L 3. Avelumab + Inlyta (RCC 1L), plus 5 phase 1 combinations 4. DLBCL, NSCLC 1L (high intensity), unique combinations leveraging ADCC
2	**IO bi-functionals**	Engineer or access platforms where biology is best addressed by a bi-functional approach	• anti-PD-L1/TGF-beta trap • anti-PD-L1/anti-LAG-3 • NHS-IL 12
3	**DNA Damage Response (DDR)**	Establish leadership in DDR and leverage synergies across portfolio (immuno-oncology plus emerging platforms)	• DNA-PK-i • ATR-i • ATM-i
4	**Emerging Platforms**	Invest in complementary discovery areas	• Antibody-Drug-Conjugates (ADC, e.g. partnership with Mersana/Sutro) • Oncogenic signaling • Bi-functional fusion proteins • Bi-specific antibodies

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

External Innovation

2017 deal activity aligned with strategic pillars

1 Clinical collaborations for avelumab combinations

Expand across the immunity cycle

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

2 + F-star

Leading bi-specific platform

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

3 + VERTEX

Strengthen DDR platform

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

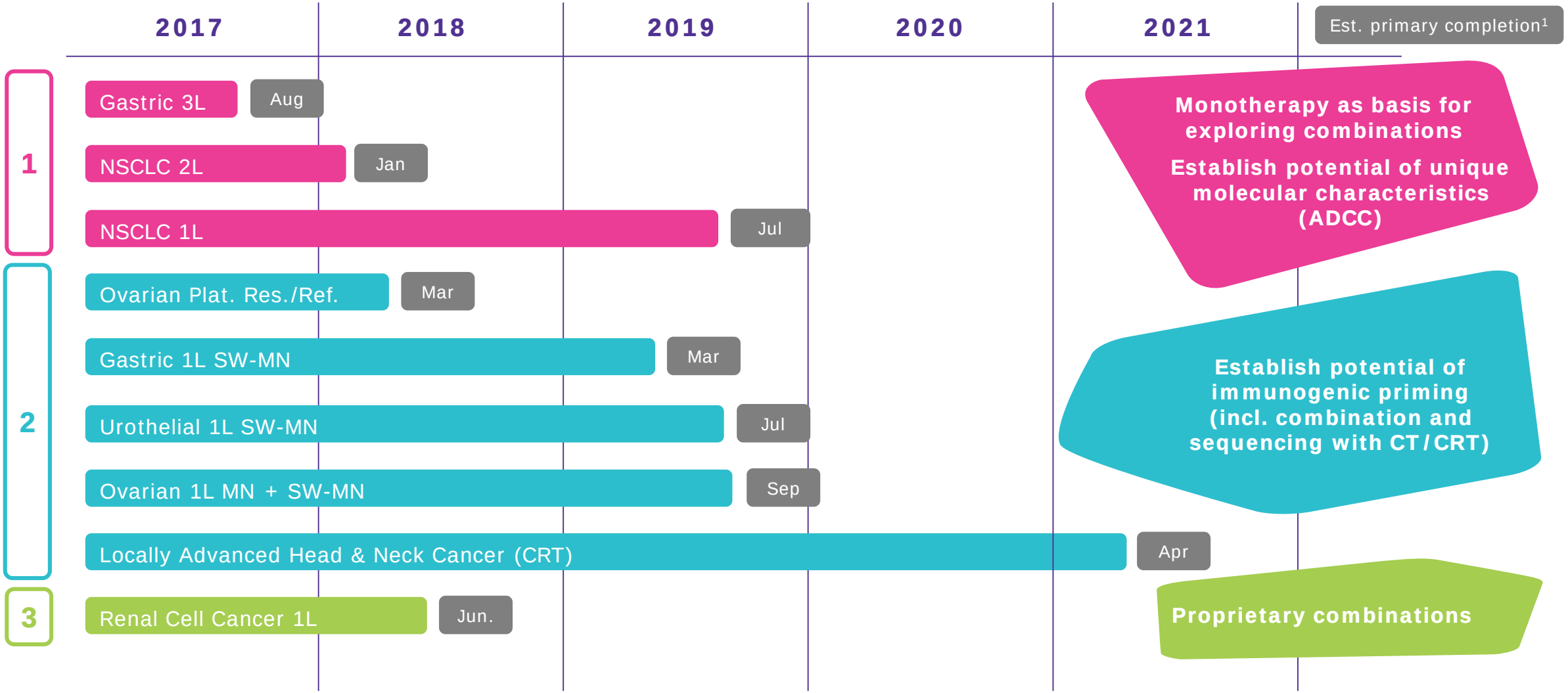
Vertex

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

Merck KGaA, Darmstadt, Germany

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

Avelumab
Nine ongoing pivotal studies with differentiation potential



[1] Estimated primary completion date acccording to Clinicaltrials.gov as of August 2, 2017
Acronyms: CT: Chemotherapy | CRT: Chemoradiotherapy | Plat. Res./Ref.: Platinum Resistant/Refractory | MN: Maintenance | SW: Switch

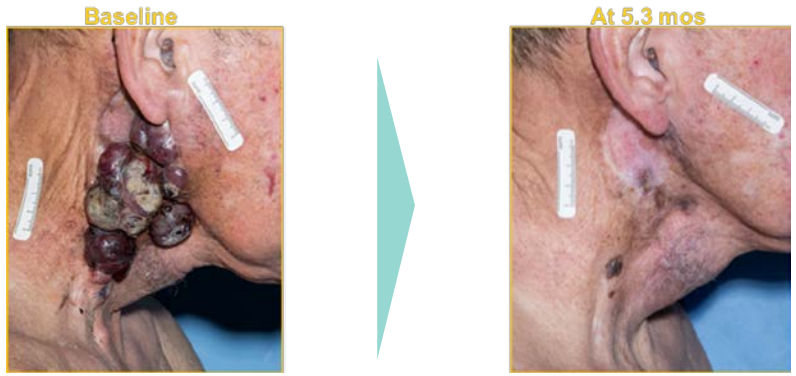
Merck KGaA
Darmstadt, Germany

Avelumab

Clinical results support avelumab as therapeutic option for metastatic Merkel cell carcinoma

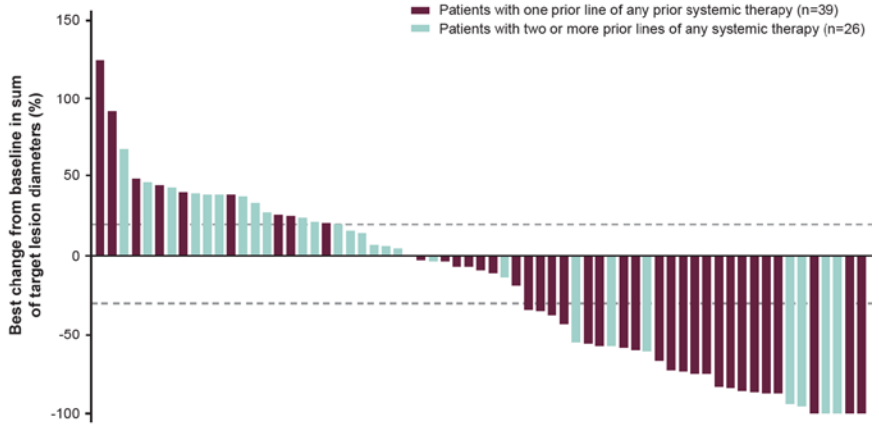
Encouraging response rates[1]

- ORR: 31.8%
  - 9.1% complete response
  - 22.7% partial response
  - Rapid (78.6% responding within 7 weeks of treatment)
  - Durable (82.1% still responding at time of analysis)
- 6-mo OS: 69% (median OS: 11.3 months)
- 6-mo PFS rate: 40%
- Manageable safety profile; no unexpected safety signals



Potential for differentiation

- Largest international multicenter, open-label study of anti-PD-L1/PD-1 reported in this patient population (88 patients) – Responses observed in large number of patients
- Improved response rates observed when used earlier, i.e. fewer lines of prior chemotherapy appeared to be associated with better response to avelumab in MCC 2L and beyond
  - ORR of 40.4% for patients with one prior systematic treatment
  - ORR of 19.4% for patients with two and more prior treatments



Note: timelines are event-driven and may change

[1]Avelumab (MSB0010718C; anti-PD-L1) in patients with metastatic Merkel cell carcinoma previously treated with chemotherapy: results of the phase 2 JAVELIN Merkel 200 trial / Oral Presentation at the 52nd ASCO Annual Meeting, June 3-7, 2016; Chicago, Illinois. Abstract No. 9508; Howard Kaufman et al.

Key ASCO abstracts at a glance (two oral presentations)

MCC (1L)

- Initial results from a cohort of chemotherapy-naïve pts with mMCC (ongoing study)
- Manageable safety profile, consistent with findings for 2L+ cohort
- **Unconfirmed ORR: 64.0%** (≥6 weeks follow-up) / **Confirmed ORR: 56.3%** (≥3 months follow-up)
- Avelumab is associated with early responses; preliminary results suggest that responses mature to become durable

NSCLC

- Exposure-response and PD-L1 expression analysis of NSCLC 2L (Phase I cohort)
- Patients in upper half of increased exposure ($C_{troughfirst}$-dose quartiles Q3-Q4) showed increasing ORR (by higher PD-L1-staining level); **ORR: 25% (≥1%); 26% (≥5%); 33% (≥50%); 43% (≥80%)***
- Analysis provides rationale for the modification of the NSCLC 1L Phase III trial

Urothelial

- Updated efficacy and safety data of avelumab in metastatic urothelial carcinoma 2L (pooled Phase Ib)
- Durable responses in heavily pretreated patients, irrespective of tumor PD-L1 expression status
- **Confirmed ORR: 17.4%;** 6.2% CR (≥6m follow-up)

RCC (oral presentation)

- First line avelumab + Inlyta therapy in patients with advanced renal cell carcinoma 1L (Phase Ib)
- Preliminary findings confirm manageable safety profile and consistent with agents administered as monotherapy
- **Confirmed ORR: 58.2%,** based on 3 CR and 32 PR (follow-up ongoing)

Anti PD-L1/ TGF-beta trap (oral presentation)

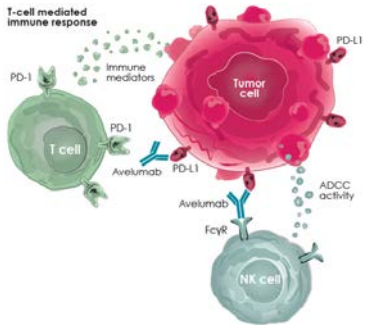
- Preliminary results from Phase I dose-escalation study (bifunctional fusion protein targeting PD-L1 and TGF-β)
- Manageable safety profile in patients with heavily pre-treated advanced solid tumors
- Early signs of clinical efficacy: **1 ongoing confirmed CR** (cervical), **1 durable PR** (pancreatic), **1 unconfirmed PR** (anal)
- A 25% reduction in the sum of diameters of target lesions after 2 doses of M7824 (cervical), and 2 cases of prolonged stable disease (pancreatic; carcinoid).

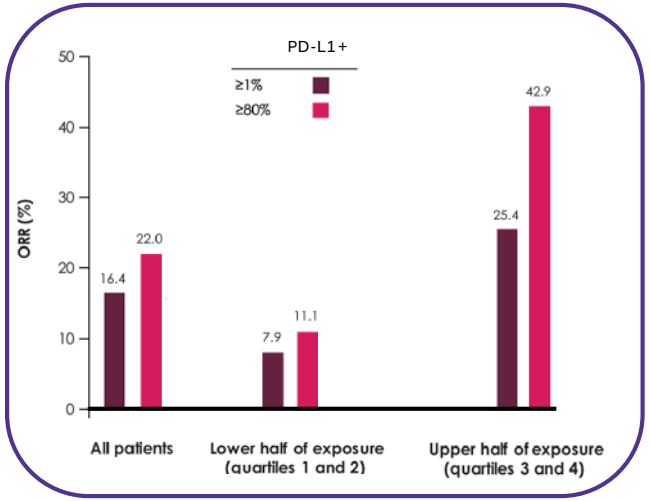
Note: timelines are event-driven and may change

[1]Avelumab (MSB0010718C; anti-PD-L1) in patients with metastatic Merkel cell carcinoma previously treated with chemotherapy: results of the phase 2 JAVELIN Merkel 200 trial / Oral Presentation at the 52nd ASCO Annual Meeting, June 3-7, 2016; Chicago, Illinois. Abstract No. 9508; Howard Kaufman et al.

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

NSCLC 2L+: exposure response

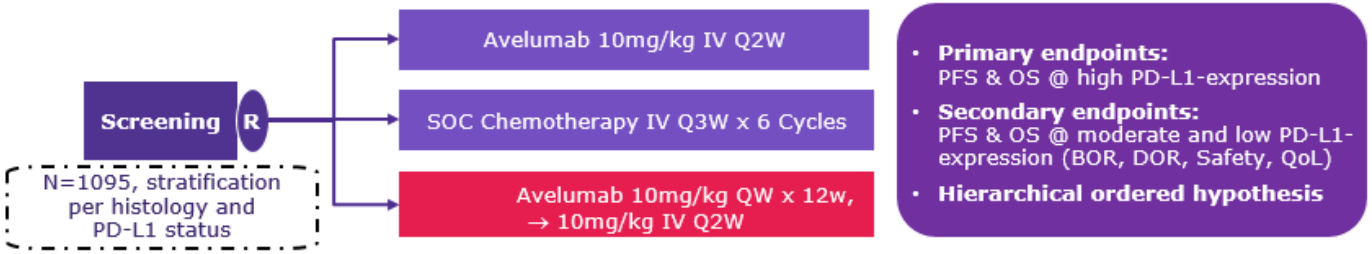




NSCLC 1L: testing hypothesis of higher efficacy/intensity correlation

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

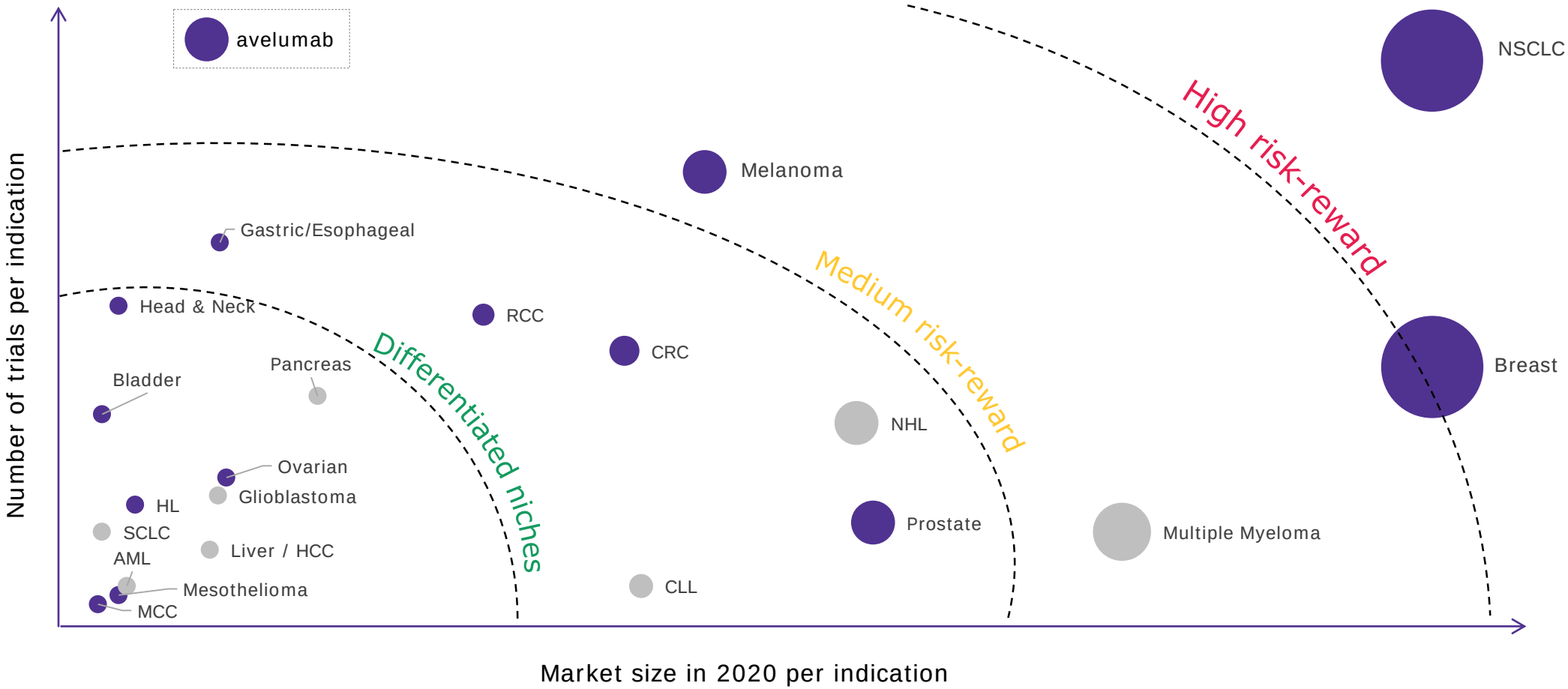
- Potential association between **higher ORR** and **higher avelumab exposure**
- ORR highest in patients with both higher avelumab **exposure** and tumors with higher levels of **PD-L1 expression**
- **NSCLC 1L phase III trial amended** to leverage high-intensity hypothesis (est. primary completion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



[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

Avelumab plays predominantly in attractive and differentiated niches



Avelumab
Differentiation strategy varies according to chosen target indication and market

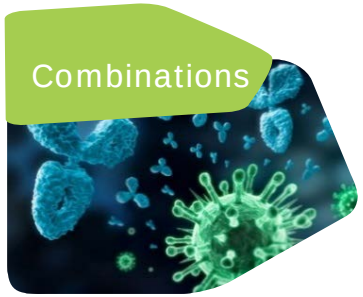
1
Unsaturated and / or niche indications

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

2
Saturated and / or major indications

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

Avelumab
Combinations will drive differentiation strategy



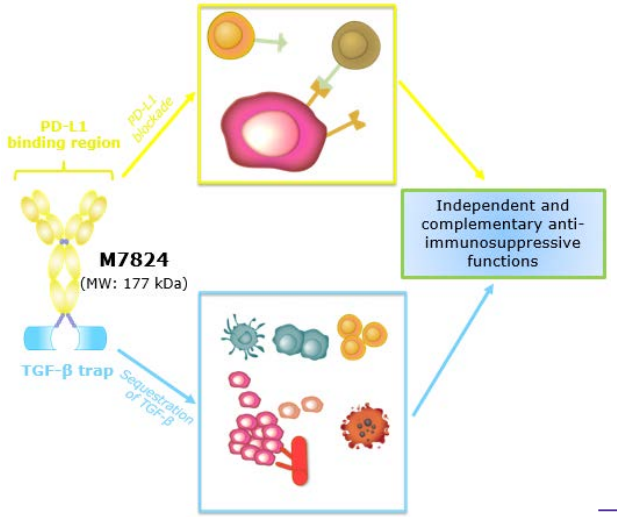
- **In registration: metastatic Merkel Cell (EU)**
- Phase III: Ovarian (1L & Plat. Res. Ref.) [1]
- Phase III: Gastric (1L MN & 3L)
- Phase III: NSCLC (1L & 2L)
- Phase III: Urothelial (1L MN)
- Phase III: SCCHN (Locally advanced, Front line)
- Phase II: Merkel Cell (1L)
- Multiple other tumor types

- **Phase III: Ovarian 1L & Plat. Res. Ref.**[1]
  (Avelumab + Chemotherapy)
- **Phase III: Renal 1L**
  (Avelumab + Inlyta)
- **Phase III: L/A Head and Neck**
  (Avelumab + Chemoradiation)
- **Phase I: DLBCL**[2]
  (Avelumab + various agents)
- **Phase I/II: Advanced malignancies**
  (Avelumab + 4-1BB / + OX40)
- **Phase Ib/II: Ovarian**
  (Avelumab + Entinostat; Syndax)
- **Phase I/Ib: Ovarian**
  (Avelumab + VS-6063; Verastem)
- **Phase I/II: SCCHN**
  (Avelumab + TG4001; Transgene)
- **Phase Ib/II: NSCLC**
  (Avelumab + VX15/2503; Vaccinex)
- **Phase I/Ib: NSCLC**
  (Avelumab + Debio1143; Debiopharm)
- **Phase I/Ib: Glioblastoma and Colorectal**
  (Avelumab + VXM01; VAXIMM)

[1]Avelumab is explored in both mono- and combination therapy; [2]Diffuse Large B-cell lymphoma

2 Anti-PD-L1/TGF-ß trap

Dose escalation completed, showing first signs of clinical activity[1]



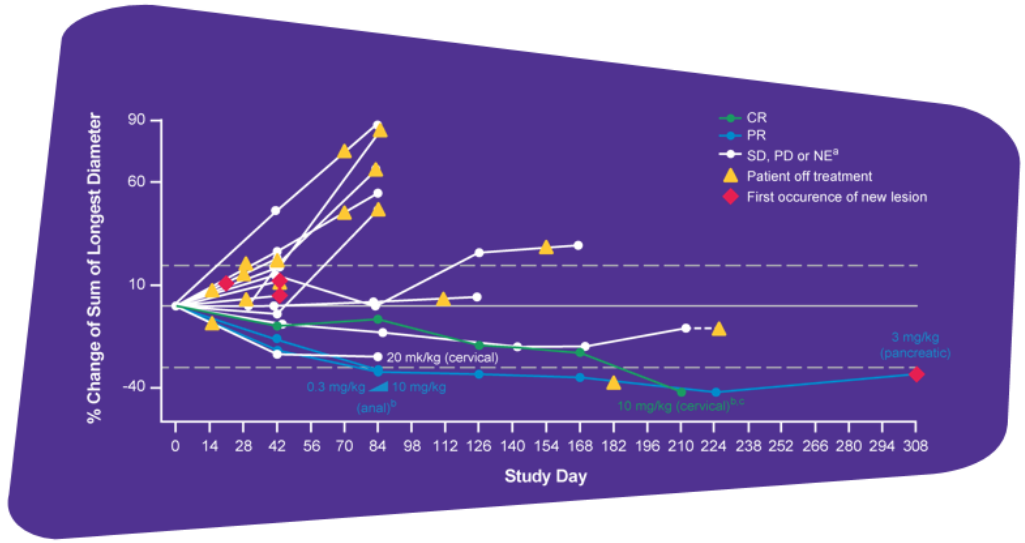
- **Innovative first-in-class bifunctional fusion protein** designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF-β signaling)
- **Manageable safety profile** (patients with heavily pretreated advanced solid tumors)
- **Saturated peripheral PD-L1** and **sequestered all released plasma TGF-β1, -β2, and -β3[1]**

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

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

Primary endpoints
- TEAEs
- DLTs
- Treatment-related AEs

Secondary endpoints
- PK
- M7824 immunogenicity
- BOR



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

2

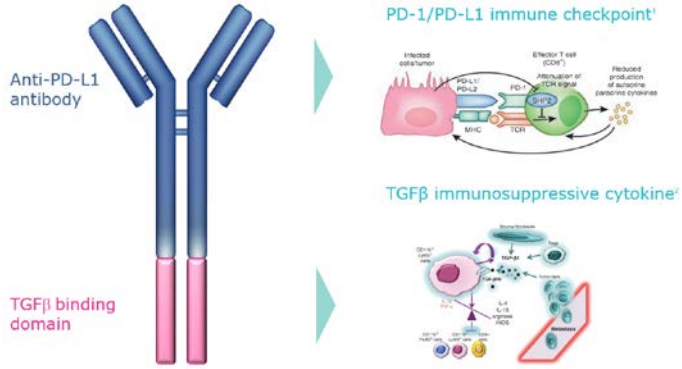
Anti-PD-L1/TGF-ß trap
PD-L1–TGF-beta indicates potential to move beyond checkpoint inhibitors

Four focus areas for exploration

- Replace current IO SOC (leveraging Dual MOA)
- Identify opportunities where current IO SOC is not established yet
- Explore non-immunogenic tumor types (alter micro-environment)
- Explore opportunity in PD-x Failures

Status and next steps

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



Merck KGaA
Darmstadt, Germany

2 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

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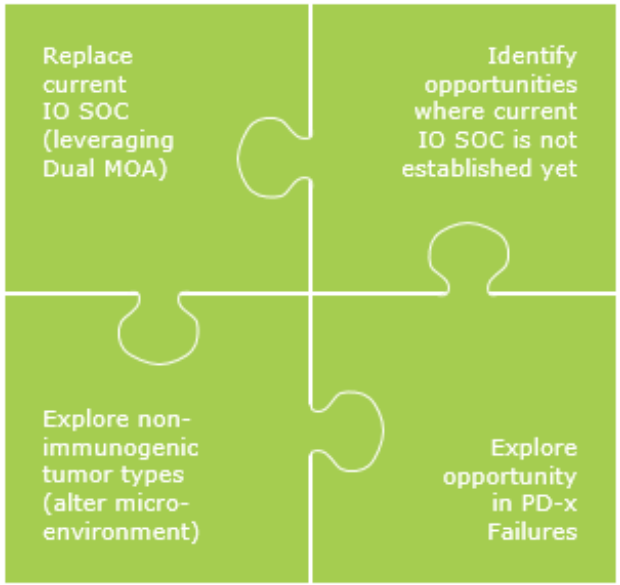
- **Ongoing confirmed CR** (cervical, 10 mg/kg)
- **Durable confirmed PR** (pancreatic, 3 mg/kg)
- **Unconfirmed PR** (anal, 0.3 mg/kg 10 mg/kg)
- **Near-PR** (cervical, 20 mg/kg)
- **Prolonged SD** (pancreatic, 3 mg/kg)
- **Prolonged SD** (carcinoid, 1 mg/kg)

14 cohorts in recruitment



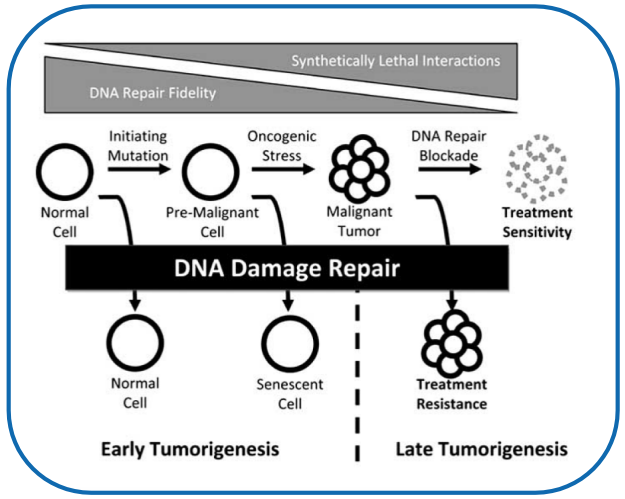
Defined criteria allow timely decision

- 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.
Acronyms: CR: complete response | PR: partial response

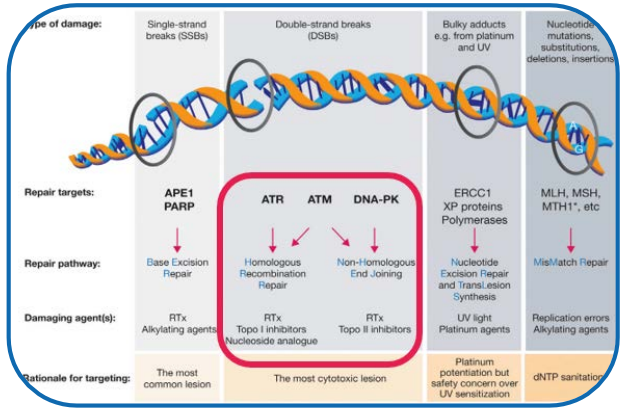
Merck KGaA
Darmstadt, Germany

3 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 |

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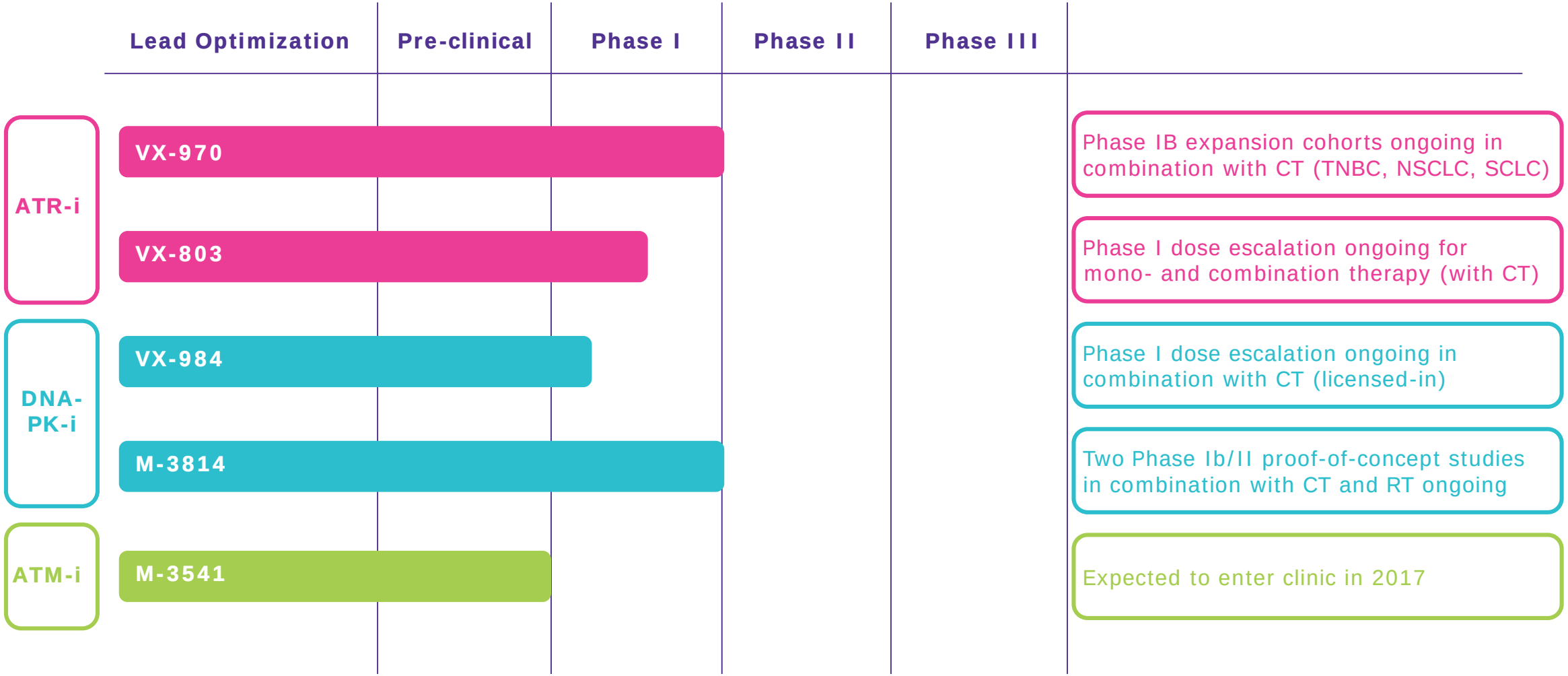
3

DNA damage response (DDR)

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



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

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

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

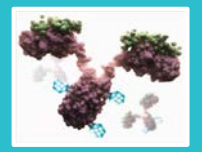
At least **70%** of all cancer patients receive some type of **CHEMOTHERAPY** (NCI 2016)

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

Combination with CT

Combination with RT

Combination with ADC



DNA-PK

ATM

ATR

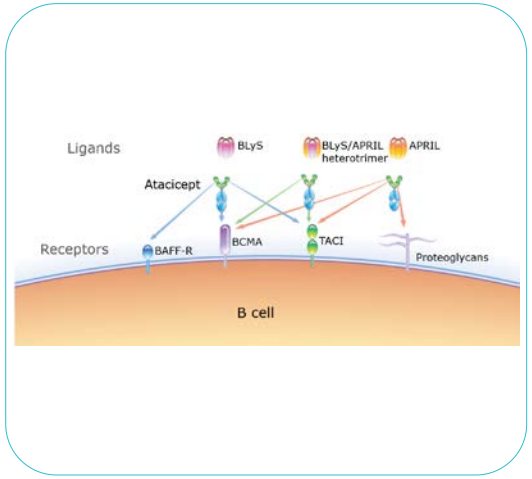
Monotherapy

Combination with DDR

Combination with IO

Update on selected assets

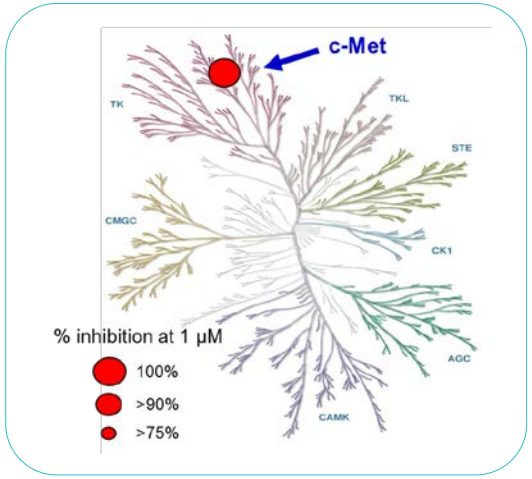
Atacicept



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

Phase III decision subject to interactions with authorities

Tepotinib

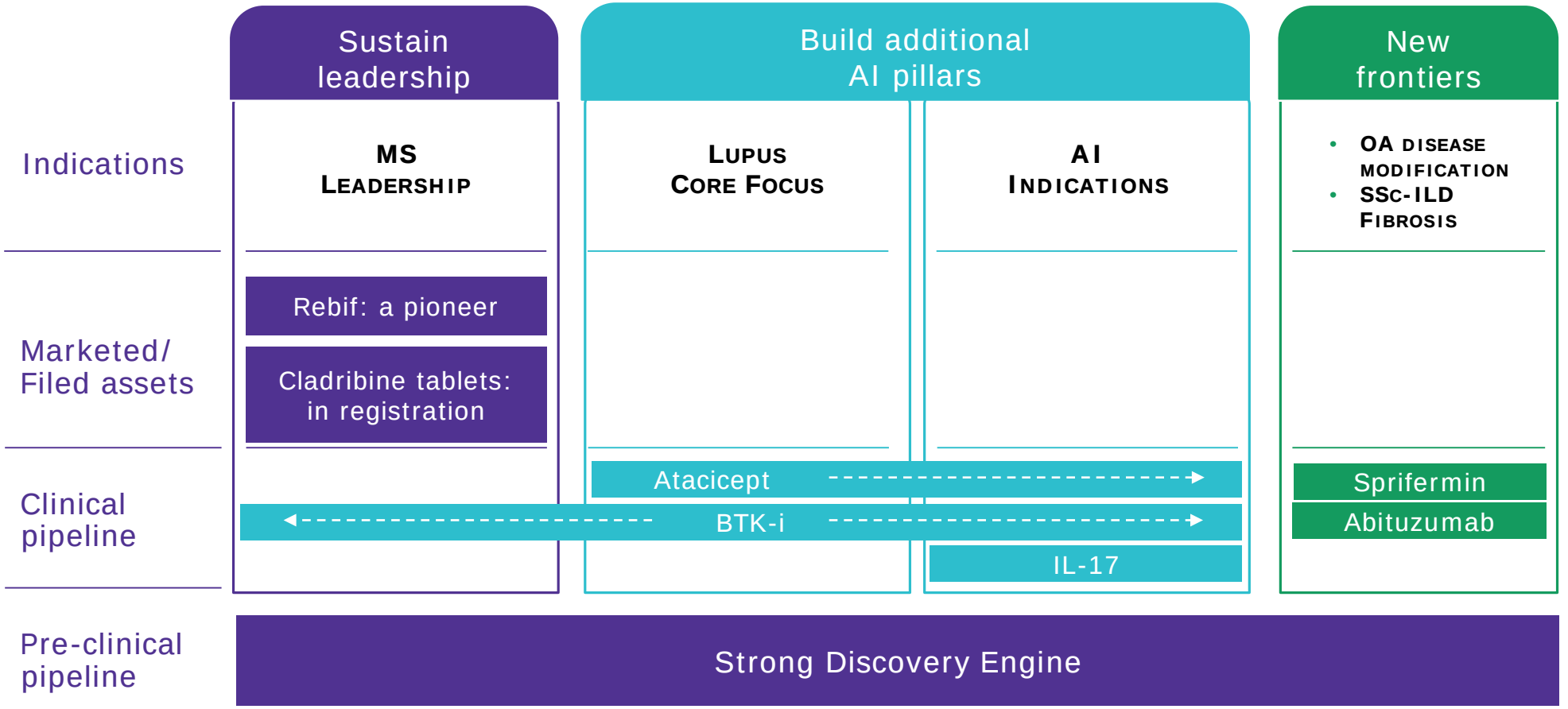


- Highly selective small molecule c-Met inhibitor
- Active in ligand-dependent and ligand-independent tumor models
- Biomarker-driven approach for patient selection
- Preliminary data show encouraging signs of anti-tumor activity in c-Met positive patients in NSCLC and HCC
- Phase II trials in progress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

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

Note: timelines are event-driven and may change and graphics are only illustrative

Immunology
Strategy anchored on leadership in selected disease areas



Cladribine tablets – Decision by EC expected in Q3 2017

Background

- Targets lymphocytes (both B and T cells), integral to MS pathogenesis
- Two Phase III and one Phase IIIb extension studies conducted in RRMS and early MS[1,2,3]; Phase II study in patients failing IFN beta therapy[5]
- Substantial new efficacy & safety characterization including data from long-term follow up (>10,000 patient-years)
- Most recent analyses provide relevant information on benefit/risk profile of cladribine tablets in RRMS:
  - ARR reduction (58%)
  - Risk of disability progression (33% reduction)
  - Relative reduction in mean number of lesion (86% reduction in T1 gadolinium-enhanced lesions)
  - 47% of patients experience NEDA over 2 years[4]

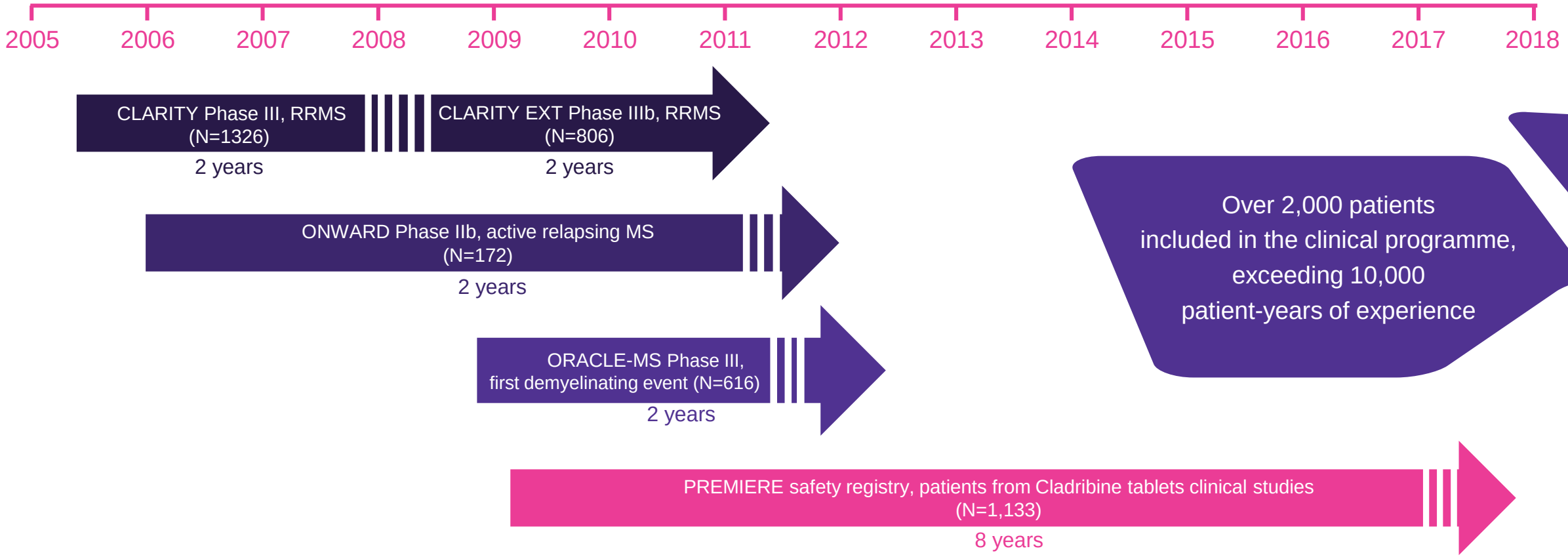
Potential for differentiation

- Merck KGaA, Darmstadt, Germany aims to address significant unmet needs for agents delivering high efficacy with favorable safety profile in a convenient dosing regimen
- Administered orally (tablet formulation)
- Extremely short treatment courses (8–10 days per year) leading to long-term efficacy[1]

Note: timelines are event-driven and may change

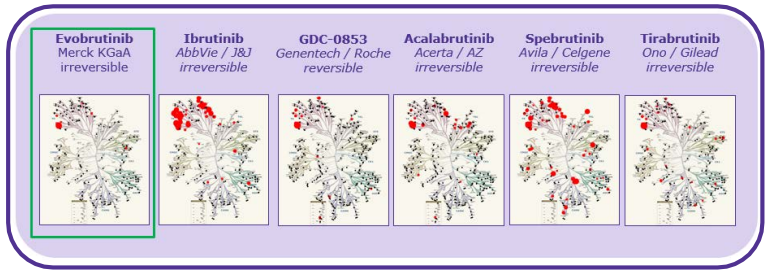
EC = European Commission; ARR = Annualized Relapse Rate; MAA = Marketing Authorization Application; MS = multiple sclerosis; NEDA = no evidence of disease activity; RRMS = relapsing-remitting multiple sclerosis. [1] Giovannoni G et al. New Engl J Med 2010;362:416–26; [2] Giovannoni G et al. 65th annual meeting of the American Academy of Neurology 2013. P07.119. [3] Leist TP et al. Lancet Neurol 2014;13:257–67. [4] Giovannoni G et al. Lancet Neurol. 2011;10:329–37. [5] Montalban X et al. 65th annual meeting of the American Academy of Neurology 2013. P07.099.

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



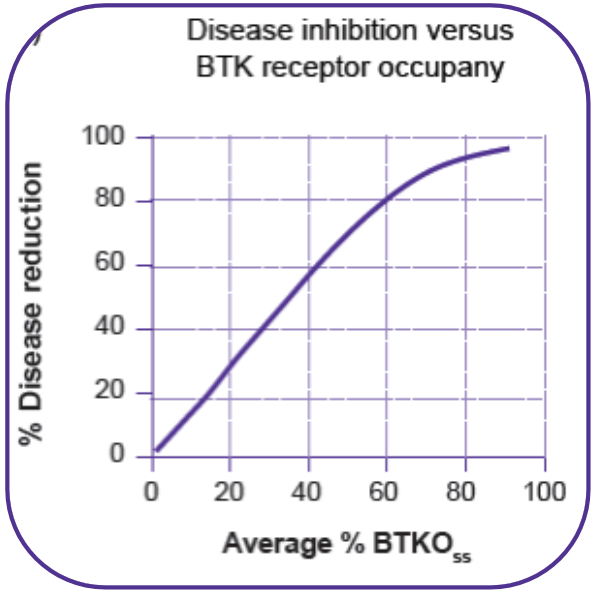
CLARITY: Giovannoni G et al. N Engl J Med 2010;362:416–26; CLARITY EXT: Giovannoni G et al. AAN 2016 [P3.028]; ONWARD: Montalban X et al. AAN; 2016 [P3.029]; ORACLE-MS: Leist TP et al. Lancet Neurol 2014;13:257–67; PREMIERE registry (NCT01013350) [clinicaltrials.gov]

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

Comprehensive phase I/IIa safety data-set

SLE (Ib)

Safety

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

RA (IIa)

Signal finding

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

Robust phase II program to enable differentiated phase III

RMS

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

SLE

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

RA

- Randomized, double-blind, placebo-controlled **dose-ranging study** in subjects with RA
- **Initiated in July 2017** subject to outcome of phase IIa study

Read-outs

Q1 2019

Q4 2019

Q4 2018

Source: clinicaltrials.gov | Note: timelines are event-driven and may change.

Outlook
Healthcare is well set for future growth

Stable existing business	Base business delivering solidly with stable outlook
R&D pipeline optionality	High quality assets across all three areas continuously complemented with short- and longer term optionalities
Innovative partnerships	Joint investments and innovative deals models to maximize potential of assets and maintain focus
Disciplined execution	Systematic pipeline review and timely decision making ensure efficient resource and budget allocation

03 LIFE SCIENCE

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

#1 website in research life science industry

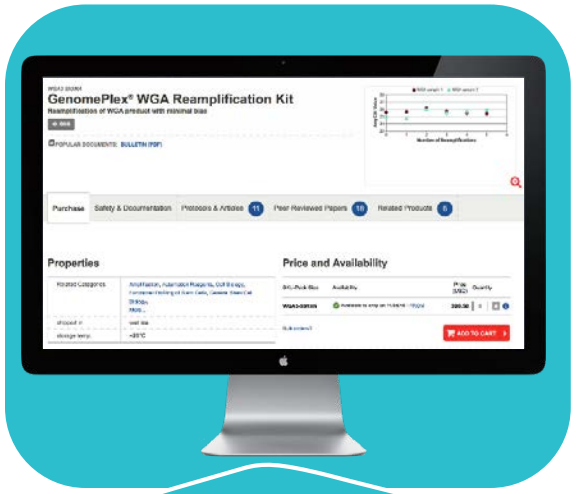
Industry leading e-commerce platform and supply chain capability

SEARCH

Hundreds of thousands of products at your fingertips

CONTENT

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



Real-time pricing and availability

ORDER

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

Merck KGaA
Darmstadt, Germany

Life Science delivers synergies and integrates as planned

synergies

Delivery of 2016 synergy target of €105 m:

- HQ measures complete
- >50% of headcount targets met
- 4 site closures in progress
- Procurement actions moving
- Preparing distribution consolidation

integration

Smooth integration ongoing with early achievements:

- Organization structure implemented
- High engagement from organization
- Common definition and implementation of processes well underway, e.g. pricing, customer excellence

No disruption of growth momentum during integration

04 PERFORMANCE MATERIALS

Performance Materials

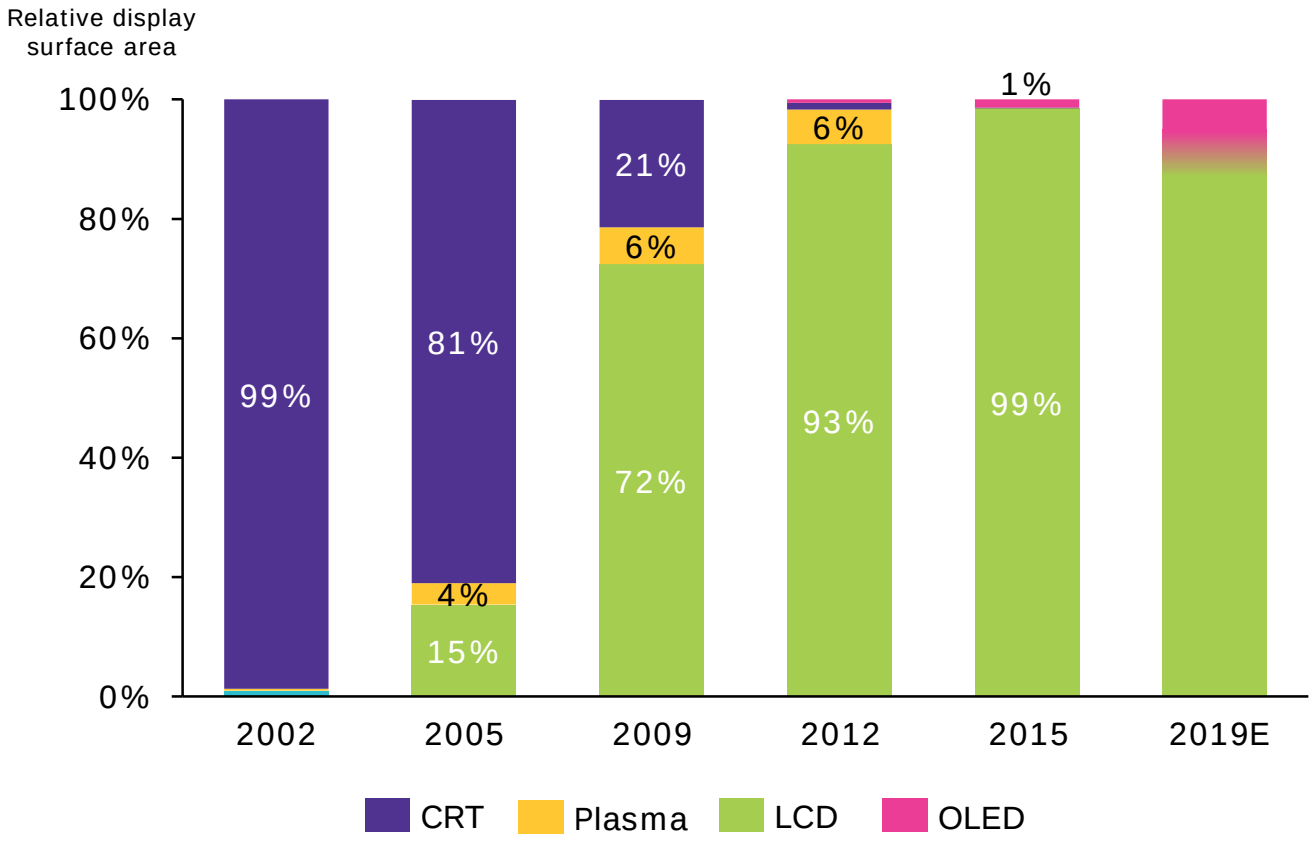
The four pillars are set for future profitable growth

Business unit	% sales	Products	Mid-term growth trend
 **Display Materials**	~50-55%	• Liquid crystals (LC) and photoresists for TVs, smartphones and tablet computers • Other display and non-display applications (e.g. LC Windows)	
 **Integrated Circuit Materials**	~15-20%	• Dielectrics, colloidal silica, lithography materials, yield enhancers, edge-bead removers • Polyimide raw materials and printing materials	
 **Pigments and Functional Materials**	~15-20%	• Effect pigments and functional materials for coatings, plastics, printing and cosmetics • Functional materials for cosmetics & special applications	
 **Advanced Technologies**	~5-10%	• Organic and inorganic light emitting diodes • Functional materials for electronics and energy solutions	

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

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

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

Market position

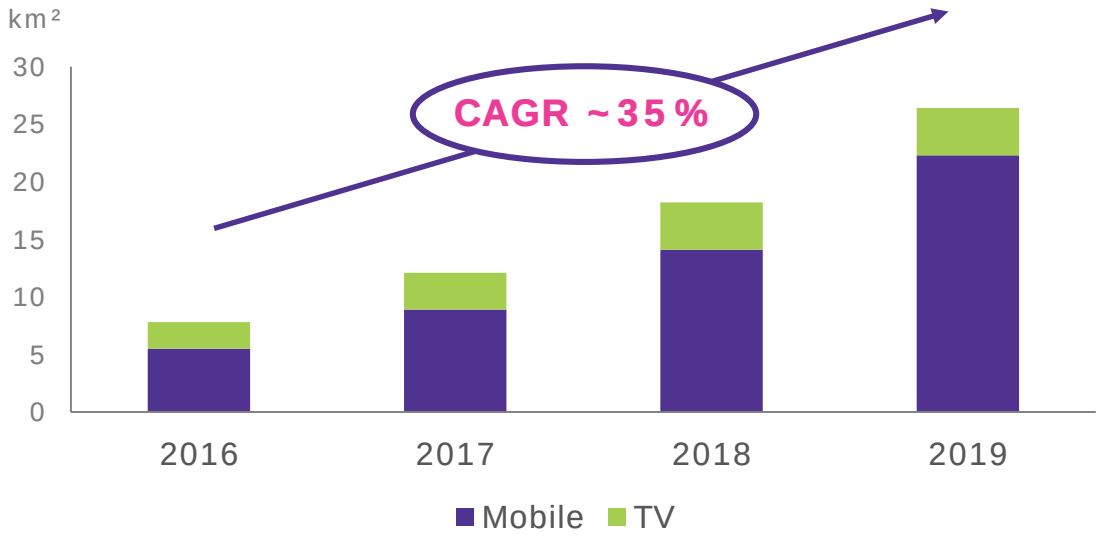
- Among top 3 OLED material provider
- Unrivaled experience and expertise in displays
- Long & intimate relationships with all display producers
- Recent capacity expansion to serve growing demand

our ambition

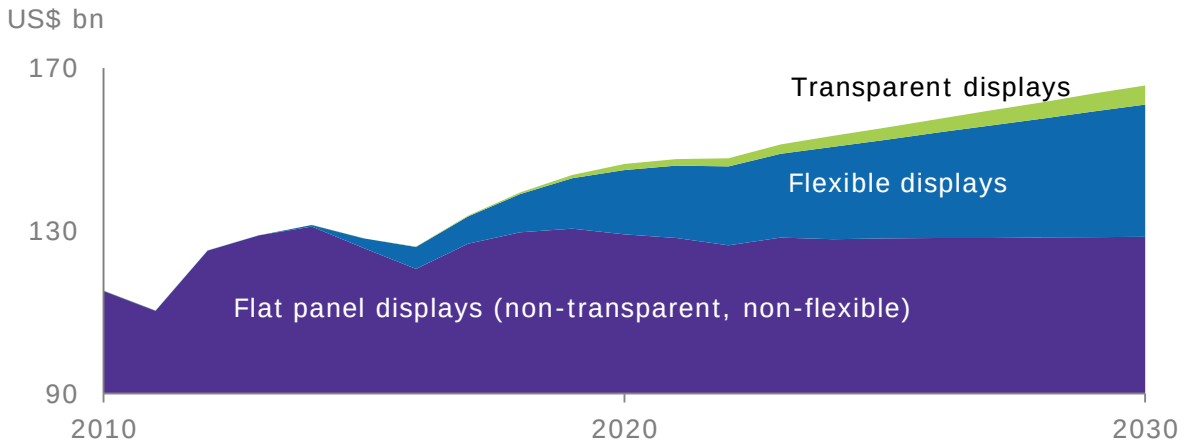
solution provider

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

Announced OLED capacity expansion[1]



Display market development[1]



[1]Source: IHS, Merck KGaA, Darmstadt, Germany, VLSI

Liquid crystals offer a variety of opportunities

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

Merck KGaA, Darmstadt, Germany has a strong position and will benefit further from complex technological advances and underlying market trends

Market drivers and technological trends

Miniaturization: Devices are becoming smaller with better performance
- Need for enabling materials to reduce size (Moore's law)

Mobility: Everyone is continuously connected without direct power supply
- More chips needed for local energy production
- Energy storage → smaller batteries with higher density

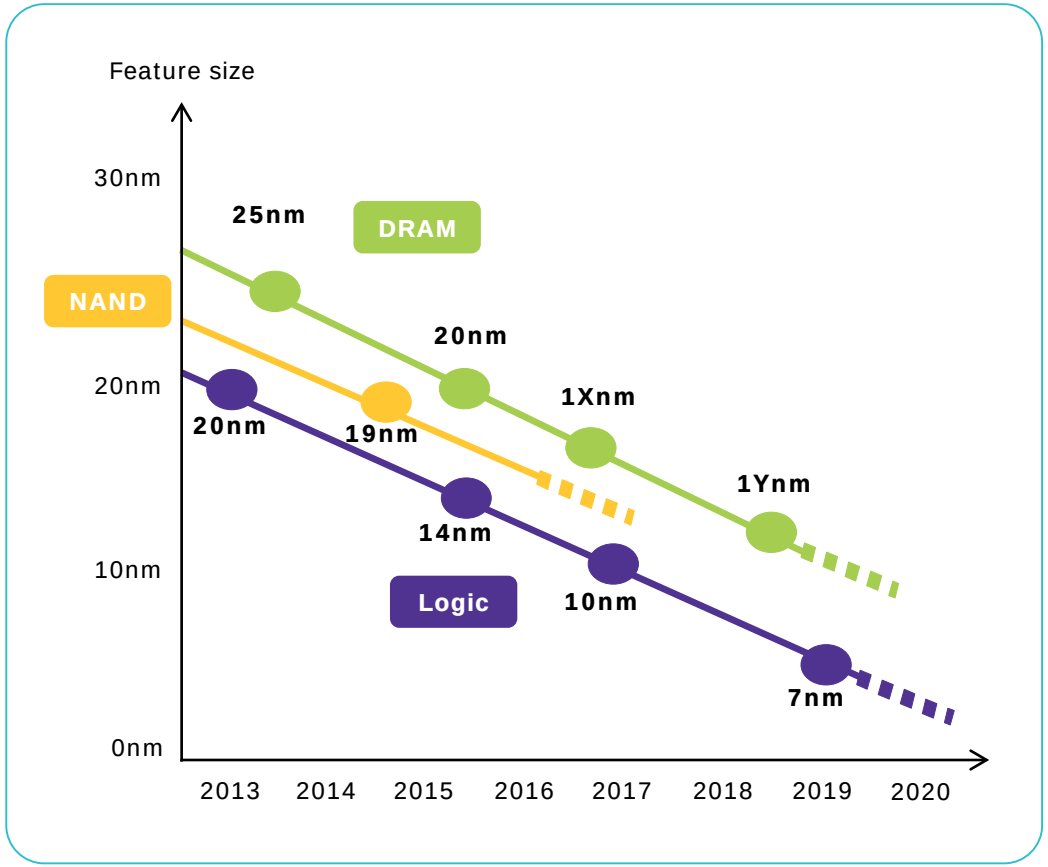
Internet of Things: Everything is continuously connected
- More gadgets and devices that include chips
- Increasing amount of communication and sensor chips

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

Selected competitors

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

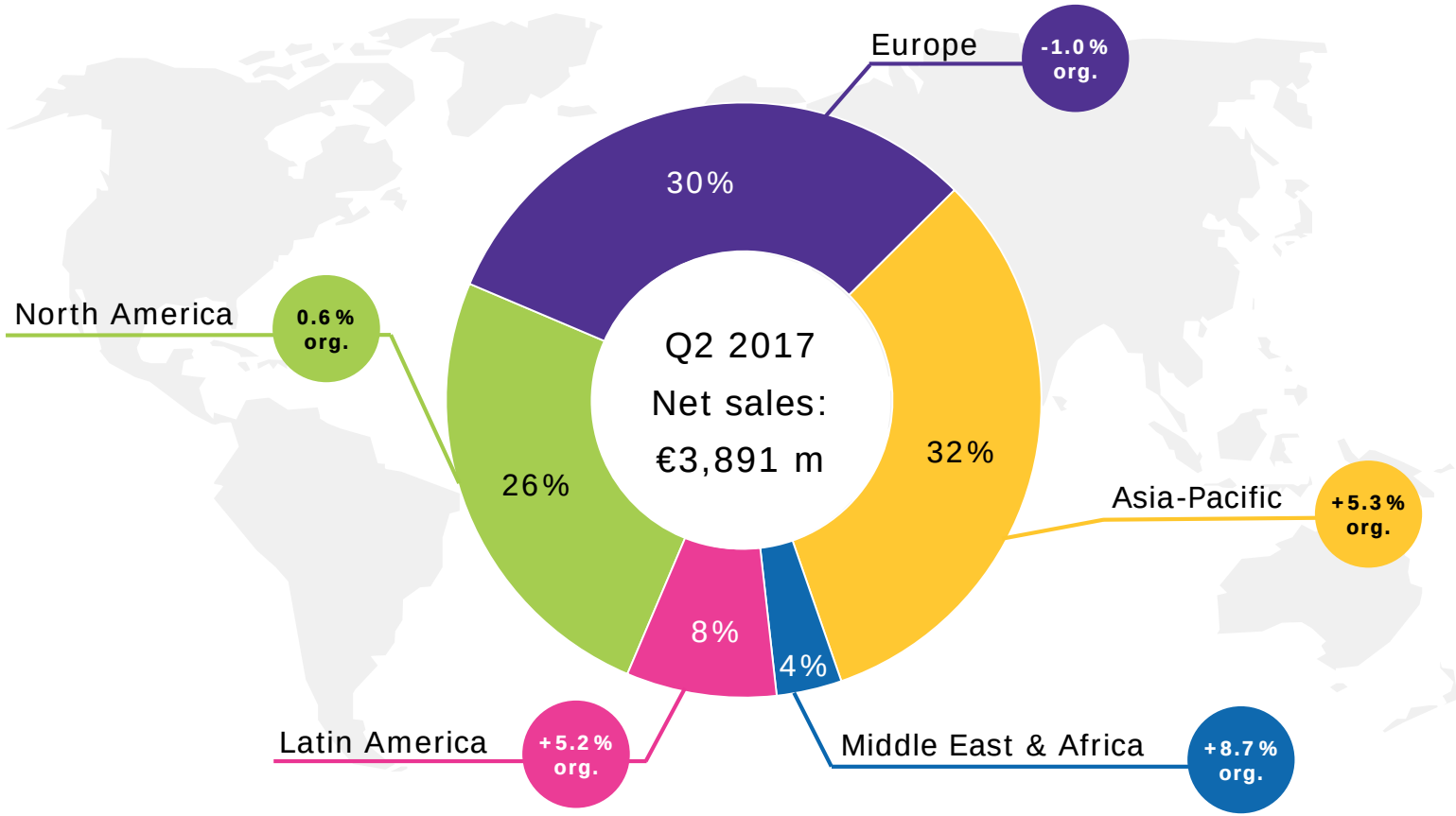
Feature sizes develop as predicted by Moore's law



05 FINANCIAL OVERVIEW

Organic growth driven by APAC, LATAM and MEA

Regional breakdown of net sales [€ m]



Regional organic development

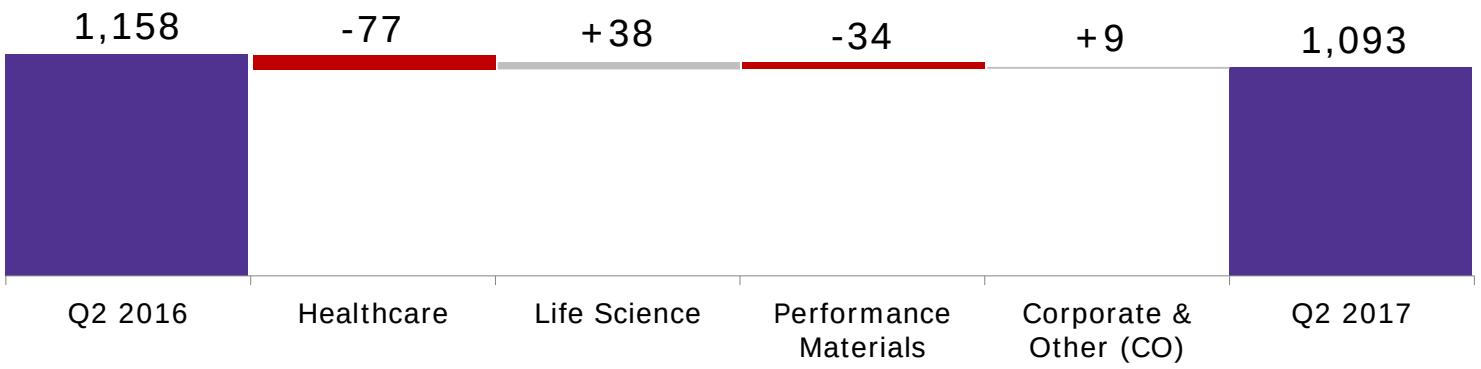
- Slight decline in Europe reflects competition for Rebif, Erbitux and Gonal-f, mitigated by solid demand in Life Science
- Slight growth in North America from Life Science and Rebif pricing offset tough Gonal-f comparables
- Solid growth in APAC supported by Glucophage repatriation and strong Life Science demand in China, outweighing LC softness
- Strong performance in LATAM and MEA across all major businesses

Investments in Healthcare and softness in Liquid Crystals burden EBITDA pre

Q2 2017 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	2.6%	0.1%	-1.0%	**1.7%**
Life Science	4.2%	0.1%	0.3%	**4.6%**
Performance Materials	-3.2%	1.8%	0.0%	**-1.3%**
Group	2.3%	0.4%	-0.3%	**2.3%**

Q2 YoY EBITDA pre contributors [€ m]



- Healthcare reflects strong growth in General Medicine, especially Glucophage in China and resilience of portfolio
- Solid growth in Life Science driven by all business segments
- Organic growth of ICM*, Pigments and OLED is outweighed by ongoing market share normalization in Liquid Crystals

- Healthcare reflects investments in marketing & selling and R&D as well as negative product mix effects
- Life Science driven by organic growth and synergy realization
- Performance Materials lower due to un-favorable business mix & usual price declines
- CO contains positive FX hedging Δ vs. LY

*Integrated Circuit Materials
Totals may not add up due to rounding

Q2 2017: Overview

Key figures

[€m]	Q2 2016	Q2 2017	Δ
Net sales	3,805	**3,891**	2.3%
EBITDA pre	1,158	**1,093**	-5.6%
Margin (in % of net sales)	*30.4%*	*28.1%*	
EPS pre	1.55	**1.54**	-0.6%
Operating cash flow	311	**520**	67.1%

[€m]	Dec. 31, 2016	June 30, 2017	Δ
Net financial debt	11,513	**11,248**	-2.3%
Working capital	3,486	**3,775**	8.3%
Employees	50,414	**52,233**	3.6%

Comments

- EBITDA pre & margin reduction reflect investments in Healthcare and ongoing LC market share normalization
- EPS pre stable despite EBITDA pre decrease due to improved financial result
- Strong increase in operating cash flow driven by lower tax payments
- Net financial debt reflects strong operating cash flow amid dividend payment
- Working capital reflects increased receivables mainly due to Glucophage repatriation
- Higher headcount due to investments in growth markets and takeover of temporary workers

Totals may not add up due to rounding

Healthcare: Investments in future growth weigh on profitability

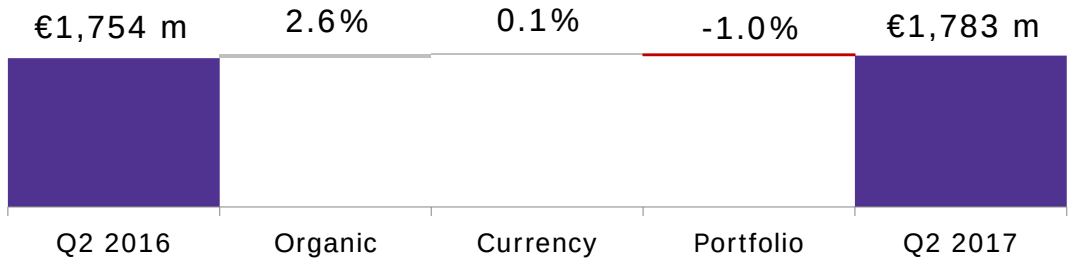
Healthcare P&L

[€m]	Q2 2016	Q2 2017
Net sales	1,754	1,783
Marketing and selling	-643	**-710**
Administration	-66	**-78**
Research and development	-378	**-389**
EBIT	298	**348**
EBITDA	558	**465**
EBITDA pre	557	**480**
Margin (in % of net sales)	*31.8%*	***26.9%***

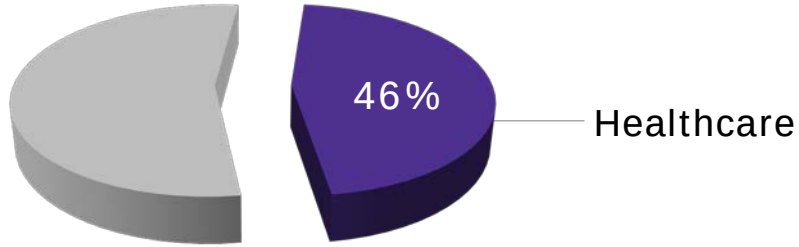
Comments

- Rebif organically lower as competition in U.S. & E.U. as well as tender phasing in Russia outweigh pricing and positive inventory effect in the U.S.
- Organic decline of Erbitux due to competitive and price pressure in EU outpaces growth in China & LATAM, but also facing strong base LY
- Fertility slightly lower, mainly due to Gonal-f with record quarter LY
- Marketing & selling reflects pre-launch investments for Bavencio and Mavenclad and Glucophage in China after full repatriation
- R&D investment picking up, expected further ramp-up in H2
- EBITDA pre reflects higher investments and negative mix effects exceeding income from milestone payment for Bavencio

Net sales bridge



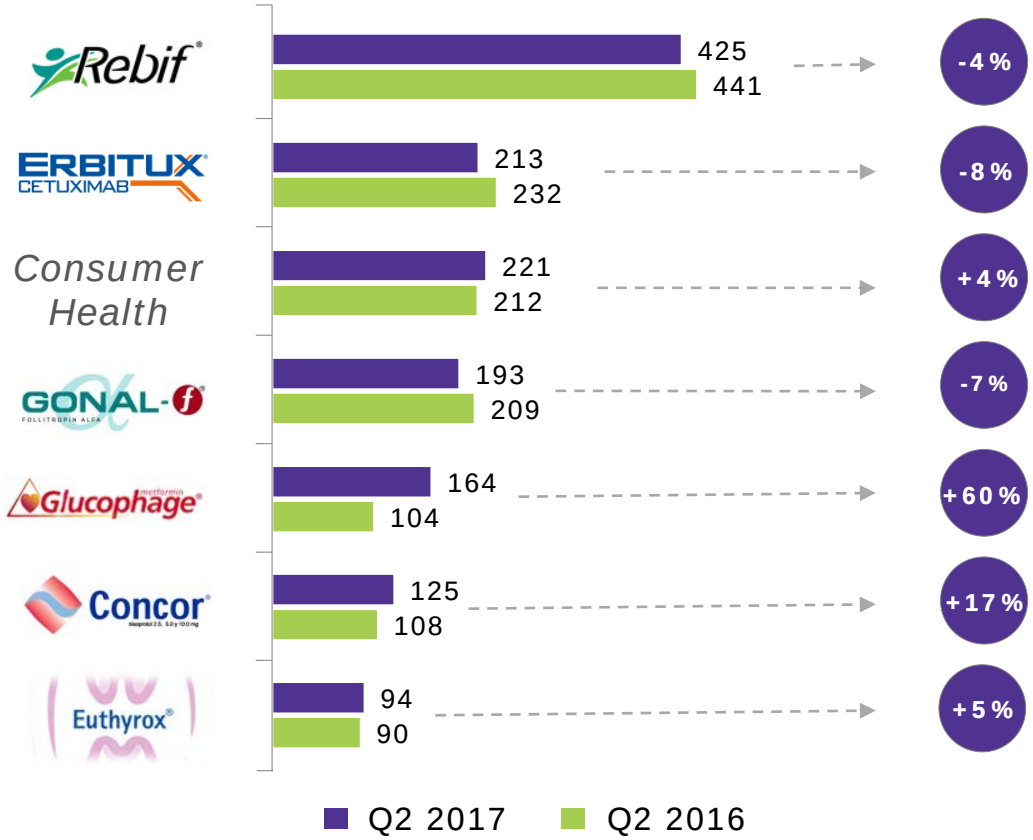
Q2 2017 share of group net sales



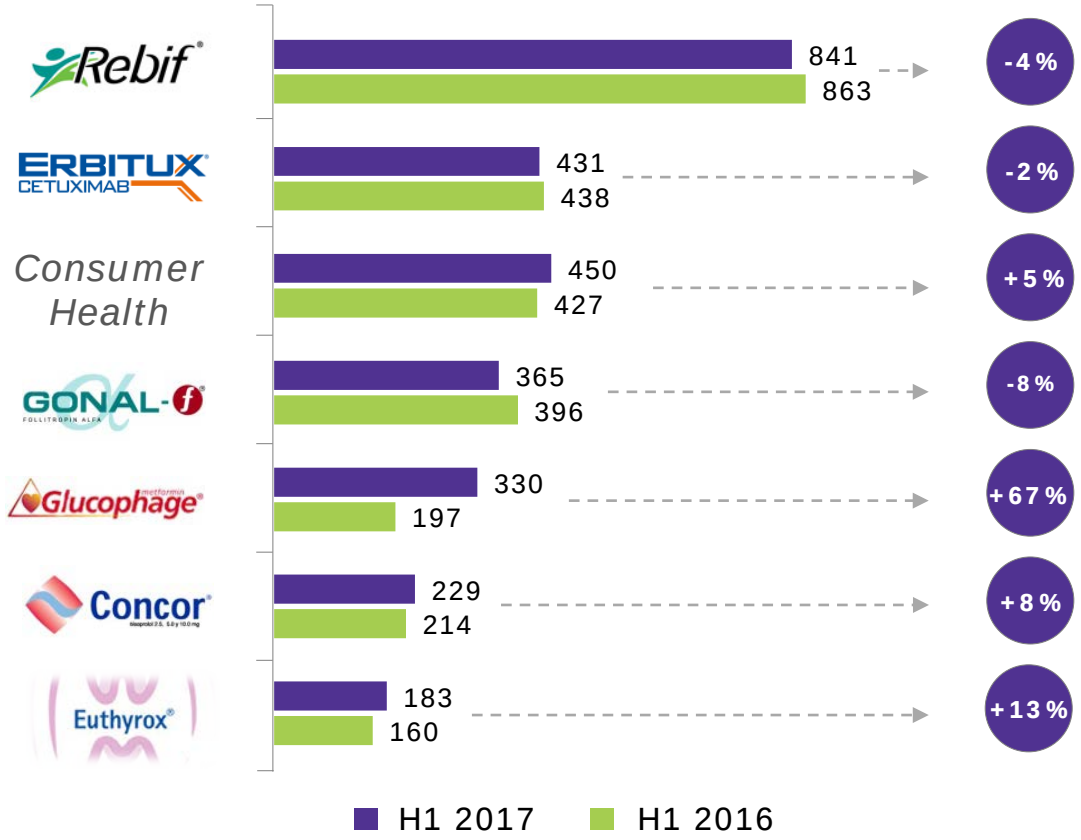
Totals may not add up due to rounding

Healthcare organic growth by franchise / product

Q2 2017 organic sales growth [%] by key product [€ m]



H1 2017 organic sales growth [%] by key product [€ m]

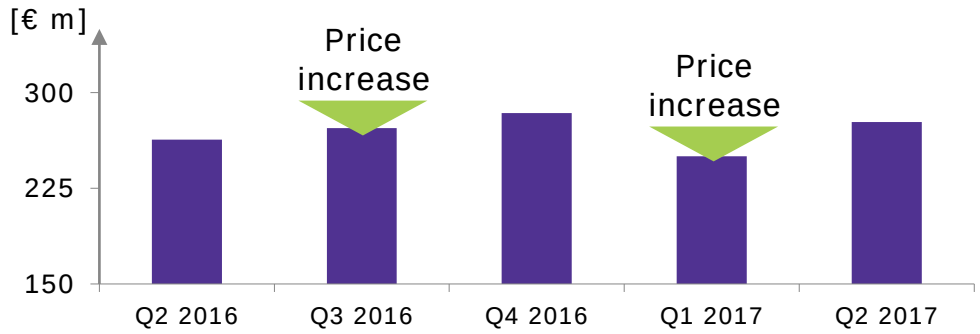


Totals may not add up due to rounding

Rebif: Relief in the U.S. – competitive ramp-up in Europe ongoing

Rebif sales evolution

North America



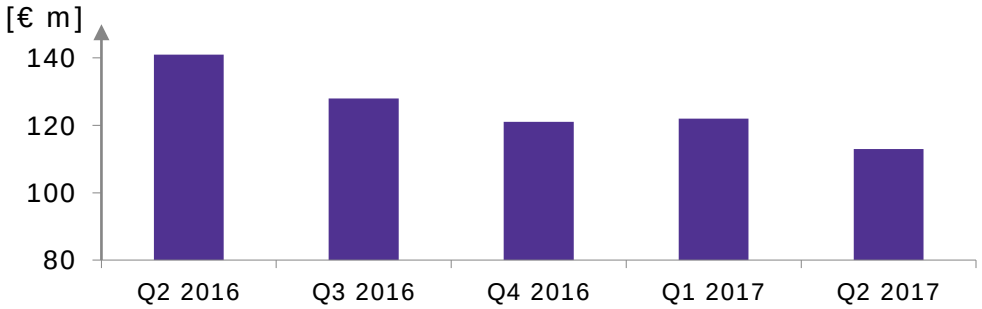
Trend

Q2 drivers

4.4% org.

- Price
- Volume
- FX

Europe



Trend

Q2 drivers

-18.7% org.

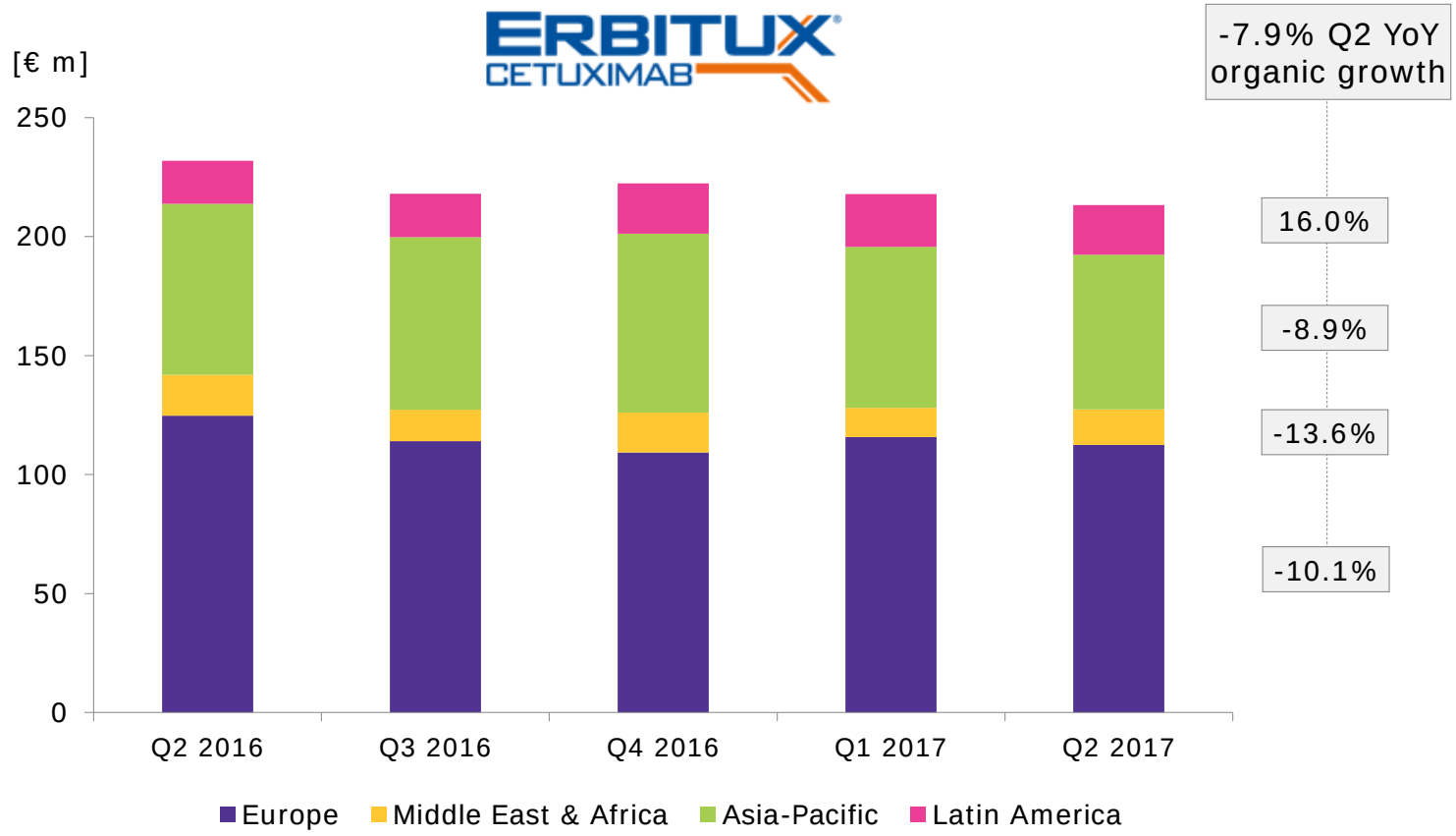
- Price
- Volume

Q2 2017 Rebif performance

- Rebif sales of €425 m in Q2 2017 reflect organic decline, while FX is almost neutral
- U.S. price increases and wholesaler inventory stocking outweigh competition-driven U.S. volume erosion
- Market shares within interferons stable due to high retention rates and known long-term track record
- Phased market entry of orals in Europe as well as tender phasing in Russia cause ongoing organic decline

Erbitux: A challenging market environment

Erbitux sales by region



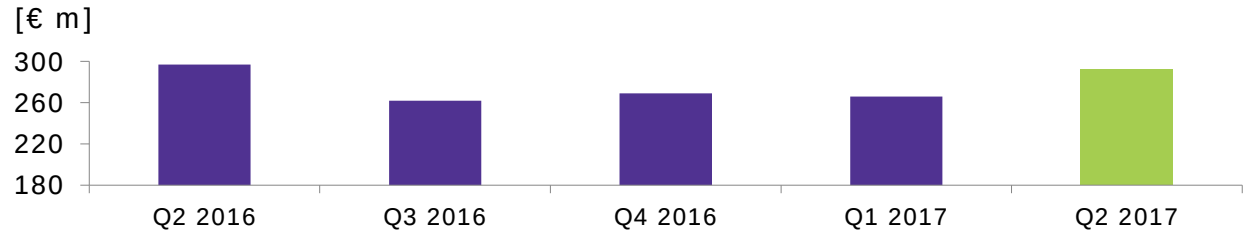
Q2 2017 Erbitux performance

- Sales decline organically to €213 m comparing to strong base LY
- Europe impacted by competition, price reductions and shrinking market size due to increasing immuno-oncology trials
- APAC lower as healthy organic growth in China is more than offset by inventory destocking in Japan
- LATAM strong, while MEA affected by tender phasing from Q1 2017

Strong organic growth of General Medicine driven by all major products

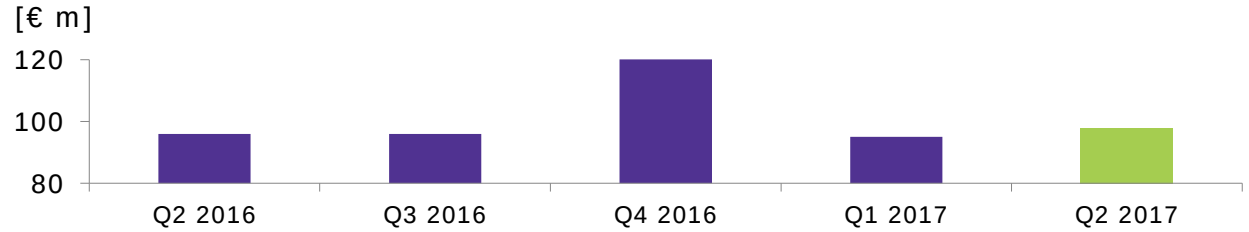
Sales evolution

Fertility



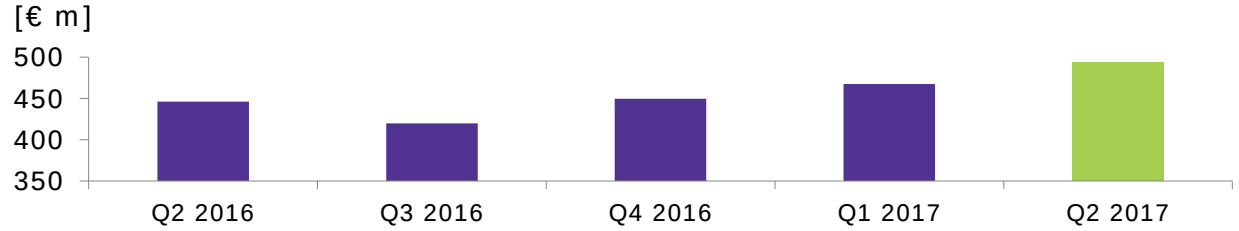
Organic
-1.5% org.

Endocrinology



Organic
2.5% org.

General Medicine*



Organic
14.1% org.

Q2 2017 organic drivers

- Fertility slightly lower, mainly due to Gonal-f facing high base LY and ongoing competition from biosimilars in Europe
- LY Gonal-f benefited from favorable competitive situation in the U.S.
- Rest of Fertility portfolio continues to perform well across most regions
- Endocrinology growth supported by release of accruals for rebates in U.S.
- General Medicine benefits from Glucophage repatriation in China
- Concor with strong volume increase especially in growth markets

*includes "CardioMetabolic Care & General Medicine and Others

Life Science: Solid organic growth and synergy realization drive EBITDA pre

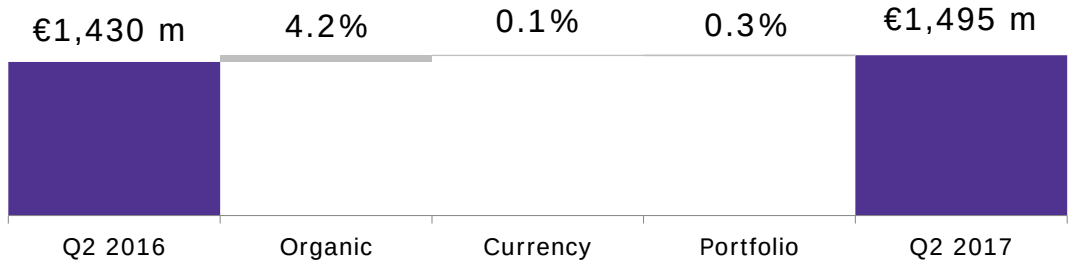
Life Science P&L

[€m]	Q2 2016	Q2 2017
Net sales	1,430	1,495
Marketing and selling	-413	**-443**
Administration	-58	**-65**
Research and development	-65	**-67**
EBIT	166	**221**
EBITDA	343	**411**
EBITDA pre	417	**454**
Margin (in % of net sales)	*29.1%*	***30.4%***

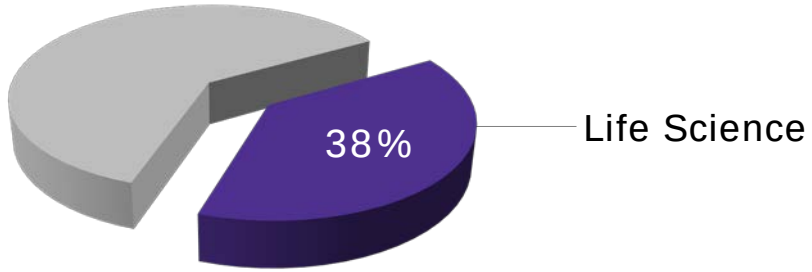
Comments

- Growth of Process Solutions picks up due to ongoing strength in single-use, service activities and improved small molecule business
- Applied Solutions shows moderate organic growth, driven by bio-monitoring products for pharma & pick up of Lab Water
- Research Solutions benefits from strong demand in China, U.S. slightly improving while Europe remains soft
- Q2 2016 EBIT affected by inventory step-up for Sigma-Aldrich
- Profitability reflects organic growth and synergies

Net sales bridge



Q2 2017 share of group net sales



Totals may not add up due to rounding

Performance Materials: Ongoing LC market share normalization burdens profitability

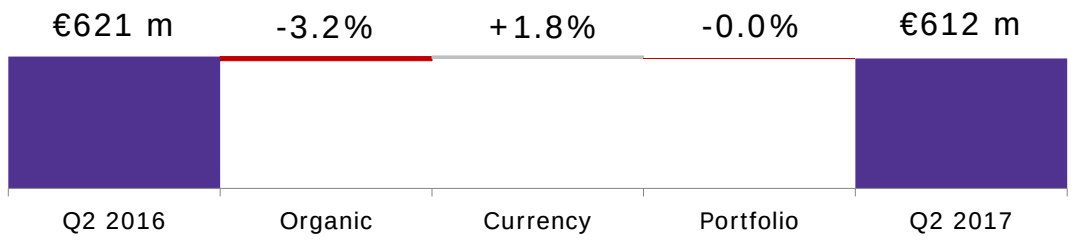
Performance Materials P&L

[€m]	Q2 2016	Q2 2017
Net sales	621	612
Marketing and selling	-59	**-64**
Administration	-14	**-19**
Research and development	-53	**-59**
EBIT	193	**167**
EBITDA	267	**231**
EBITDA pre	273	**239**
Margin (in % of net sales)	*44.1%*	***39.1%***

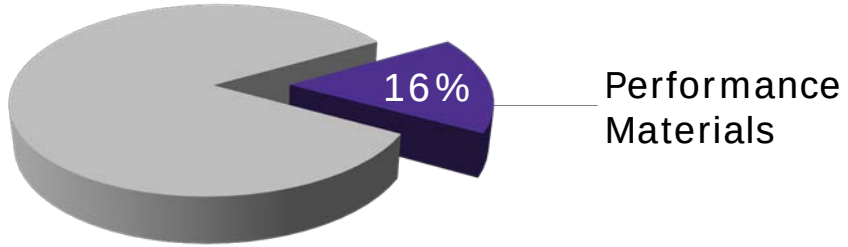
Comments

- Organic growth of Integrated Circuit Materials, Pigments and OLED not fully offsetting Liquid Crystal market share normalization
- LC volume development temporarily below usual price reductions
- OLED continues to grow on industry capacity expansion & investments
- Strong growth in ICM mainly driven by demand for dielectric materials (AZ) and deposition materials (SAFC from Sigma)
- Growth of Pigments due to solid demand for decorative pigments, while LYs demand for insect repellents sets tough comps for active cosmetics
- Profitability reflects negative business mix, typical LC price reductions as well as higher R&D for future growth projects

Net sales bridge



Q2 2017 share of group net sales



Totals may not add up due to rounding

Reported figures reflect business performance and impairments

Reported results

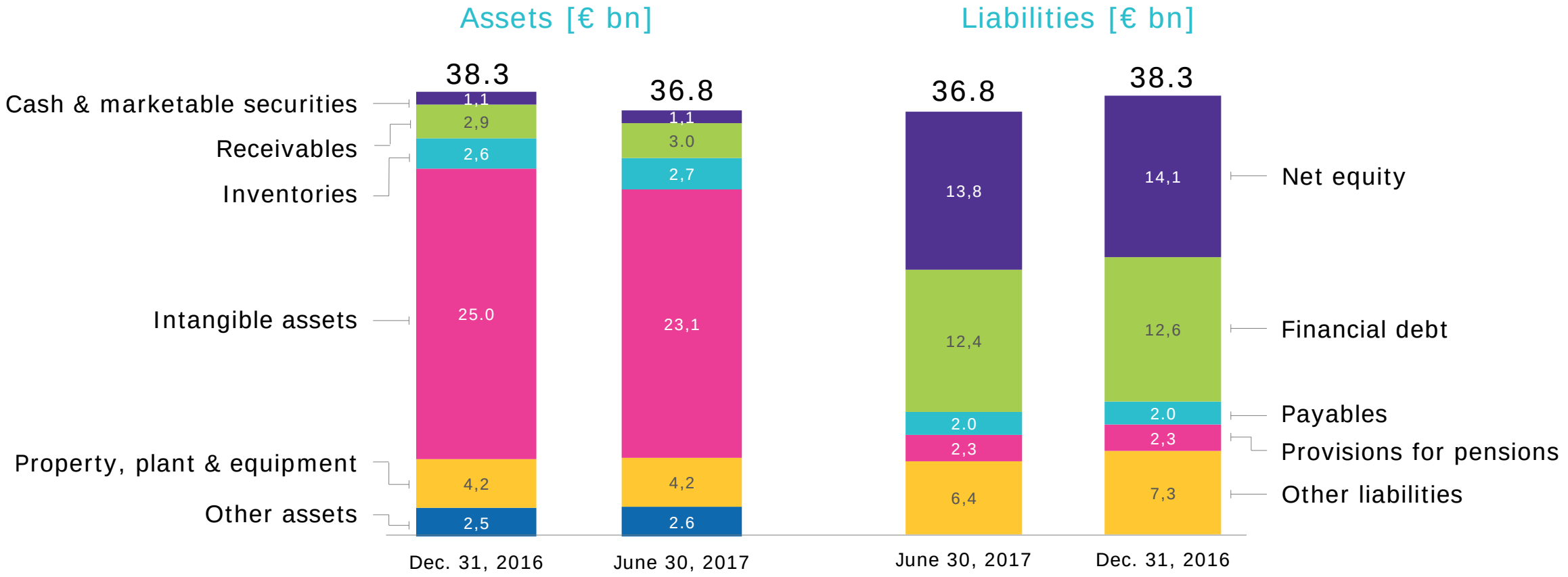
[€m]	Q2 2016	Q2 2017	Δ
EBIT	550	**628**	14.0%
Financial result	-121	**-71**	-41.5%
Profit before tax	429	**557**	29.7%
Income tax	-115	**-134**	16.4%
Effective tax rate (%)	*26.7%*	***24.0%***	
Net income	312	**421**	35.1%
EPS (€)	0.72	**0.97**	34.7%

Comments

- EBIT higher despite lower EBITDA pre due to write-up of Vevey site (~ -€70 m) and Xalkori impairment (~ €70 m) LY
- Financial result LY contained significant adverse effects from LTIP*
- Effective tax rate within guidance range of ~23-25%; LY impacted by Xalkori impairment

*Long Term Incentive Plan
Totals may not add up due to rounding

Balance sheet – deleveraging in progress after Sigma acquisition



- Total assets decrease, while equity ratio increases to 37.4%
- Reduction in intangible assets reflects D&A (-€0.6 bn) and FX (-€1.5 bn)
- Lower net equity reflects negative FX mitigated by H1 profit
- Other liabilities decrease driven by profit transfer to E. Merck KG, Darmstadt, Germany as well as bonus payments

Totals may not add up due to rounding

Healthy operating cash flow supported by lower tax payments

Q2 2017 – cash flow statement

[€m]	Q2 2016	Q2 2017	Δ
Profit after tax	314	**423**	109
D&A	519	**380**	-139
Changes in provisions	-67	**21**	88
Changes in other assets/liabilities	-397	**-333**	64
Other operating activities	-28	**-11**	17
Changes in working capital	-30	**40**	70
Operating cash flow	311	**520**	209
Investing cash flow	-114	**-302**	-188
thereof Capex on PPE	-125	**-172**	-47
Financing cash flow	-357	**-184**	173

Cash flow drivers

- D&A reduction reflects write up of Vevey site (~ -€70 m) and Xalkori impairment (~ €70 m) LY
- Changes in other assets/liabilities driven by lower tax payments
- Investing cash flow contains higher Capex & payments for F-star cooperation
- Capex mainly driven by investments in Healthcare and Sigma integration
- Financing cash flow reflects dividend payment, LY with higher redemption of debt

Totals may not add up due to rounding

Exceptionals in Q2 2017

Exceptionals in EBIT

[€m]	Q2 2016		Q2 2017	
	Exceptionals	thereof D&A	Exceptionals	thereof D&A
Healthcare	70	71	-53	-68
Life Science	74	0	46	3
Performance Materials	7	0	16	7
Corporate & Other	10	0	16	-3
Total	160	71	25	-61

Totals may not add up due to rounding

Financial calendar

Date	Event
November 9, 2017	Q3 2017 Earnings release
March 8, 2018	Q4 2017 Earnings release
April 27, 2018	Annual General Meeting
May 15, 2018	Q1 2018 Earnings release

Merck KGaA
Darmstadt, Germany

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