MERCK KGAA, DARMSTADT, GERMANY -BAADER INVESTMENT CONFERENCE 2016

Constantin Fest, Head of Investor Relations



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Agenda



- **Business overview & strategy recap**
- **O2** Healthcare Funding for success
- **D3** Life Science Focusing on profitable growth
- **Performance Materials Strength and innovation**



Business and financial review H1 2016







BUSINESS OVERVIEW & STRATEGY RECAP

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

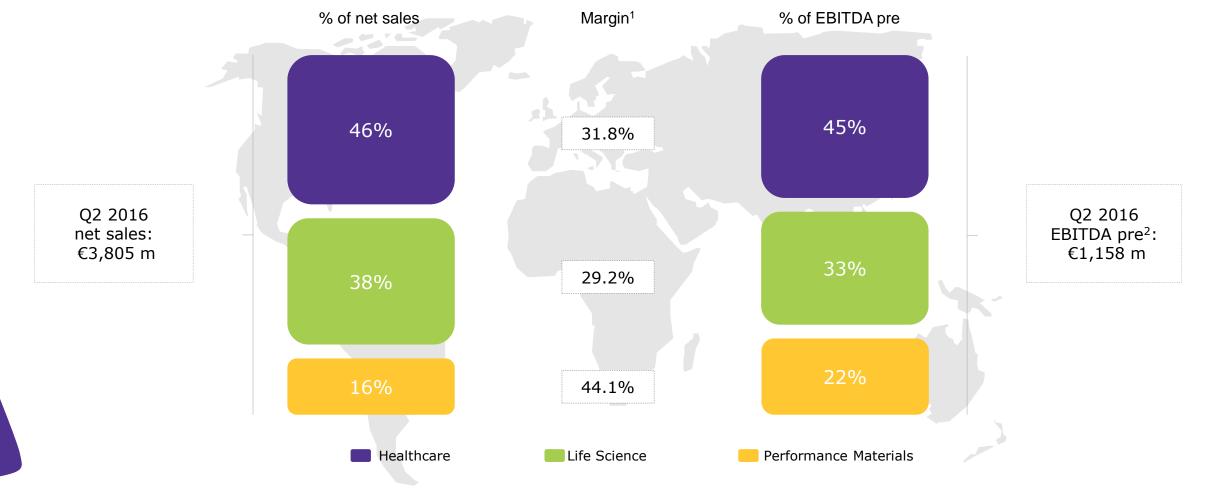
- Tools and services for biotech
 research & production
- Tools and laboratory supply for the academic research and industrial testing



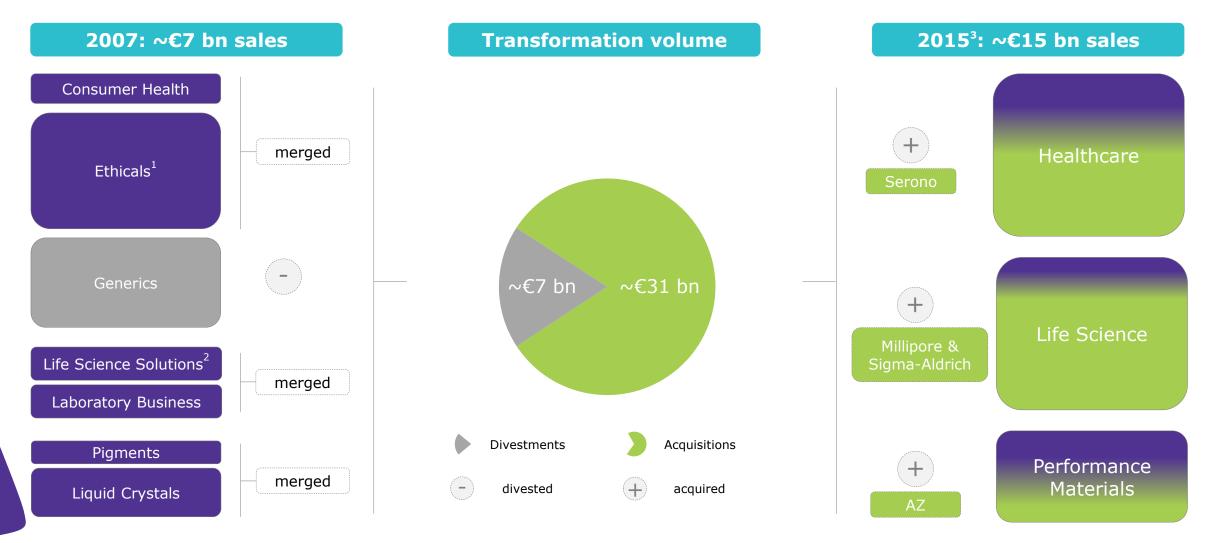
Market leader in display materials

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

Group Strong businesses with attractive margins



Group We have added scale and strengthened the attractiveness of our portfolio



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

MilliporeSigma

performance materials

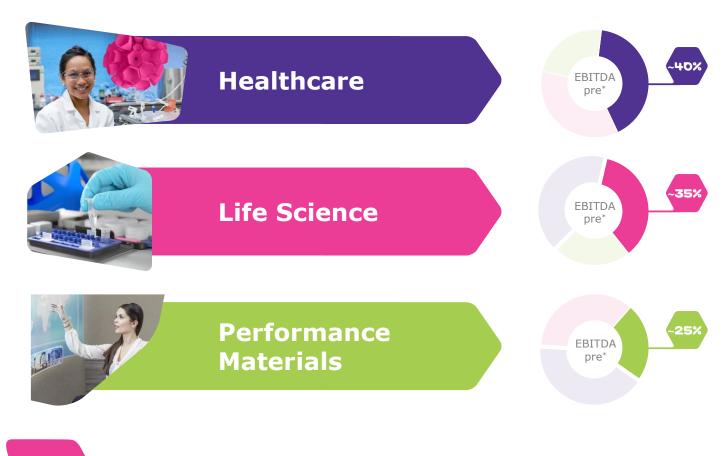
+ AZ

- No. 2 in the world market
- Broad and global product portfolio
- Leading eCommerce platform
- Best-in-class supply chain management

- World market leader
- Technology and innovation leader

Science Technology Innovation Specialties Quality Customer	focus
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Group Each business sector has its specific priorities



Funding for success

- Invest in pharma pipeline
- Prepare for launches
- Maintain cost discipline

Focusing on profitable growth

- Sustain top-line momentum
- Drive underlying earnings
- Integrate Sigma and realize synergies

Maintaining superior profitability

- Build on resilient four-pillar platform
- Continuously innovate
- Protect margins with high value-added products

We are set for profitable and sustainable growth

*2015 reported EBITDA pre including Sigma-Aldrich and 100% of expected synergies, excluding Corporate & Other





Healthcare Healthcare is set to deliver on promising pipeline candidates

Deliver on organic growth

Focus on pipeline



Stable existing business to fuel slight organic growth



Solid pipeline of oncology, immuno-oncology and immunology molecules



Transformation of R&D operating model ongoing



Competitive R&D funding in our focus areas

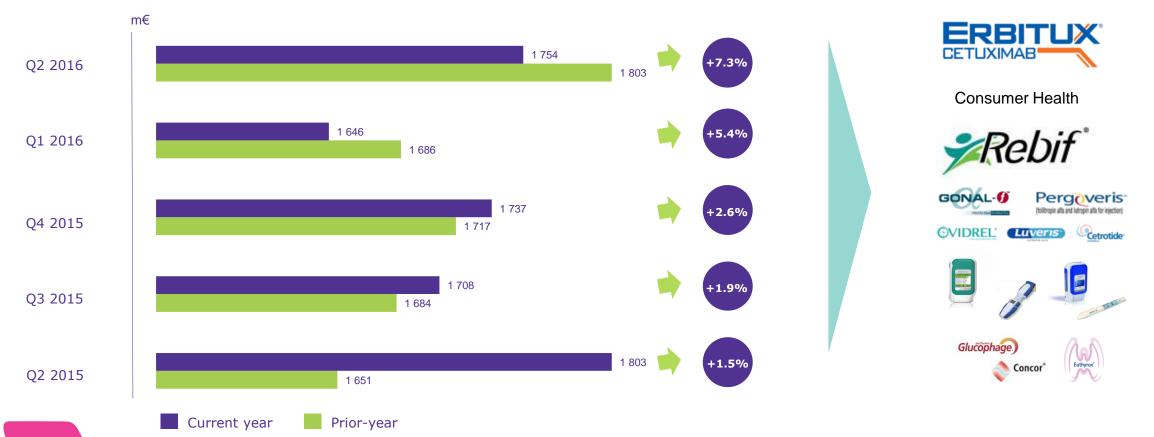


Cost discipline and efficient execution



Healthcare **Delivered organic sales growth, committed to future performance**

Stable to slight organic growth



Defending the existing product portfolio is a key strength of Healthcare



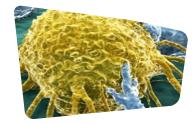
Healthcare **Pipeline highlights**

	Immunology	Immuno-Oncology	Oncology
Phase I	BTK inhibitor (SLE)	Avelumab (solid tumors)	Tepotinib (solid tumors)
		• M9241 (NHS-IL12)	 DNA-PK inhibitor (solid tumors)
		 M7824 (bifunctional immunotherapy) 	
Phase II	Atacicept (SLE)	Avelumab (mMCC)	Tepotinib (HCC, NSCLC)
	• BTK (RA)		
Phase III	 MSB11022 (proposed biosimilar of Adalimumab) 	 Avelumab (Bladder, Gastric 1L&3L, NSCLC 1L&2L, Ovarian 1L&plat res./ref., Renal Cell) 	
Registration	Cladribine tablets (MS) ¹		



selected R&D projects

- Atacicept: phase III decision expected in H2 2016
- BTK inhibitor: three phase II trials to be started in 2016 (e.g. RA and SLE) – RA already started
- Cladribine tablets: EMA accepted submission for review of market authorization approval in July 2016
- M7824 (bifunctional PD-L1 + TGFbeta trap): novel, first in-class bifunctional immunotherapy, expansion into phase Ib cohorts started
- Tepotinib: analysis of phase II data for HCC and NSCLC expected in H1 2018



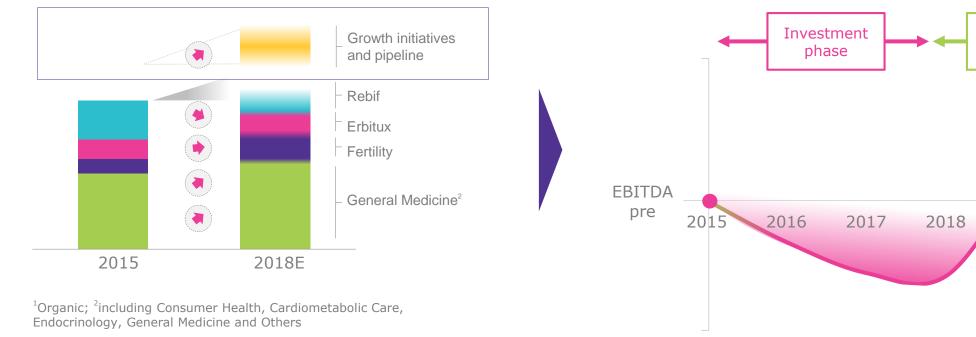
avelumab

- Cooperation with Pfizer
- Currently eight phase III trials ongoing
- MCC 2L: encouraging response rates presented at ASCO 2016 – application for market authorization by FDA planned in H2 2016
- Overall, around 30 ongoing therapy programs, spanning approximately 2,200 patients across more than 15 tumor types

(1) As announced on July 18th, 2016 the European Medicines Agency (EMA) accepted Merck's KGaA, Darmstadt, Germany Marketing Authorization Application Abbreviations: HCC: hepatocellular cancer | mMCC: metastatic merkel cell carcinoma | NSCLC: non-small cell lung cancer | RA: rheumatoid arthritis | SLE: systematic lupus erythematosus | MS: multiple sclerosis | plat res./ref.: platinum resistant/refractory | 1L: 1st line treatment | 2L: 2nd line treatment | 3L: 3rd line treatment

Healthcare Pipeline opportunities will lead to rising investments

Stable to slightly growing¹ sales until 2018 confirmed



Should pipeline catalysts materialize, investments will lead to considerable payback as of 2018+

Long-term

EBITDA pre

upside

2019

Rising investments until 2017 to accelerate sales and earnings growth as of 2018

2020

Illustration





Life Science Serving customers across the life science industry



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



- Pharmaceutical companies
- Small biotech
- Contract manufacturing organizations



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

Life Science We create sustainable value that is based on strong strategic levers



- A combined portfolio of +300,000 products
- Integrated offerings along the life science value chain
- Complete workflow solutions



- Increased presence in North America
- Accelerating growth momentum in Asia
- Expanded geographic reach in 60+ countries



- Outstanding supply chain management (Ability to deal with complexity)
- Simple e-commerce platform (customer interface with global coverage)
- Expertise to manage regulatory barriers

Our capabilities are the foundation for future topline growth in Life Science

Life Science Life Science delivers synergies and integrates as planned

synergies

On track to deliver 2016 synergy target of €90 m:

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



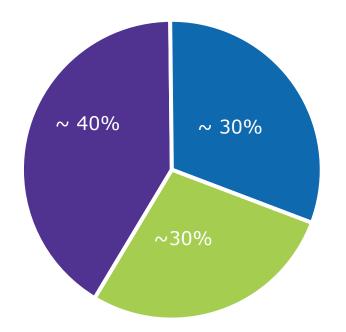
Integration

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

Life Science Expected synergies identified and fully confirmed

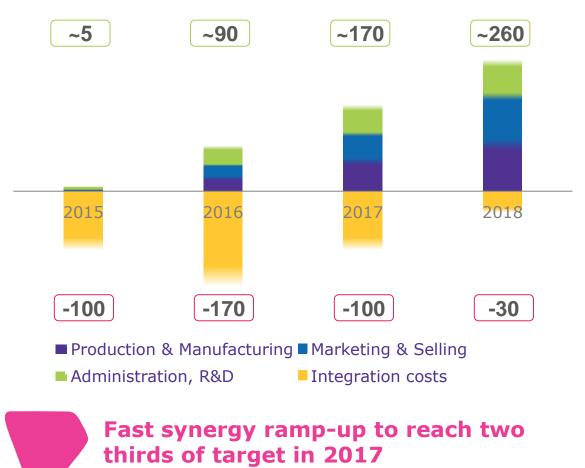


Sources of synergies (3rd full year 2018)

Production & Manufacturing Marketing & SellingAdministration, R&D

Three major areas for delivering the synergies

Timing of expected synergies and related costs [€m]



Life Science We aim to be the profitability champion of the sector

New sales breakdown as of Q2 2016

Profitability champion including synergies* **Applied Solutions Research Solutions** Mid single digit growth Low single digit growth Company A Millipore Sigma 36% 26% SIAL MM Company B Company C Company D **Process Solutions** Company E High single digit growth Industry average ~25%

Above industry margin levels

Life Science is well set for sustainable growth and profitability





Performance Materials The four pillars are set for future profitable growth



~50-60% of total sales,

- liquid crystals (LC) and photoresists for TVs, smartphones and tablet computers
- other display and non-display applications (e.g. LC Windows)

~15-20% of total sales,

- effect pigments and functional materials for coatings, plastics, printing and cosmetics
- functional materials for cosmetics and special applications

~15-20% of total sales,

- dielectrics, colloidal silica, lithography materials (photo resists), yield enhancers, edge-bead removers
- polyimide raw materials and printing materials

~5-10% of total sales,

 organic (OLED) and inorganic (LED) light emitting diodes and functional materials for electronics and energy solutions, especially OLED is providing first substantial sales

Performance Materials Innovation leadership is the backbone of future profitability and growth



Incremental product adjustments - only minor investments

LC	New singles for PSVA technology, new mode SA-VA
pigments	Meoxal luminous metal effect pigments
ICM	low defect CMP ² slurries
advanced tech.	Organic Photovoltaics



Fundamental research - more substantial investments needed

LC	Smart windows, smart antennas
pigments	Counterfeiting prevention applications
ICM	Directed self-assembly (DSA) in lithography
advanced tech.	OLED printing technology

Performance Materials Sound platform to deliver high earnings

Four-pillar platform diversifies earnings stream

- Liquid Crystals remain key earnings contributor
- AZ* expertise is being leveraged to develop innovative value-added solutions for customers
- OLED is becoming a visible growth driver
- Pigments continue to grow with high-end products



Continuous innovation as key profitability driver

- New products contribute high growth and profitability
- LC* technology mode UB-FFS* launched in 2014 is the most recent example

Balanced sales and consistently high earnings



We are the innovation leader IDS* "Improved picture quality" 1996 VR* "Large TVs" 2000 DS* "Display cost reduction & advanced performance" 2008 VR* "Superior image resolution and lower energy consumption" 2014

Diversification of portfolio and ongoing innovation lead to strong profitability

Merck KGaA

Darmstadt, Germany

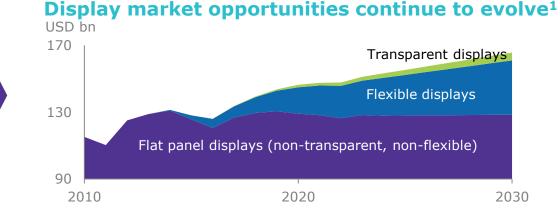
Performance Materials

Long-term growth and profitability drivers are intact



Macroeconomics and electronics remain buoyant

- Global consumer electronics market expected to grow above GDP*
- Mobile data, Internet of Things and Big Data are key growth drivers for LC and IC
- Display market continues to grow

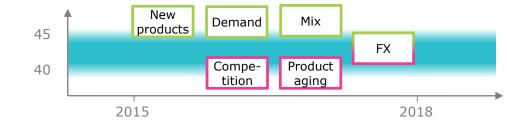


High value-added products yield superior profitability

- High market share in liquid crystals expected to prevail
- Strong differentiation by innovation inherent mature of business

Sustainable profitability drivers





Unique differentiation and market position will continue to lead to strong profitability and maintain low single-digit growth trajectory



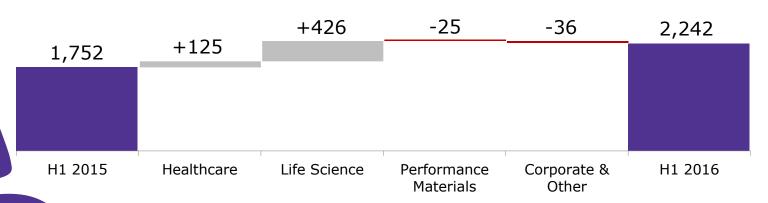


Life Science and Healthcare drive growth and profitability

H1 2016 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	6.4%	-7.9%	-1.0%	-2.6%
Life Science	8.5%	-2.1%	80.6%	87.1%
Performance Materials	-3.5%	-0.8%	2.9%	-1.4%
Group	4.9%	-5.1%	19.5%	19.3%

H1 YoY EBITDA pre contributors [€ m]



•Growth in Healthcare driven by strong Fertility, GM* as well as Xalkori commissions

• Strong organic growth in Life Science driven by Process Solutions

• Organic decline in Performance Materials reflects destocking in display supply chain

Portfolio reflects Sigma and Kuvan

• HC benefits from good organic growth, Rebif commission savings and R&D phasing

- Life Science driven by Sigma, strong organic growth and positive business mix
- Performance Materials slightly lower due to Liquid Crystal sales decrease
- Corporate EBITDA pre contains hedging and investments in corporate initiatives

H1 2016: Overview

Key figures

[€m]	H1 2015	H1 2016	Δ
Net sales	6,261	7,470	19.3%
EBITDA pre Margin (in % of net sales)	1,752 <i>28.0%</i>	2,242 30.0%	27.9%
EPS pre	2.43	3.09	27.2%
Operating cash flow	605	663	9.6%
[€m]	Dec. 31, 2015	Jun. 30, 2016	Δ
Net financial debt	12,654	12,510	-1.1%
Working capital	3,448	3,813	10.6%
Employees	49,613	50,456	1.7%

Comments

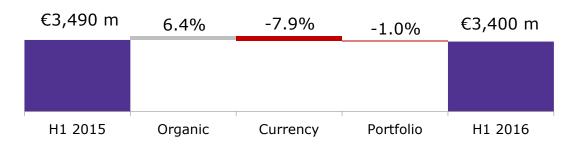
- EBITDA pre & margin increase driven by Sigma, organic performance and end of Rebif commission expenses
- EPS pre grows in line with EBITDA pre
- Healthy operating cash flow driven by strong business performance
- Net financial debt reflects cash-in for Kuvan & operating cash flow partially offset by dividend payments
- Working capital shows increase in business activity – further room for improvement

Healthcare: Good organic growth and product mix drive profitability

Healthcare P&L

[€m]	H1 2015	H1 2016
Net sales	3,490	3,400
Marketing and selling	-1,390	-1,256
Administration	-135	-137
Research and development	-706	-756
EBIT	536	939
EBITDA	910	1,387
EBITDA pre	941	1,065
Margin (in % of net sales)	27.0%	31.3%

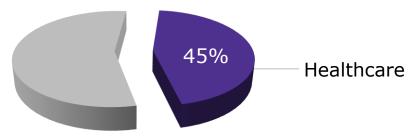
Net sales bridge



Comments

- Rebif still impacted by ramp-up of competition in Europe, while U.S. pricing, Russian tender and PDP* in Brazil support performance
- Erbitux shows solid organic growth benefiting from volume increase in all regions, but also low comparables; EU remains competitive
- Marketing & selling reflects end of commission expenses for Rebif (U.S.) partially offset by reinvestments in sales force & launch preparations
- R&D spend increases as pipeline development progresses
- EBIT reflects Kuvan disposal gain of €324 m in Q1 2016
- Profitability improves due to good organic growth, end of Rebif commissions and ~€30m disposal gain from Merck KGaA, Darmstadt, Germany Ventures minority

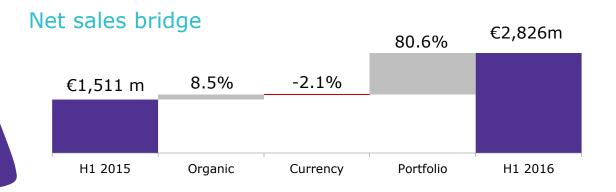
H1 2016 share of group net sales



Life Science: A strong first half of 2016

Life Science P&L

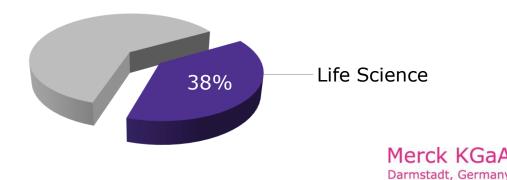
[€m]	H1 2015	H1 2016
Net sales	1,511	2,826
Marketing and selling	-477	-833
Administration	-59	-121
Research and development	-94	-126
EBIT	170	271
EBITDA	334	627
EBITDA pre	384	810
Margin (in % of net sales)	25.4%	28.6%



Comments

- Very strong growth of Process Solutions driven by increasing biopharma production and single-use demand across all regions
- Applied Solutions shows moderate organic growth, driven by biomonitoring products for pharma & demand for analytical testing
- Research Solutions benefits from increased research on biologics as well as solid demand for high-value chemicals
- Cost base contains Sigma, but improves in relation to sales
- Profitability reflects Sigma, business mix and synergies



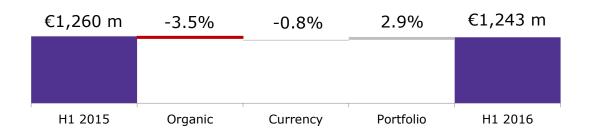


Performance Materials: Healthy profitability amid destocking of display industry inventories

Performance Materials P&L

[€m]	H1 2015	H1 2016
Net sales	1,260	1,243
Marketing and selling	-99	-116
Administration	-32	-31
Research and development	-95	-101
EBIT	452	399
EBITDA	572	534
EBITDA pre	572	547
Margin (in % of net sales)	45.4%	44.0%

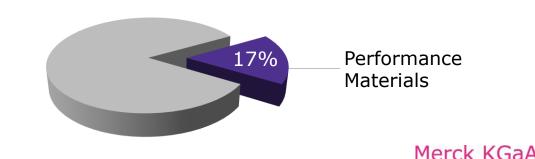
Net sales bridge



Comments

- LC impacted by volume declines of mature TN-TFT and indicated inventory correction in supply chain, expected to continue into H2
- OLED continues to grow on industry capacity expansion & investments
- Integrated Circuit Materials (ICM) shows solid above-market growth mainly driven by dielectric materials for chip production
- Pigments & Functionals post solid growth esp. due to cosmetic API*
- Marketing & selling reflects contribution from Sigma's SAFC Hitech
- Healthy profitability due to leading market position with highly differentiated products, despite destocking in display supply chain

H1 2016 share of group net sales



Darmstadt, Germany





Group We are well set for profitable and sustainable growth



Maximize growth of existing franchises Deliver on pipeline

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

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



Group Upgrade of full-year 2016 guidance

Guidance for 2016









Appendix

















2016 business sector guidance



Additional financial guidance 2016

Further financial details

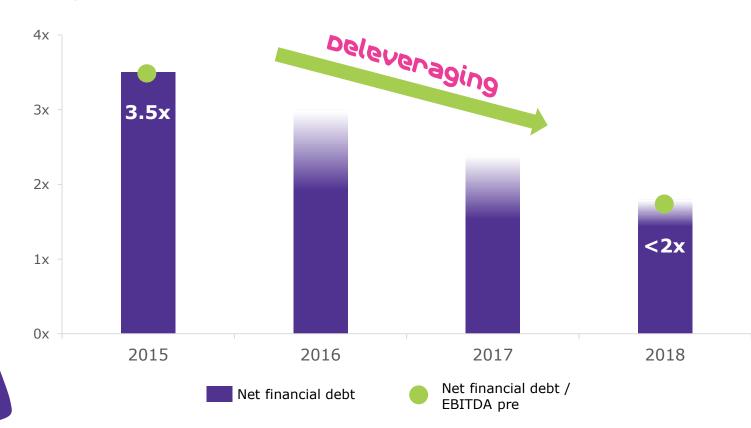
Corporate & Other EBITDA pre	~ -€370 – -400 m
Interest result	~ -€270 – -300 m
Intangibles amortization from Sign	na PPA ~ €250 – 300 m p.a.
Underlying tax rate	~23% to 25%
Capex on PPE	~€750 – 800 m
Hedging/USD assumption	2016 & 2017 hedge ratio ~40%-45% at EUR/USD ~1.10 to 1.15
2016 Ø EUR/USD assumption	~1.07 – 1.12



Strong focus on cash generation to ensure swift deleveraging

Net debt and leverage development

[Net debt/ EBITDA pre]



Focus on deleveraging

- Commitment to swift deleveraging to ensure a strong investment grade 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)

Group We have clear financial priorities for the next two years



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

Near-term financial priorities will secure our profitable growth path

High cost base in strong currencies and hedging losses partially offset FX tailwinds



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





• 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

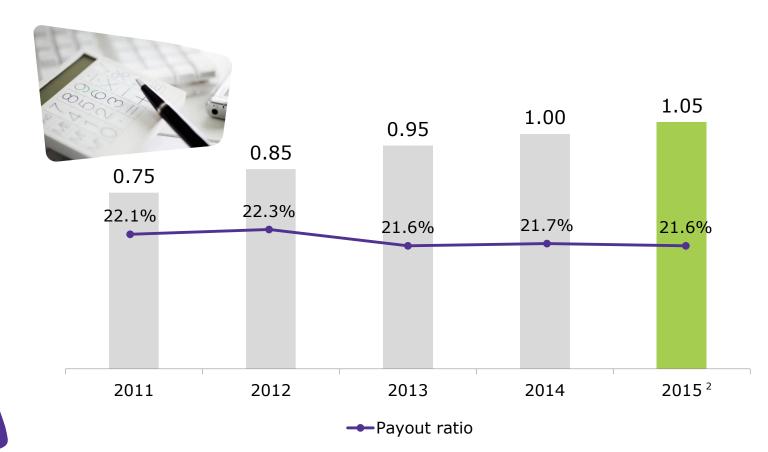
- Main production sites in Germany
- Several R&D and mixing facilities in Asia

FX Impact



Sustainable dividend development

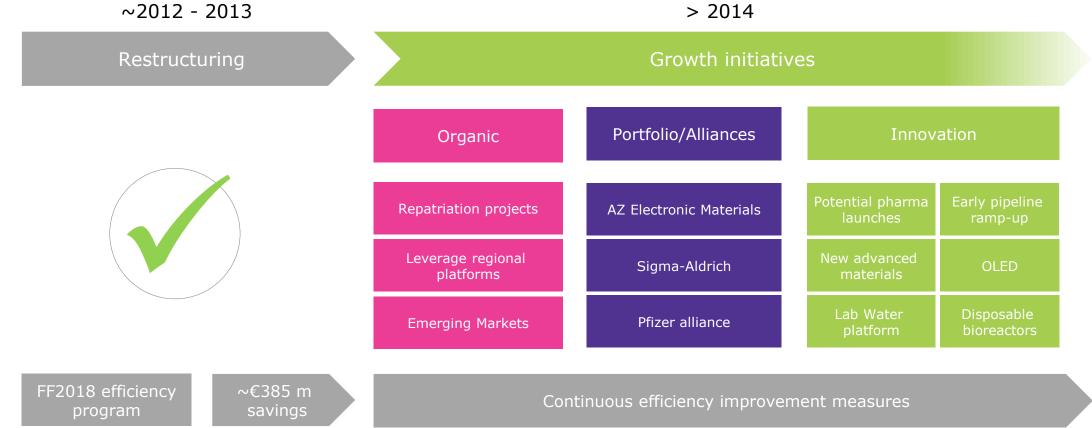
Dividend¹ development 2011-2015



2015 dividend and policy

- Dividend of €1.05 per share proposed² for 2015
- Last year's dividend constitutes the minimum level³
- Development of dividends in line with business performance and earnings progression
- Aiming for a corridor of 20%-25% of EPS pre

Group Strategic agenda 2018 – milestones achieved



Group Profitability improved fundamentally



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





Portfolio management: Differentiating across diverse business models

General Medicine portfolio



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

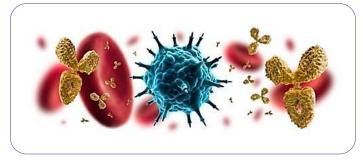
Biologicals portfolio



- Moderate risk and reward profile
- Economies of scale due to stateof-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 existing franchises is clear



Continue to drive front-line mCRC share by increasing patient testing and expanding head and neck coverage



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



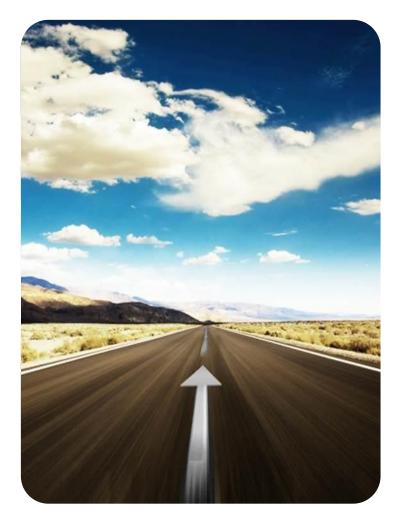
Build on No.1 position and ART¹ channel access with embryo diagnostics and other innovative technologies



Harness strengths of existing business and build a new focus area driven by innovative devices and services for patients



Build on existing track record in Emerging Markets, drive brand and life-cycle management and expand business including asset repatriation



Merck KGaA Darmstadt, Germany

Clinical pipeline

Phase I

Tepotinib c-Met kinase inhibitor Solid tumors M2698 p70S6K & Akt inhibitor Solid tumors M3814 DNA-PK inhibitor Solid tumors Beigene-283 BRAF inhibitor Solid tumors

Avelumab Anti-PD-L1 mAb Solid tumors

Avelumab Anti-PD-L1 mAb Hematological malignancies

M9241 (NHS-IL12)¹ Cancer immunotherapy Solid tumors

M7824 Bifunctional immunotherapy Solid tumors

M1095 (ALX-0761) Anti-IL-17 A/F nanobody Psoriasis M2951 BTK inhibitor Systemic lupus erythematosus

Phase II

M2736 (ATX-MS-1467) Immune tolerizing agent Multiple sclerosis

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

Sprifermin Fibroblast growth factor 18 Osteoarthritis Atacicept Anti-Blys/anti-APRIL fusion protein Systemic lupus erythematosus M2951 BTK inhibitor Rheumatoid arthritis

Phase III

Avelumab – Anti-PD-L1 mAb Non-small cell lung cancer 1L² Avelumab – Anti-PD-L1 mAb Non-small cell lung cancer 2L³ Avelumab – Anti-PD-L1 mAb Gastric cancer 1L² Avelumab – Anti-PD-L1 mAb Gastric cancer 3L⁴ Avelumab – Anti-PD-L1 mAb Bladder cancer 1L² Avelumab – Anti-PD-L1 mAb Ovarian cancer platinum resistant/refractory Avelumab – Anti-PD-L1 mAb Ovarian cancer 11² Avelumab - Anti-PD-L1 mAb Renal cell cancer 1L²

MSB11022 Proposed biosimilar of Adalimumab Chronic plaque psoriasis

Pipeline as of July 28th, 2016

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.

Registration

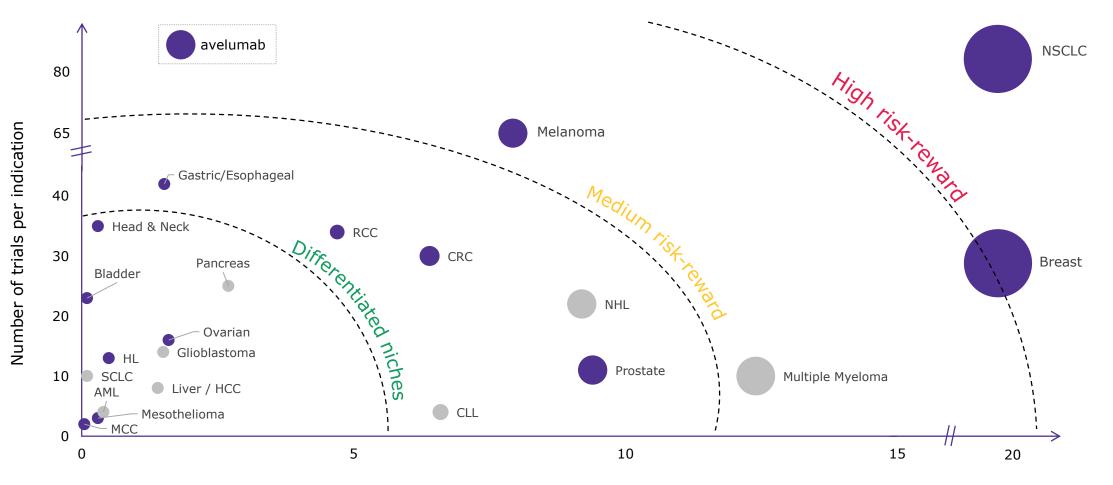
Cladribine Tablets⁵ – **Lymphocyte targeting agent** Relapsing-remitting multiple sclerosis

- Neurodegenerative Diseases
 Oncology
 Immunology
 Immuno-Oncology
- Biosimilars

¹Sponsored by the National Cancer Institute (USA); ²1st line treatment; ³2nd line treatment; ⁴3rd line treatment ⁵As announced on July 18th, 2016 the European Medicines Agency accepted Merck's KGaA, Darmstadt, Germany Marketing Authorization Application

Merck KGaA Darmstadt, Germany

Avelumab plays predominantly in attractive and differentiated niches



Market size in 2020 per indication [€bn]

Avelumab – Differentiation strategy varies according to chosen target indication and market

Ambition: Smart leader

- Indications (Merkel cell) or markets (Asia for gastric)
 - Quick to market strategy, e.g. BTD for MCC in November 2015
 - Small, but less crowded markets and sales potential with notable impact for us
 - Strategic strength of Healthcare in niche markets

Ambition: Smart follower

- Indications such as NSCLC or Bladder
- Learn from experience of incumbents/early movers
- Potential for combinations given breadth of combined development pipelines, e.g. lung
- Differentiate in trial design and explore application of further biomarkers



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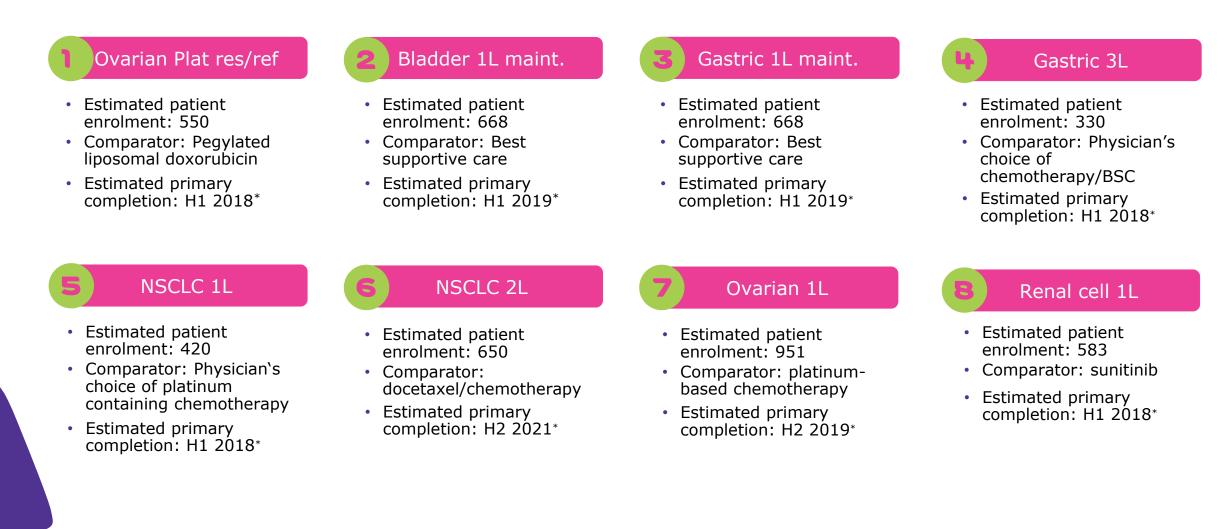
Saturated and / or major indications

Unsaturated

and / or niche

indications

The alliance initiated 8 Phase III studies



MCC 2L: Clinical results support avelumab as potential therapeutic option – planned to apply for marketing authorization in H2 2016

Encouraging response rates¹

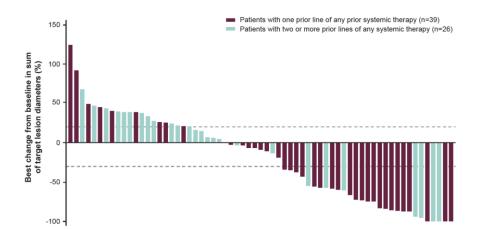
- ORR: 31.8%
 - 9.1% complete response
 - 22.7% partial response
 - Rapid (78.6% responding within 7 weeks of treatment)
 - Durable (82.1% still responding at time of analysis)
- 6-mo OS: 69% (median OS: 11.3 months)
- 6-mo PFS rate: 40%
- Manageable safety profile; no unexpected safety signals





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



Going forward, avelumab combinations will drive differentiation strategy



- Phase II 2L MCC (BTD, ODD and FTD)
- Phase III 1L and 2L Plat res/ref ovarian
- Phase III 1L MN and 3L gastric
- Phase III 1L and 2L NSCLC
- Phase III 1L MN bladder
- Phase I Hodgkins Lymphoma
- Multiple other tumor types



- Phase III, RCC 1L
- Phase Ib/II, NSCLC 1L ALK+
- Phase I/II
- Phase Ib/II, ovarian
- Phase I/Ib, ovarian

- (avelumab + Inlyta) (avelumab + Xalkori/lorlatinib) (avelumab + 4-1BB) (avelumab + Entinostat; Syndax collaboration) (avelumab + VS-6063; Verastem collaboration)
- Further combination trials under consideration

Cladribine tablets – MAA submission accepted by EMA in July 2016

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 therapy⁵
- 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 years⁴

Potential for differentiation

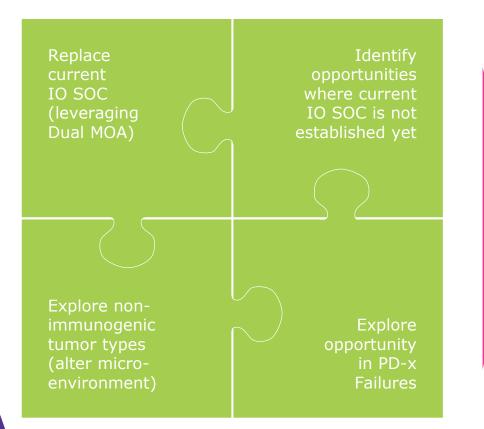
- We aim to address significant unmet needs for agents delivering high efficacy with favorable safety profile in a convenient dosing regimen
- Administered orally (tablet formulation)
- Extremely short treatment courses (8–10 days per year) leading to long-term efficacy¹

Note: timelines are event-driven and may change

EMA = European Medicines Agency; 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.

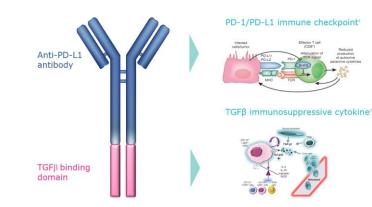
PD-L1–TGF-beta indicates potential to move beyond checkpoint inhibitors

Four focus areas for exploration

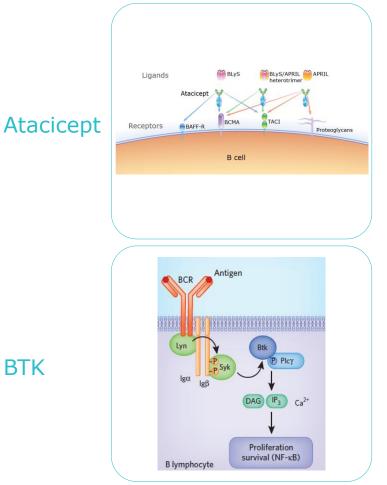


Status and next steps

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



Update on selected assets (1/2)

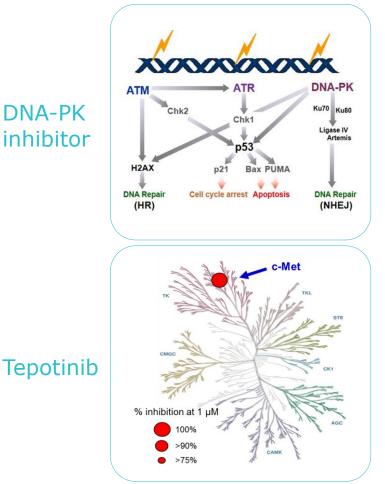


- Binds to receptors of two cytokines regulating maturation, function, and survival of B cells (B-lymphocyte stimulator (BLyS) & a proliferation-inducing ligand (APRIL))
- ADDRESS II (Ph IIb) in SLE patients aiming to show reduction in disease activity – 279 patients enrolled
- 24-week, randomized, double-blind, placebo-controlled Subcutaneous injection, once-a-week dosing
- Primary outcome: Percentage of patients with SLE responder index (SRI) response at week 24 compared to screening
- Suppress autoantibody-producing cells
- Preclinical research suggests therapeutic use in certain autoimmune diseases
- High and differentiated efficacy in preclinical models; promising kinase selectivity profile
- Aim to achieve best in class through minimization of off-target effects
- 2nd dose level of Phase I completed
- Partnering opportunities under consideration

Phase III decision expected in H2 2016

Three phase II trials expected to be started until end of 2016 (e.g. RA, SLE)

Update on selected assets (2/2)



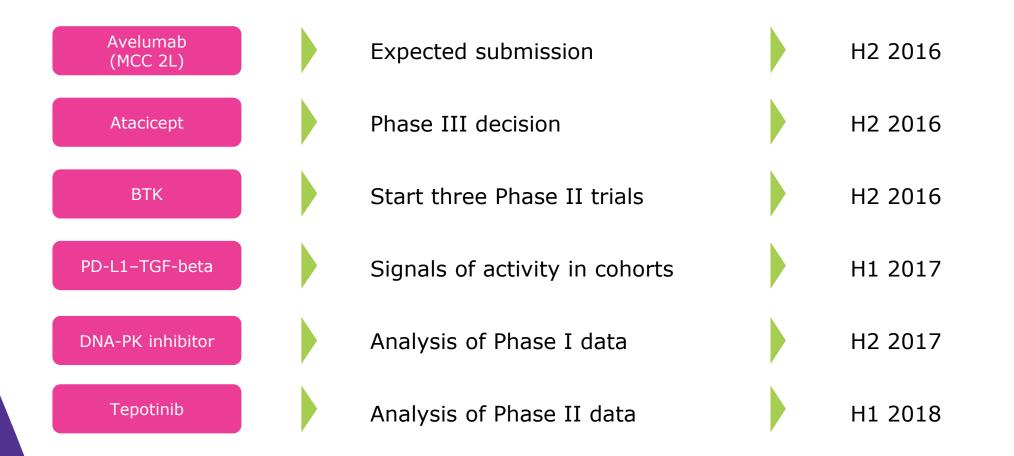
- M3814 is a selective and potent inhibitor of DNA-PK, a kinase mediating DNA double strand break repair¹
- Preclinical PoC showing complete responses and/or increased PFS in combination with radiotherapy in several xenograft models (SCCHN, NSCLC, CRC, PaCa) and strong pre-clinical combination data with SoC chemotherapies
- Two Phase Ia trials ongoing: FIM (monotherapy): 5th dose level completed, MTD not yet reached; RT combination: recruitment ongoing

Analysis of Phase I data for RT combination expected in H2 2017

- 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^{2,3}
- Phase II trials in progress in NSCLC and HCC

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

Outlook – MCC submission planned in H2 2016



Healthcare Investments in future growth

 Immuno-Oncology: avelumab and ramp-up of earlier pipeline projects +€150-200m cost increase in 2016

- Oncology/Immunology, e.g. tepotinib, BTK inhibitor: mid to high double-digit €m cost increase in 2016
- Launch readiness to be ensured for avelumab and cladribine
- Costs for launch preparation in the mid to high double-digit €m range in 2016



- Stringent pipeline assessments continue
- Investments based on sound business cases and robust clinical data

Long-term growth investments partly mitigated by strict cost management

*For scenario that pipeline catalysts materialize

Merck KGaA Darmstadt, Germany

R&D*

Marketing & Selling^{*}

Healthcare is well set for future growth

Stable existing business

Business and market specific initiatives in place to maximize existing business franchises

Strong R&D pipeline Diversified but focused pipeline with high quality assets in the areas Immuno-Oncology, Oncology and Immunology healthily spread across all clinical phases

Successful collaborations

Proven success in partnering through joint investments and collaborations – maximizing potential of assets in competitive space

Promising late stage progress Two expected submissions in 2016 may potentially result in product launches in 2017

Disciplined execution

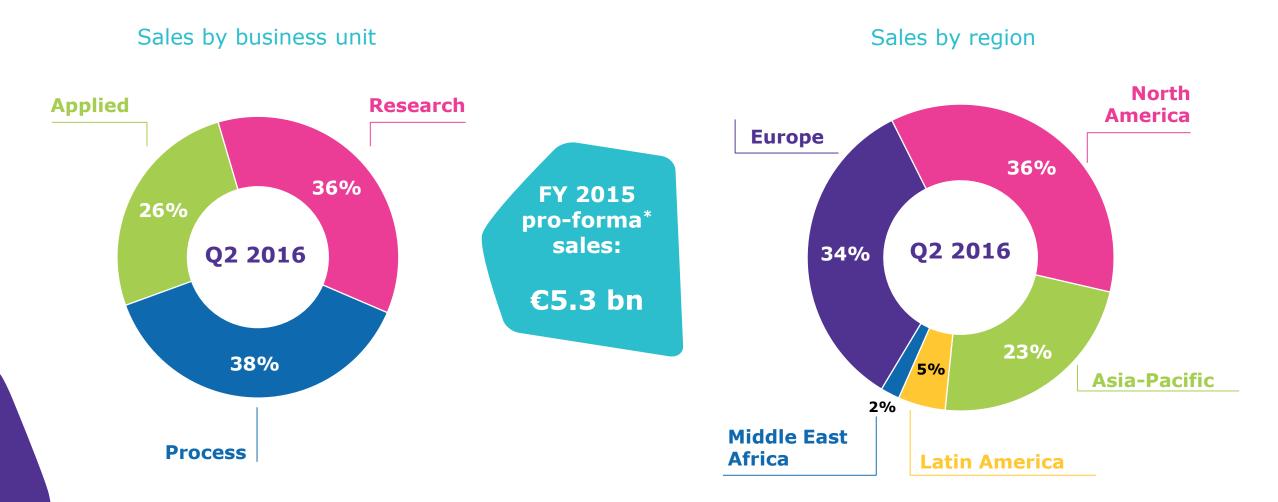
Systematic pipeline review and timely decision making allow efficient resource and budget allocation







A balanced portfolio and geographic presence



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Life Science is an attractive market



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

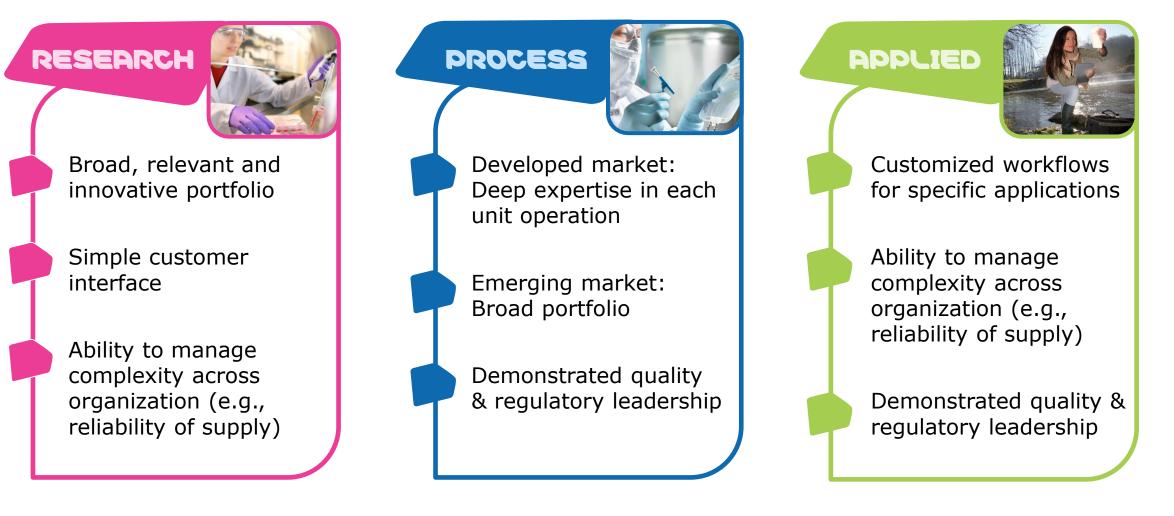


- Drug volume growth
 - from biologics
 - from emerging modalities
- Continued shift to single-use



- Volume growth from
 - Population growth
 - Increased testing needs

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



Merck KGaA Darmstadt, Germany

Process Solutions **Our end-to-end portfolio for manufacturing mAbs**



MAKE Produce antibodies



Advanced[™] CHO Fed-batch Medium *Cell culture media to enhance cell growth*

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

Clarisolve ® clarification



Provantage [®]

PURIFY Remove cell debris, virus, etc.



FlexReady [®] chromatography **Purifying mAbs**



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

EMP<u>ROV</u>E[®]

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



FORMULATE Final drug product

> Opticap[®] capsules Sterile filtration

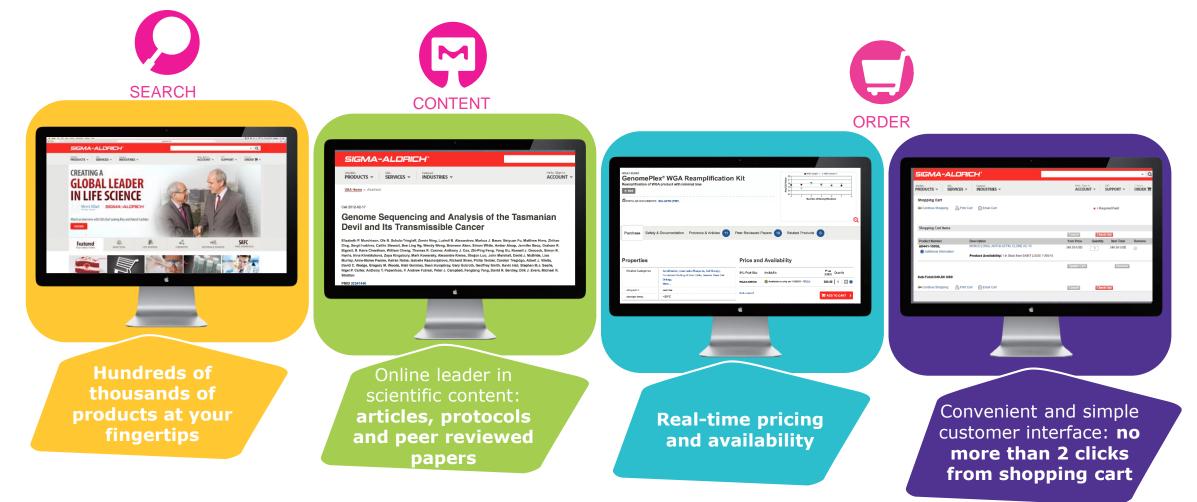
cGMP SOLUTIONS & SERVICES

BioReliance ®

Merck KGaA Darmstadt, Germany

#1 website in research life science industry

Industry leading e-commerce platform and supply chain capability

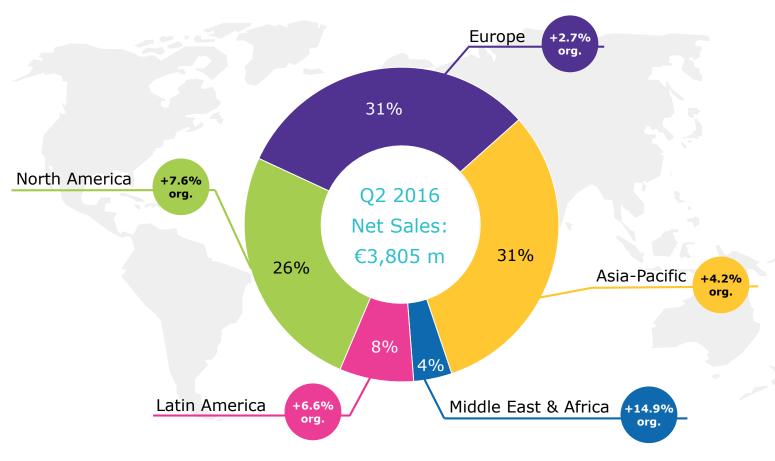






Organic growth in all regions

Regional breakdown of net sales [€ m]



Regional development

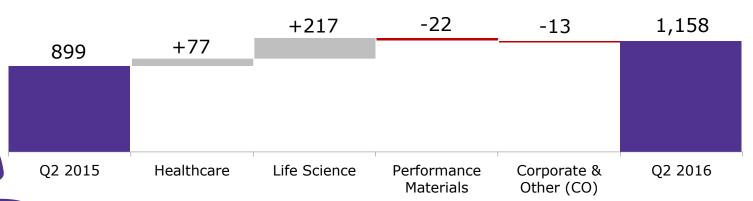
- Organic growth in Europe driven by robust demand in Process Solutions
- North America benefits from strong Fertility business, Rebif pricing and demand for Process Solutions products
- Asia-Pacific shows solid organic growth driven by Fertility, GM and Life Science partially offset by display destocking
- Solid organic growth in LatAm driven by GM and CH as well as increasing demand for analytical testing (Applied Solutions)

Life Science and Healthcare drive increase in EBITDA pre

Q2 2016 YoY net sales

	Organic	Currency	Portfolio	Total
Healthcare	7.3%	-9.0%	-1.0%	-2.7%
Life Science	8.1%	-2.8%	79.7%	85.0%
Performance Materials	-4.7%	-2.0%	3.1%	-3.5%
Group	5.1%	-6.1%	19.2%	18.2%

Q2 YoY EBITDA pre contributors [€ m]



- •Growth in Healthcare driven by strong Fertility, GM* as well as Xalkori commissions
- Process Solutions continues to drive strong organic growth in Life Science
- Organic decline in Performance Materials reflects display supply chain destocking
- Portfolio is Sigma and Kuvan
- •HC benefits from strong organic growth, end of Rebif commission expenses and ~€30 m disposal gain
- Life Science driven by Sigma, strong organic growth and synergies
- Performance Materials only slightly lower despite LC sales decline
- •CO contains corporate initiatives & hedging

Merck KGaA

Darmstadt, Germany

Q2 2016: Overview

Key figures

[€m]	Q2 2015	Q2 2016	Δ
Net sales	3,219	3,805	18.2%
EBITDA pre Margin (in % of net sales)	889 <i>27.9%</i>	1,158 30.4%	28.8%
EPS pre	1.30	1.55	19.2%
Operating cash flow	326	311	-4.7%
[€m]	Dec. 31, 2015	June 30, 2016	Δ
Net financial debt	12,654	12,510	-1.1%
Working capital	3,448	3,813	10.6%
Employees	49,613	50,456	1.7%

Comments

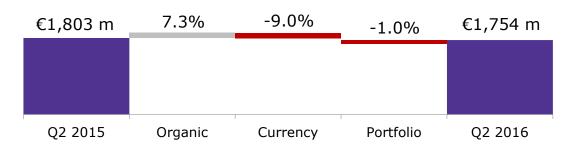
- EBITDA pre & margin increase driven by Sigma, organic performance and end of Rebif commission expenses
- EPS pre up due to EBITDA pre increase, but higher LTIP* charges burden financial result
- Healthy operating cash flow due to strong business performance amid higher tax payments
- Net financial debt reflects operating cash flow and dividend payments
- Working capital shows increase in business activity – further room for improvement

Healthcare: Strong organic growth, EBITDA pre and profitability

Healthcare P&L

[€m]	Q2 2015	Q2 2016
Net sales	1,803	1,754
Marketing and selling	-730	-643
Administration	-69	-66
Research and development	-358	-378
EBIT	267	298
EBITDA	461	558
EBITDA pre	480	557
Margin (in % of net sales)	26.6%	31.8%

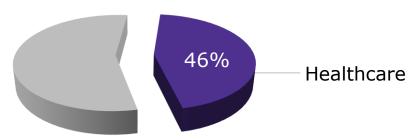
Net sales bridge



Comments

- Rebif organically stable; ramp-up of competition in Europe partially offset by tender in Russia; in U.S. pricing offsets declining volumes
- Solid organic growth of Erbitux across all regions, especially strong volume growth in China, but also low comparables
- Fertility shows strong growth across portfolio especially in China; Gonal-f benefiting from competitive situation in U.S. and low base
- Marketing & selling reflects end of commission expenses for Rebif (U.S.) partially offset by reinvestments in sales force & launch preparations
- R&D spend increases as pipeline development progresses
- Higher EBITDA pre due to strong organic growth, end of Rebif commissions and ~€30 m disposal gain from Merck KGaA, Darmstadt, Germany Ventures minority

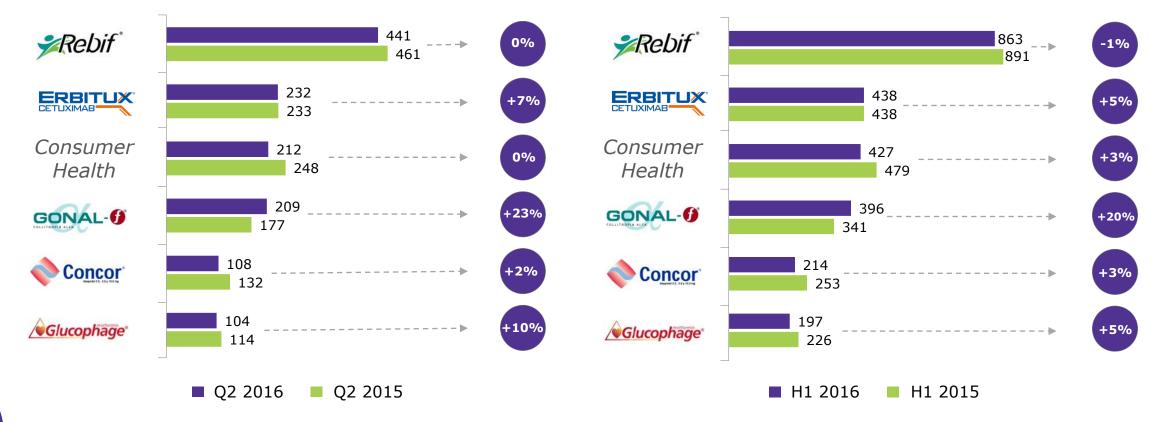
Q2 2016 share of group net sales



Merck KGaA Darmstadt, Germany

Healthcare organic growth by franchise/product

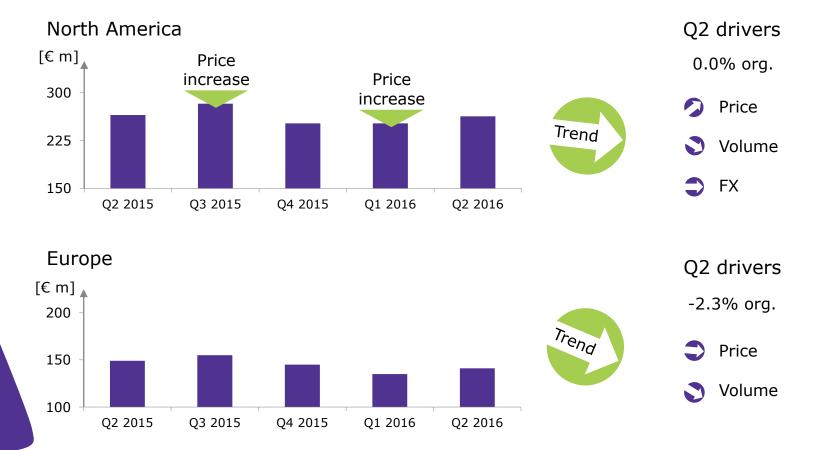
Q2 2016 organic sales growth [%] by key product [€ m]



H1 2016 organic sales growth [%] by key product [\in m]

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

Rebif sales evolution

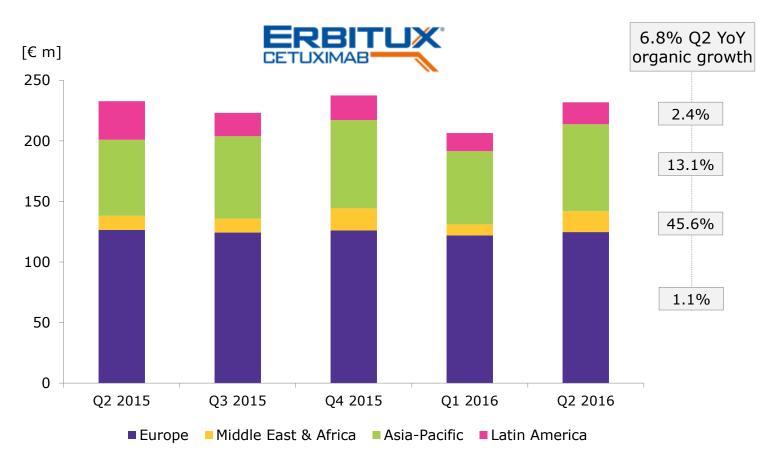


Rebif performance

- Rebif sales of €441 m in Q2 2016 reflect flat organic performance amid negative FX effects from LatAm & EU
- Market shares within interferons stable due to high retention rates and longterm safety track record
- •U.S. pricing & market share stabilization offset decline of interferon class
- 5% U.S. price increases in July will support performance going forward
- Phased market entry of orals in Europe causes ongoing volume decline;
 Q2 2016 contains tender in Russia

Erbitux: A challenging market environment

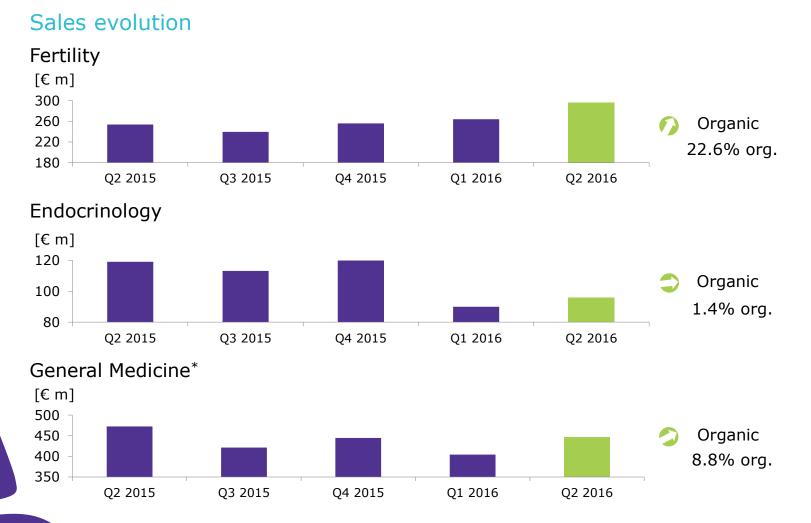
Erbitux sales by region



Erbitux performance

- Sales increase to €232 m due to solid volume development especially in growth markets
- Europe stable in ongoing tough environment (price and competition)
- Asia-Pacific shows strong growth led by China
- Organic jump in MEA reflects growing demand but also beneficial tender phasing

Strong organic growth in Fertility, General Medicine and Endocrinology



Q2 drivers

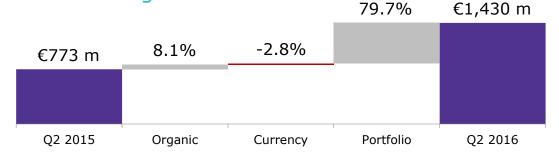
- •Gonal-f continues to benefit from competitive situation in U.S. and strong demand in China
- Sales drop in Endocrinology reflects Kuvan divestment; remaining portfolio (Saizen, Serostim) growing organically
- General Medicine sales burdened by FX headwinds from LatAM, organic performance sustainably healthy
- Euthyrox posts strong growth fueled by all regions, China remains key organic contributor of organic growth
- Glucophage growing in all regions especially benefiting from high demand in Middle East

Life Science: Another strong quarter while integration on track

Life Science P&L

[€m]	Q2 2015	Q2 2016
Net sales	773	1,430
Marketing and selling	-244	-413
Administration	-28	-58
Research and development	-49	-65
EBIT	87	166
EBITDA	170	343
EBITDA pre	200	417
Margin (in % of net sales)	25.9%	29.1%

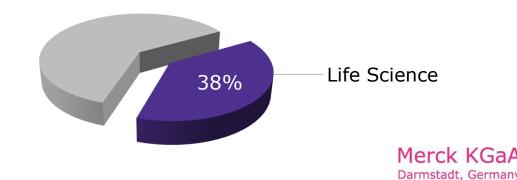
Net sales bridge



Comments

- Double-digit growth of Process Solutions driven by increasing production of large molecules across global and regional accounts
- Applied Solutions shows moderate organic growth, driven by biomonitoring products for pharma & demand for analytical testing
- Research Solutions benefits from strong demand in Emerging Markets, and for chemical analytics and molecular biology products
- Absolute costs higher due to Sigma, but improve in relation to sales
- Profitability reflects Sigma, business mix and synergies



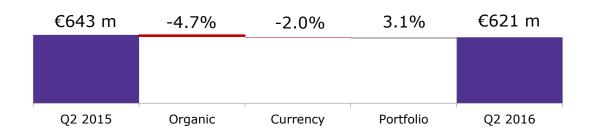


Performance Materials: Strong profitability amid ongoing destocking

Performance Materials P&L

[€m]	Q2 2015	Q2 2016
Net sales	643	621
Marketing and selling	-53	-59
Administration	-14	-14
Research and development	-49	-53
EBIT	238	193
EBITDA	299	267
EBITDA pre	295	273
Margin (in % of net sales)	45.9%	44.1%

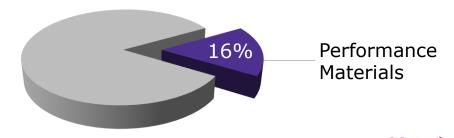
Net sales bridge



Comments

- LC declining as ongoing supply chain destocking & volume declines of mature TN-TFT outweighs volume increase in PS-VA and IPS
- Destocking is expected to continue into H2 2016
- OLED continues to grow on industry capacity expansion & investments
- Integrated Circuit Materials (ICM) shows above market growth mainly driven by dielectric and lithography materials for chip production
- Strong growth of Pigments & Functionals due to strong Xirallic for automotive coatings and cosmetic functionals, but on low comparables
- High profitability reflects leading market position, positive product mix within ICM and Pigments as well as active cost management

Q2 2016 share of group net sales



Reported figures reflect strong business performance

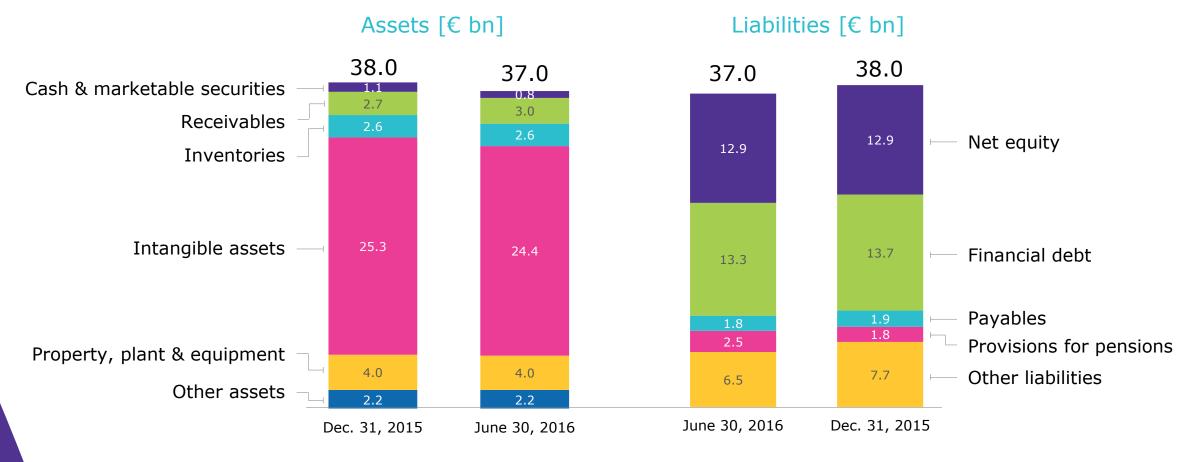
Reported results

[€m]	Q2 2015	Q2 2016	Δ
EBIT	501	550	9.8%
Financial result	-41	-121	>100%
Profit before tax	461	429	-6.8%
Income tax	-115	-115	0.0%
<i>Effective tax rate (%)</i>	24.9%	26.7%	
Net income	343	312	-9.1%
EPS (€)	0.79	0.72	-8.9%

Comments

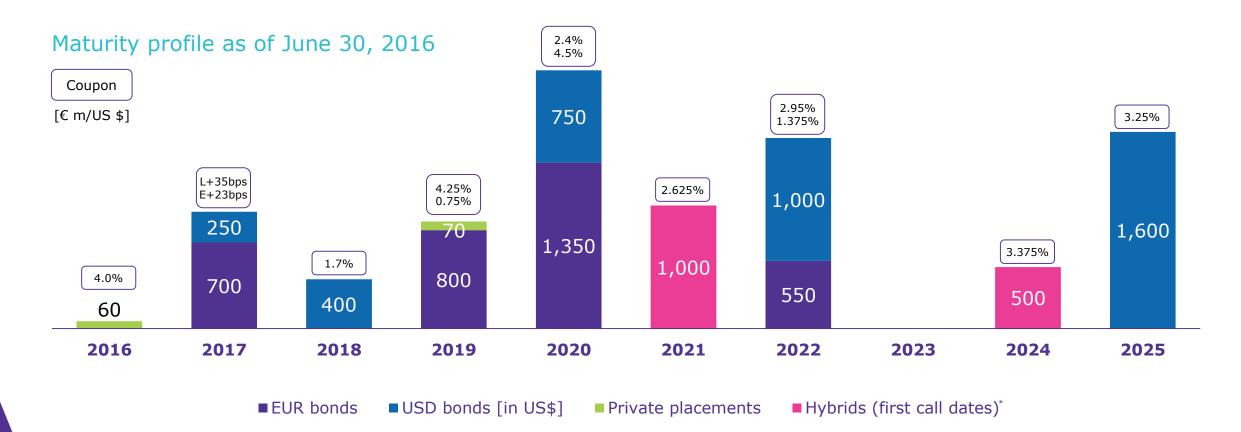
- EBIT reflects increased EBITDA pre amid integration costs, Sigma D&A and Xalkori impairment (~€70 m)
- Financial result contains Sigma financing interest expenses and significant adverse effects from LTIP
- Effective tax rate slightly above guided range of ~23% to 25% due to Xalkori impairment

Balance sheet – deleveraging in progress after Sigma acquisition



- Total assets decline by 2.6%, equity ratio grows to 34.7%
- Other liabilities decrease by €1.2 bn mainly due to dividend payment to E. Merck KG, Darmstadt, Germany and lower deferred taxes
- Further decline in interest rates increases pension provisions
- Stable net equity: Profit after tax offset by dividends, FX translation and actuarial losses

Well-balanced maturity profile reflects capital market transactions related to Sigma-Aldrich



Financing structure enables flexible and swift deleveraging

Healthy underlying operating cash flow

Q2 2016 – cash flow statement

[€m]	Q2 2015	Q2 2016	Δ
Profit after tax	346	314	-32
D&A	343	519	176
Changes in provisions	-70	-67	3
Changes in other assets/liabilities	-270	-397	-127
Other operating activities	3	-28	-31
Changes in working capital	-25	-30	-5
Operating cash flow	326	311	-15
Investing cash flow	1,860	-114	-1,974
thereof Capex on PPE	-93	-125	-32
Financing cash flow	-174	-357	-183

Cash flow drivers

- •D&A increases due to Sigma and Xalkori impairment
- Higher tax payments burden changes in other assets/liabilities
- Investing cash flow LY contained cash-in from Sigma hedging
- Capex higher due to HQ & Sigma; 2016 peak expected in Q4
- Financing cash flow reflects repayment of Millipore bond and commercial paper

Exceptionals in Q2 2016

Exceptionals in EBIT

[€m]	Q2 2015		Q2 20	016
	Exceptionals	thereof D&A	Exceptionals	thereof D&A
Healthcare	21	2	70	71
Life Science	30	0	74	0
Performance Materials	-3	0	7	0
Corporate & Other	9	0	10	0
Total	56	2	160	71



Financial calendar

Date	Event
October 13, 2016	Capital Market Day - 2016
November 15, 2016	Q3 2016 Earnings release
March 9, 2017	Q4 2016 Earnings release
April 28, 2017	Annual General Meeting
May 18, 2017	Q1 2017 Earnings release



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