



CAPITAL MARKETS DAY 2017

MEET MANAGEMENT

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Darmstadt – September 28, 2017



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Agenda

01 Group

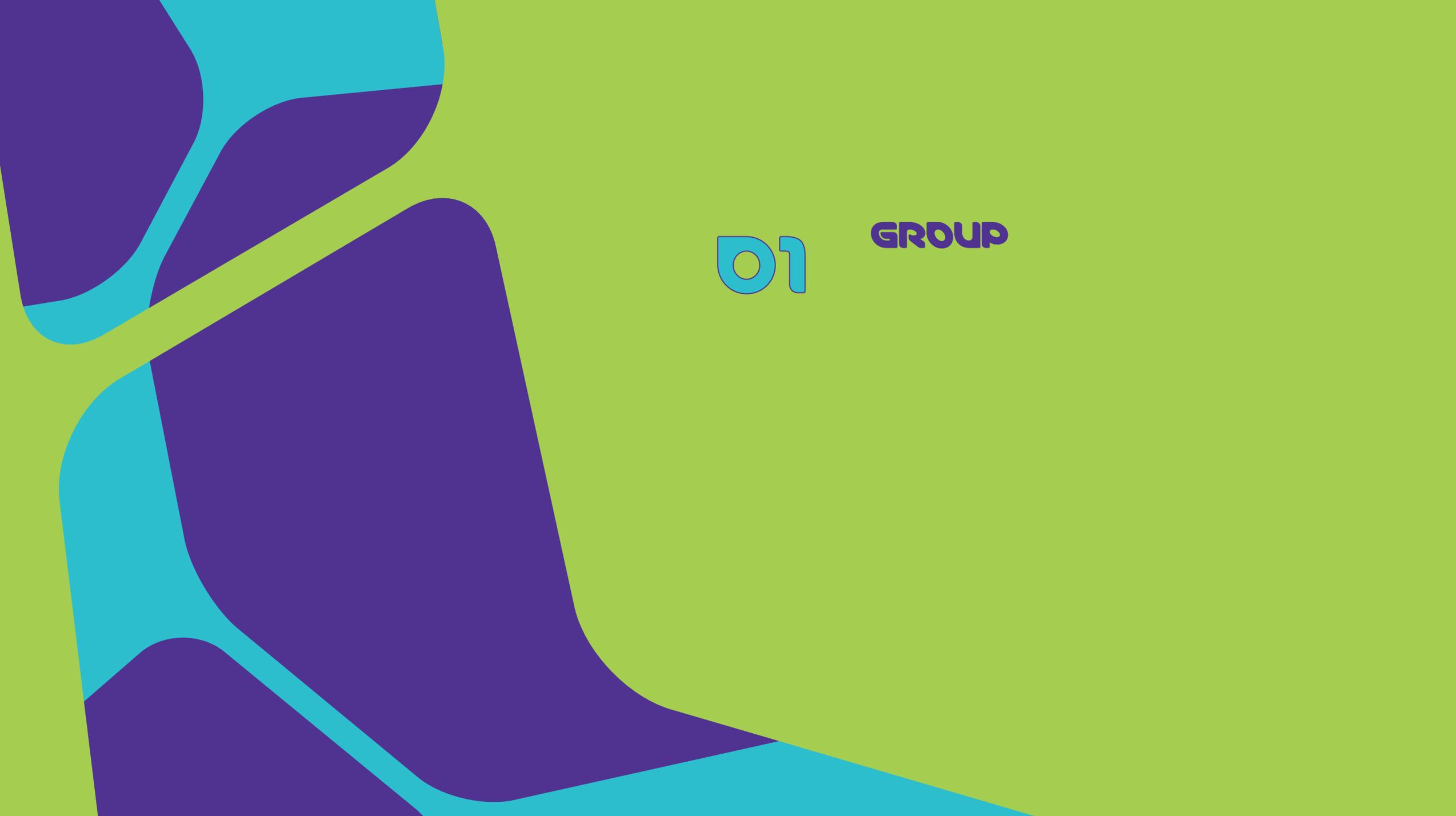
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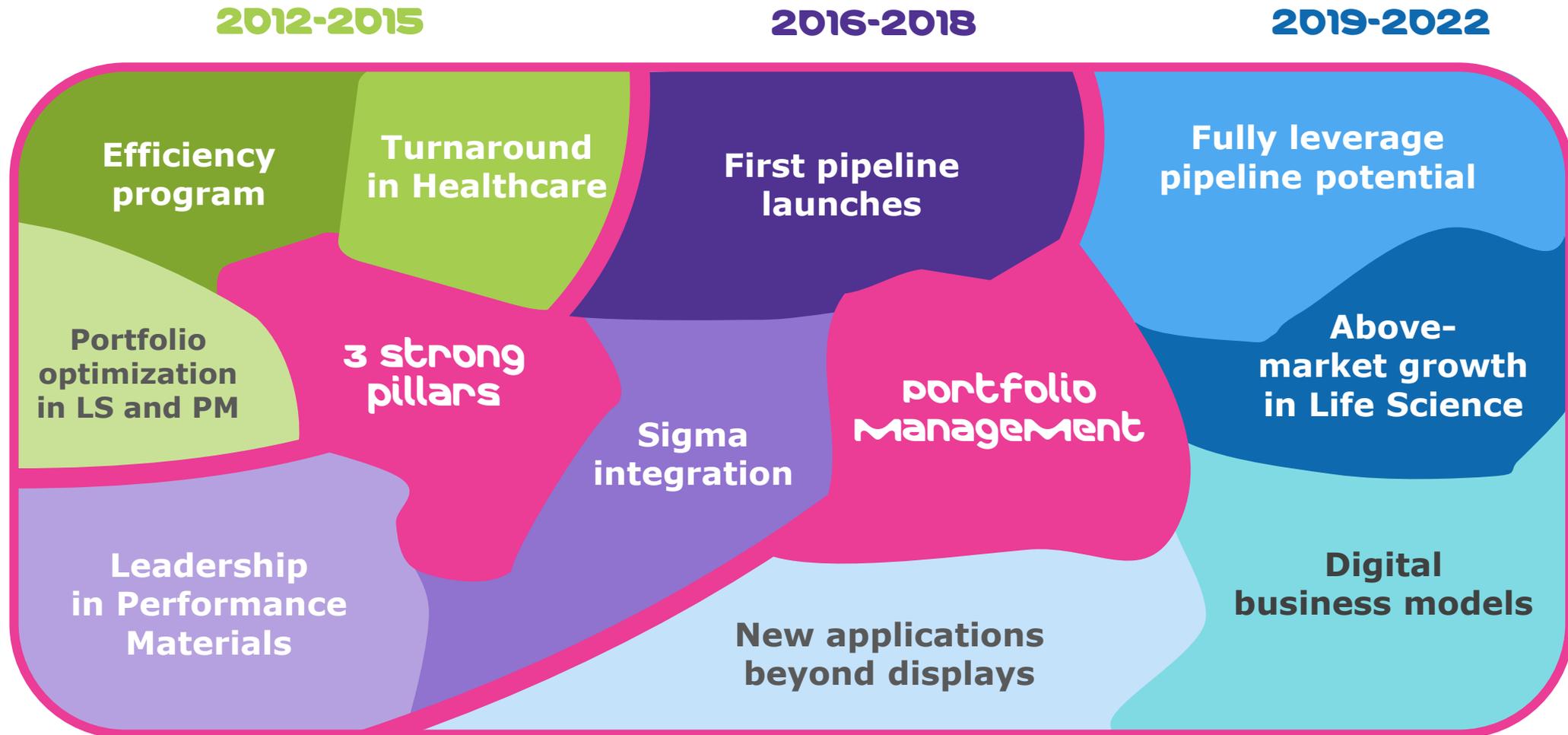
06 Back-up



01

GROUP

Group Strategic roadmap 2016-2022



Group

On track to deliver on priority goals for 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**

- Defend market leadership
- Drive innovation across all businesses

Group

Main earnings drivers in 2018



EBITDA*-supporting factors

- Organic net sales growth by Healthcare and Life Science

- Sigma-Aldrich incremental cost and revenue synergies
~+€95 m YoY

- Biosimilars divestment frees up R&D budget
(2017: mid to high double-digit R&D costs)

- First full-year sales contribution from newly launched pipeline products Mavenclad® and Bavencio®

- Potential further milestone payments for Avelumab



EBITDA*-reducing factors

- Underlying R&D costs in Healthcare above 2017, subject to clinical data outcome of priority projects

- Healthcare margins negatively impacted by product mix

- 2017 special gains of ~€200 m (swap of royalty & license income stream, 4 Bavencio® milestone payments)

- Performance Materials sales and earnings continuously affected by adjustment processes in Liquid Crystals

- Potential launch preparations for Mavenclad® U.S., subject to go/no-go decision on filing

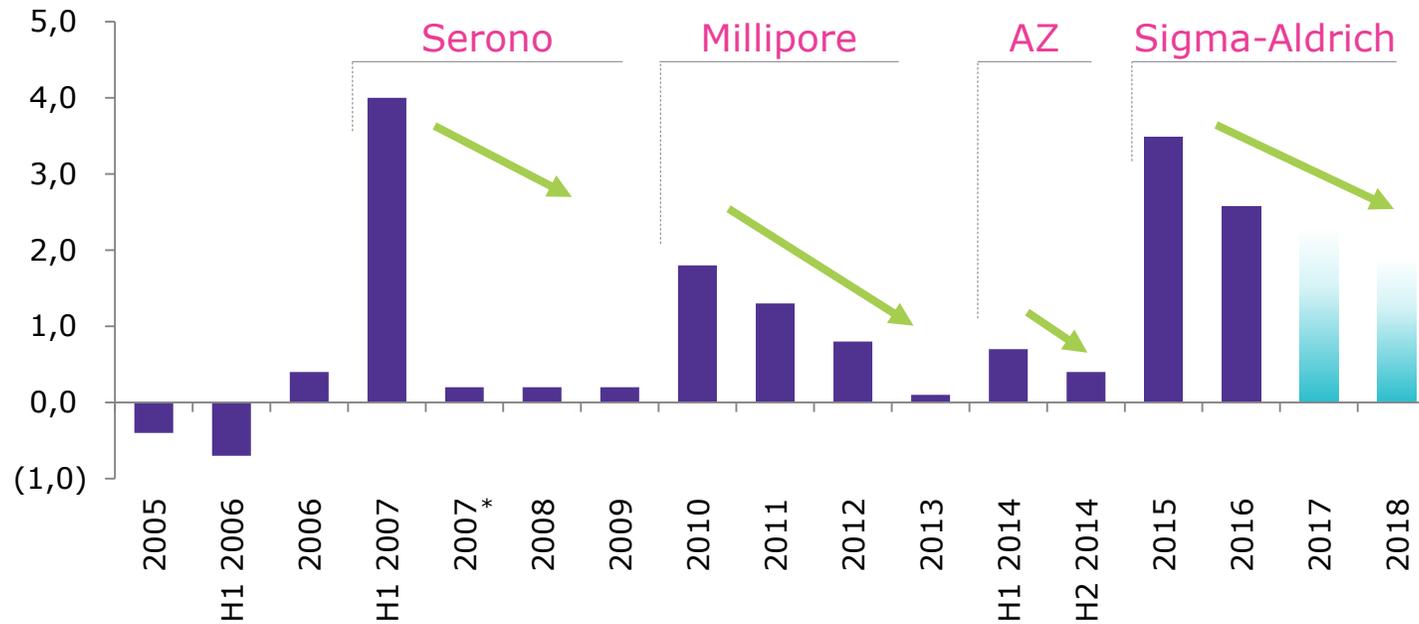
- FX if rates remain at current levels

Discipline and prioritization will be key ingredients to deliver

Group

We remain focused on deleveraging

Net debt excl. pensions / EBITDA pre



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

Merck KGaA,
Darmstadt,
Germany

- **Deleverage to <2x net debt / EBITDA pre in 2018**
- **No large acquisitions (>€500 m) until end of 2018 (unless financed by divestments)**
- **Dividend policy reflects sustainable earnings trend**

Group

Regular portfolio review and optimization remains key

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

Regular portfolio review and active capital allocation will continue

**DNA and
track
record**

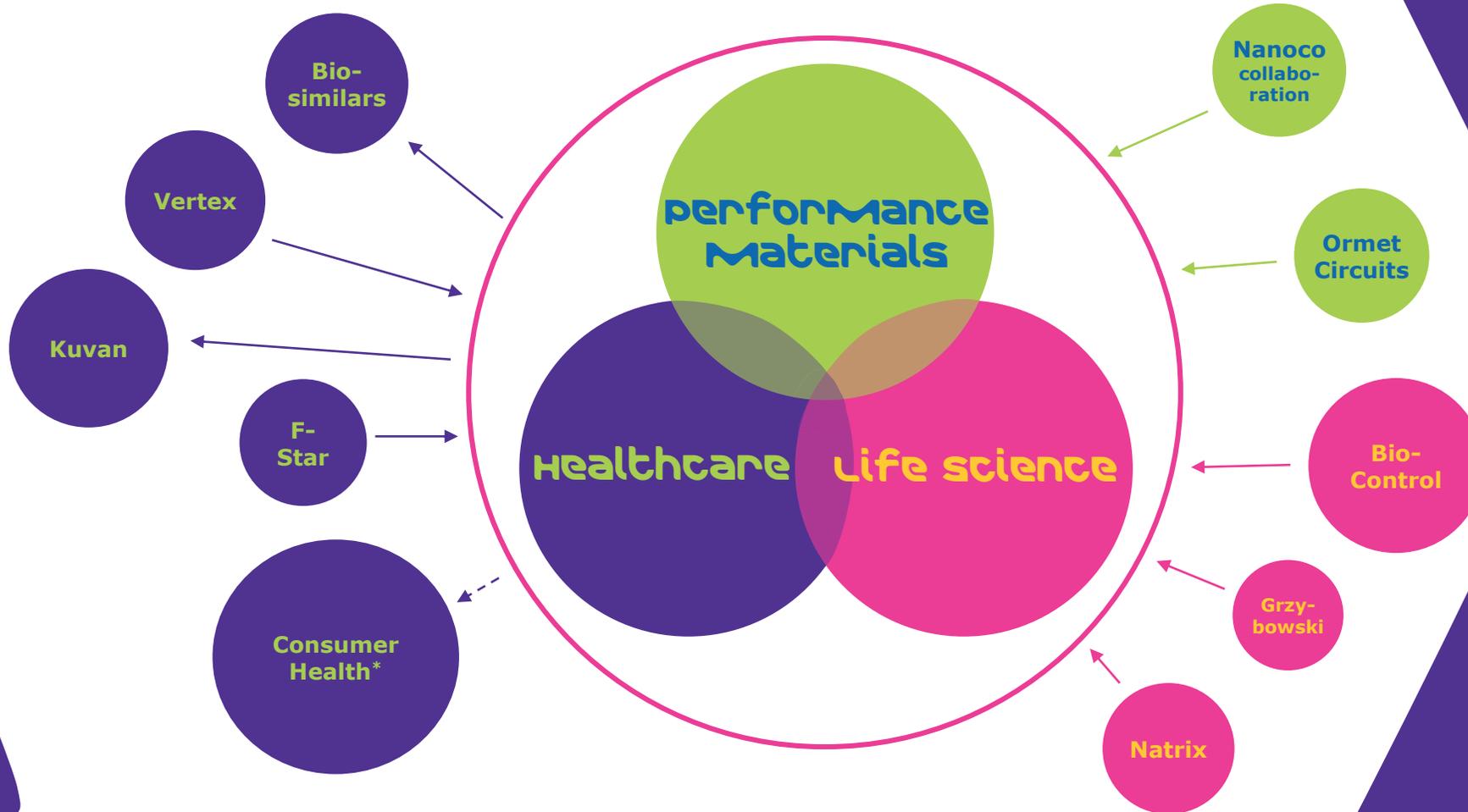
**clear
criteria**

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

Disciplined approach to portfolio management will persist

Group

Stronger portfolio through active management

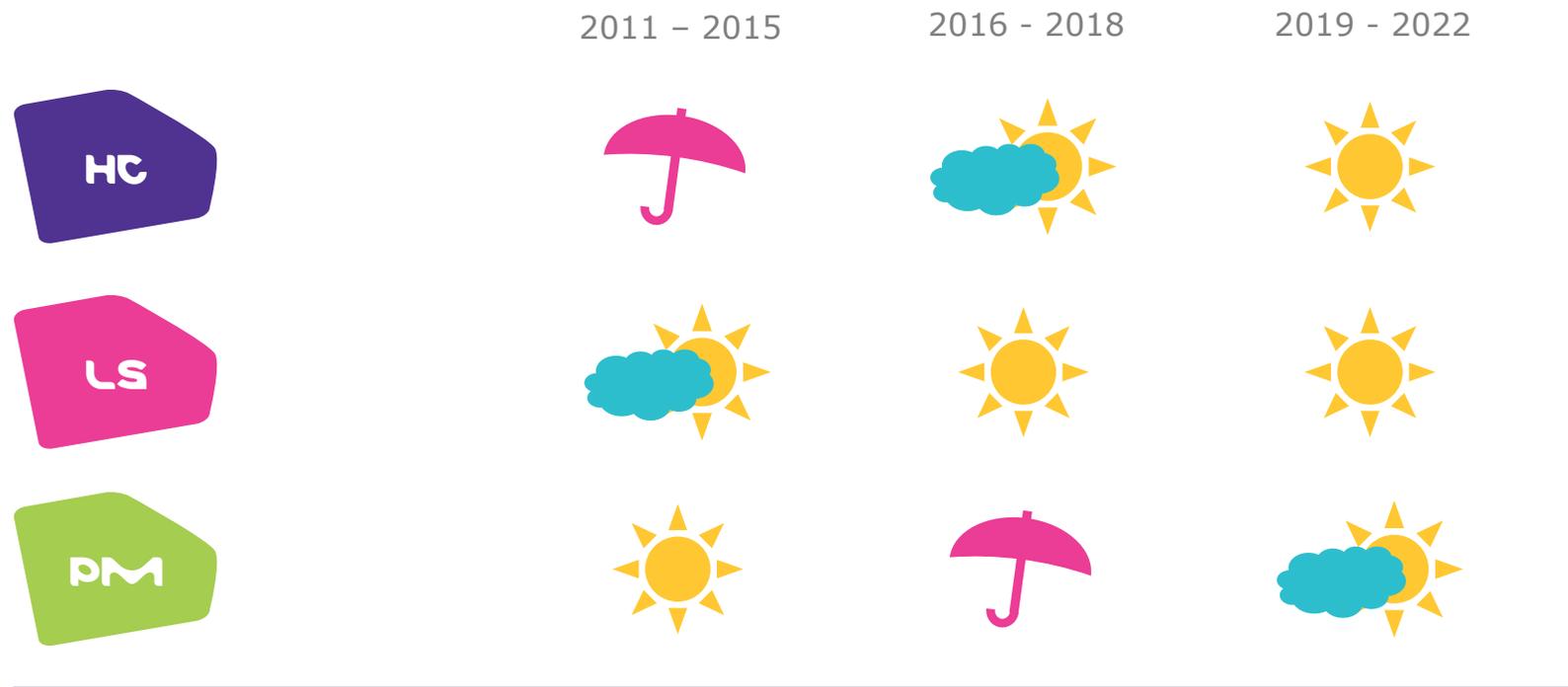


profitable growth and value creation

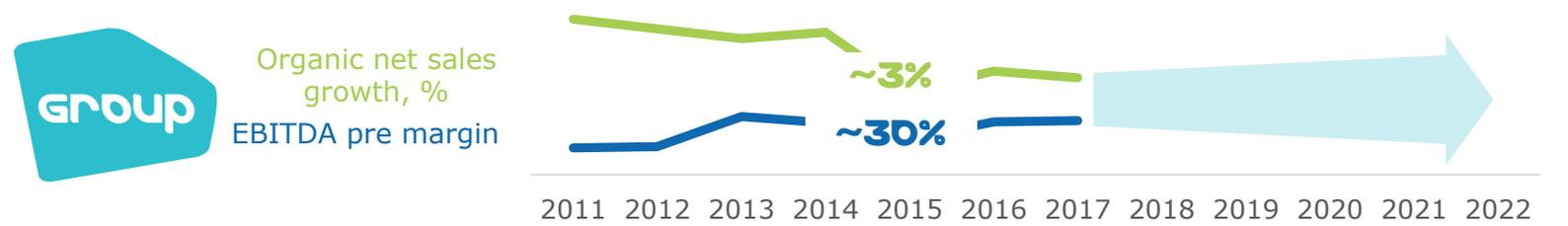
- Well-balanced approach to organic and inorganic growth
- Strengthened all three businesses
- Increased resilience of Group

Group

Company's structure enables to absorb business challenges



- Ambition to keep base business stable until 2022
- Pipeline optionality materializing
- Sustaining topline momentum
- Realizing full synergy potential
- Diversifying business mix
- Managing liquid crystals normalization



Group

Supporting value generation through operational excellence

systems

PROCESSES

Establishment of shared service platforms frees up capacities for high value-added administration activities

- New shared service hub in Manila
- Three service hubs will ensure a global footprint in growth regions and 24/7 service
- Full leverage achieved after ~3-4 years



Harmonization of KGaA, Darmstadt, Germany's diverse ERP* systems environment

- 3 integrated solutions to fit each business' needs
- Roll-out ongoing and ready in major parts of EU and Asia

analytics

Implementation of state-of-the-art technologies to improve finance processes

- Smart linking of internal & external data sets
- Integration of automation in finance processes
- Low-cost storage and high-speed processing through Cloud solution



02

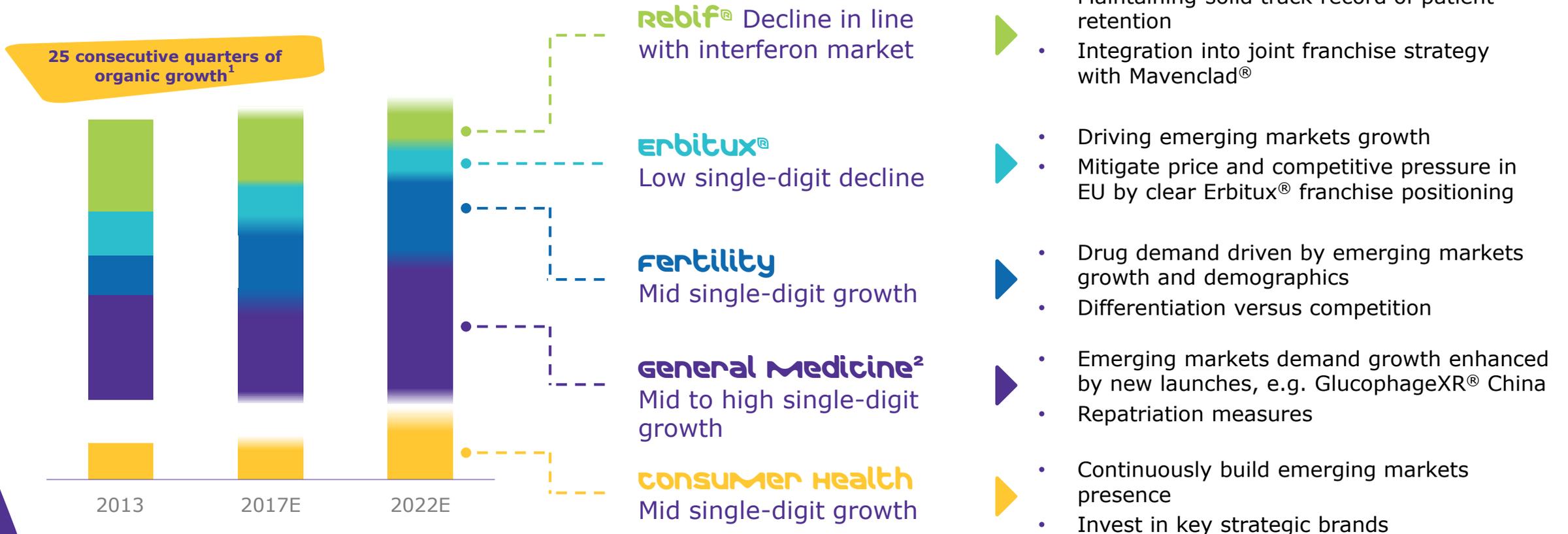
HEALTHCARE

Base business stable and pipeline progressing

Healthcare

Ambition to keep base business sales organically stable until 2022

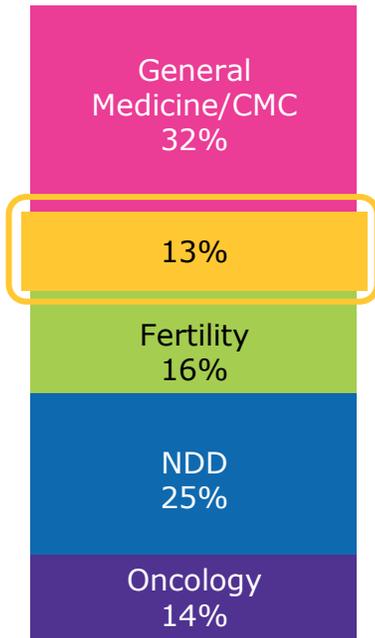
Healthcare base business net sales until 2022



Healthcare

Preparing strategic options for Consumer Health

Healthcare - Net sales 2016



CH

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

High-quality brands

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

Diversified presence

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

High-growth Markets

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

Attractive financials

- Sales ~€860 m in 2016: organic CAGR 2013-2016 ~6%
- ~3,800 employees globally

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

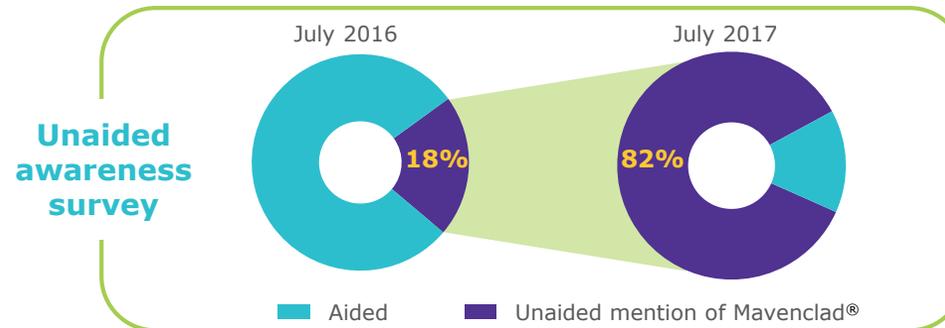
Healthcare

Mavenclad® launch well prepared and successfully executed in first days

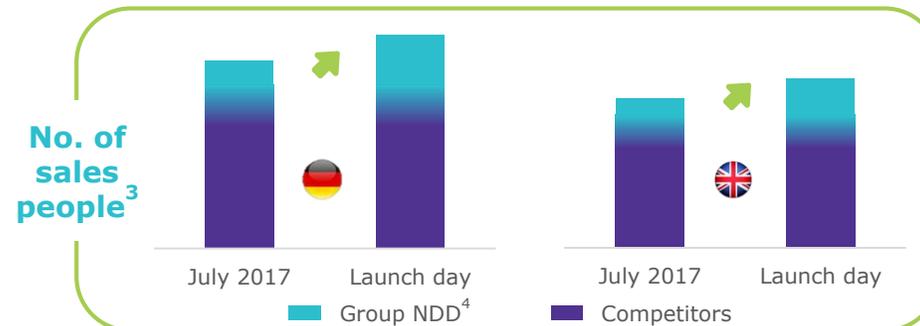
1 Interest by scientific community increased 9x within only 1 year



2 Awareness improved substantially within key German neurologists²



3 Share of voice lifted through swift build-up of sales force and utilization of existing Rebif® infrastructure



on track to reach high single digit € M sales in 2017

- Germany: first patients already started treatment
- UK: In discussions with healthcare authorities to secure immediate access and funding for patients
- Lowest-cost high-efficacy agent in multiple sclerosis
- U.S.: consultations with the FDA initiated; Go/no-go decision until end of 2017
- Further submissions initiated or in planning (e.g. CH, AUS, Israel)

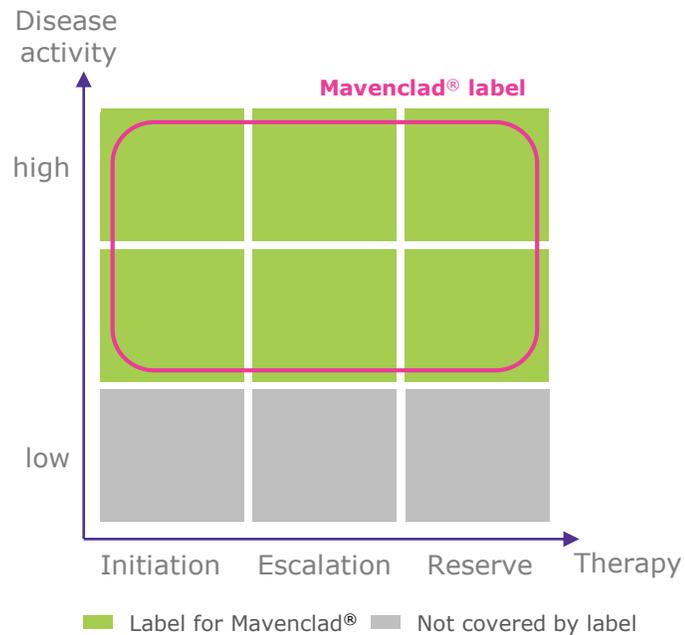
Expected peak sales ~€500 – 700 M in EU

Healthcare

Mavenclad's attractive label¹ supports integrated franchise strategy

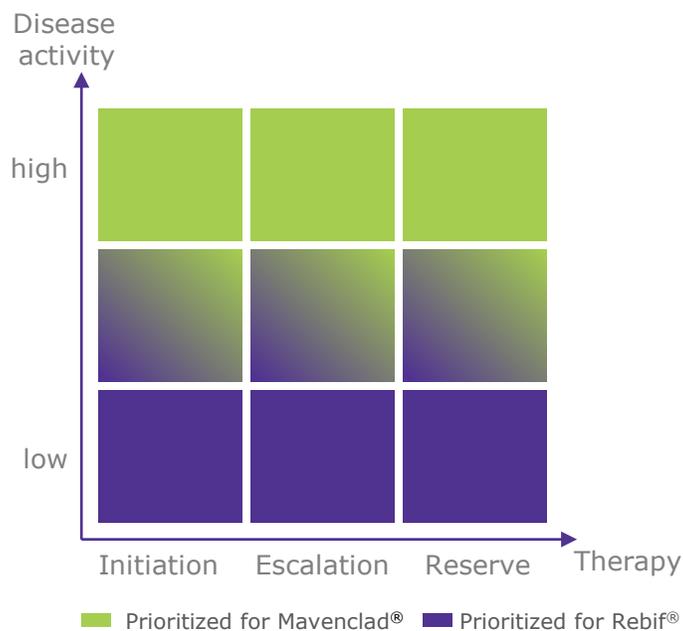
Mavenclad® label covers 60-70% of patients with RRMS² within the MS¹ patient population

MS patient population³



Group's overall NDD franchise will cover a broad MS patient pool

RRMS patients, EU-5⁴



integrated franchise strategy

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

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

Healthcare

Bavencio® launch in the U.S. running smoothly

mMCC¹

Maximizing leadership

mUC²

Building foundation

Patient share mMCC naive
(% share of total market)⁴



Bavencio® in mUC with regular
uptrend in interest since approval



■ Bavencio® ■ All other non-I-Onc treatments ■ Other I-Onc

■ Reactive MSL interactions⁴

- Successful uptake since accelerated approval³: no. of new patients continues to climb (naive patients and switches)
- High acceptance of „first and only” indication
- Strong engagement with MCC community

- Positive „halo” effect from mMCC creates impetus for use in UC³
- Compelling clinical profile with durable responses and consistent efficacy
- Bespoke go-to-market strategy: targeted key account approach, partnering with selected specialists

Bavencio®
on track
to reach
~€20 m sales
in first year
(2017)

¹mMCC = metastatic Merkel cell carcinoma; ²mUC = metastatic urothelial cancer; ³Accelerated FDA approval for mMCC on March 23, 2017, and for mUC on May 9, 2017; Continued approval for these indications in the US is contingent upon verification and description of clinical benefit in confirmatory trials; ⁴Sources: mMCC: IMS claims data, mUC: Merck KGaA, Darmstadt, Germany reactive MSL interactions – indicative only; ⁵Source: Merck KGaA, Darmstadt, Germany; Note: MCC is a rare disease with low patient numbers, so IMS data is based on small sample size and directional



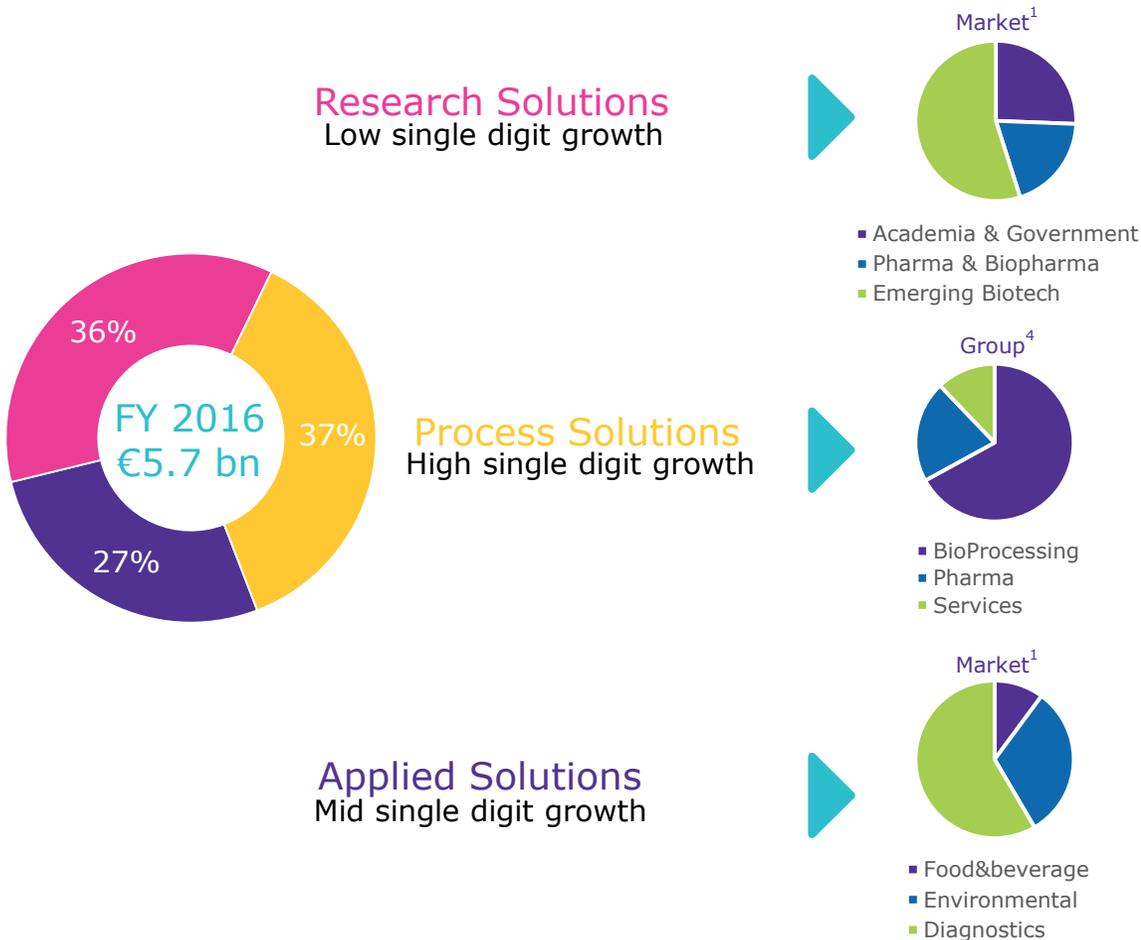
03

LIFE SCIENCE

Sustaining topline momentum and realizing synergies

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

Life Science



Long-term growth drivers

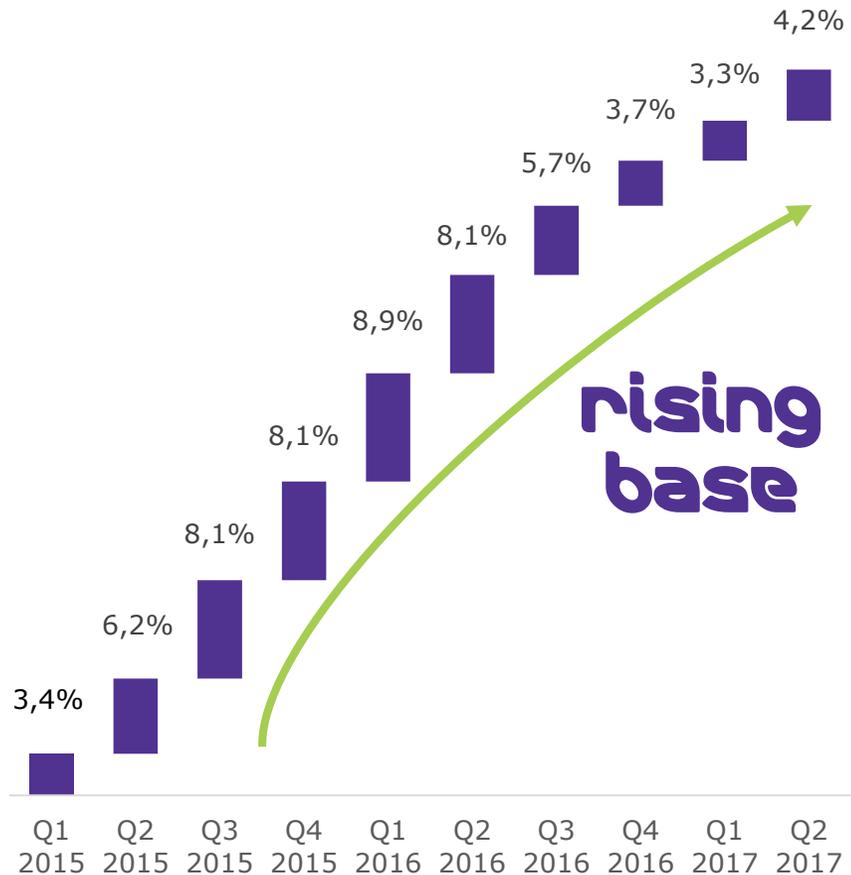
- **Research activity:** >3,000 projects in research pipelines², rising number of experiments and newly emerging therapies/technologies backs healthy growth in biotech and CROs³
 - **Public and private funding:** availability, access and predictability drive demand from academia and emerging biotech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

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

Life Science

Demand remains robust despite slower near-term growth momentum

Life Science – Organic net sales [% YoY]



process solutions

Near-term headwinds

- Driven by few global key accounts
- Due to anticipated decline of legacy blockbuster drugs as new molecules emerge
- Regional accounts continue to grow strongly
- Market fundamentals remain attractive

research solutions

Dynamics unchanged, subject to funding

- Slower demand growth at academia customers in mature markets
- Public funding uncertainty can affect short-term spending
- High growth in emerging markets unchanged

Integration of Sigma and synergy generation progressing well



- **Network consolidation and operational transformation ongoing**
 - 11 manufacturing sites (St. Charles, Hayward, Emmer, Natick, Rio, Beijing, Hohenbrunn, Steinheim, Berlin, Eppelheim, Ishikari)
 - 6 warehouses (Argentina, Chile, South Africa, Brazil, Malaysia, UK)
 - Leveraged direct material and freight spend
- **Continuing to accelerate synergy capture via Operational Excellence, lean & six sigma**
- **Savings leveraged for strategic investments in growth**, e.g. Nantong/China

On track to deliver planned synergies until 2018



- **Integration of SIAL.com almost complete and customer adoption is rising**
 - ~80% of relevant products in North America and Europe are now available online
 - >1/3 of Merck KGaA, Darmstadt, Germany eCommerce orders now contain products from both legacy companies
- **Process Solutions' more complete product offering increasingly materializing**
 - E.g. combination of production and processing capabilities enables safer CCM* components, e.g. HTST* Glucose
 - Viral clearance services allows for quicker validation and lower switching costs to our filters

First results of topline synergies coming in

Life Science's growth initiatives consist of two types of innovation activities



Evolutionary

Developing offerings to further existing platforms



Breakthrough

Developing new platforms and product categories

End to end (E2E)

- 15 new projects won to date
- New E2E labs opened in China and North America
- Increasing capacity at various sites, e.g. Martillac

Single use

- Launch of Mobius Select to allow modular customizable assembly
- Capacity expansion in Danvers and Asia

Connected Lab

- Connectivity: Internet of Things toolbox developed
- Electronic Lab Notebook platform in beta testing at several customers
- Launching LabWater offering

Next gen processing

- 7 programs in place to address continuous processing in mAb production
- Developing solutions to overcoming drug bioavailability challenges

Gene editing & novel modalities

- CRISPR/Cas9 tools launched with IP filing
- Build-up of commercial viral vector production in Carlsbad

- **Growth initiatives support Life Science's long-term growth ambition**
- **Portfolio is well set up; bolt-ons and partnerships will remain important**



04

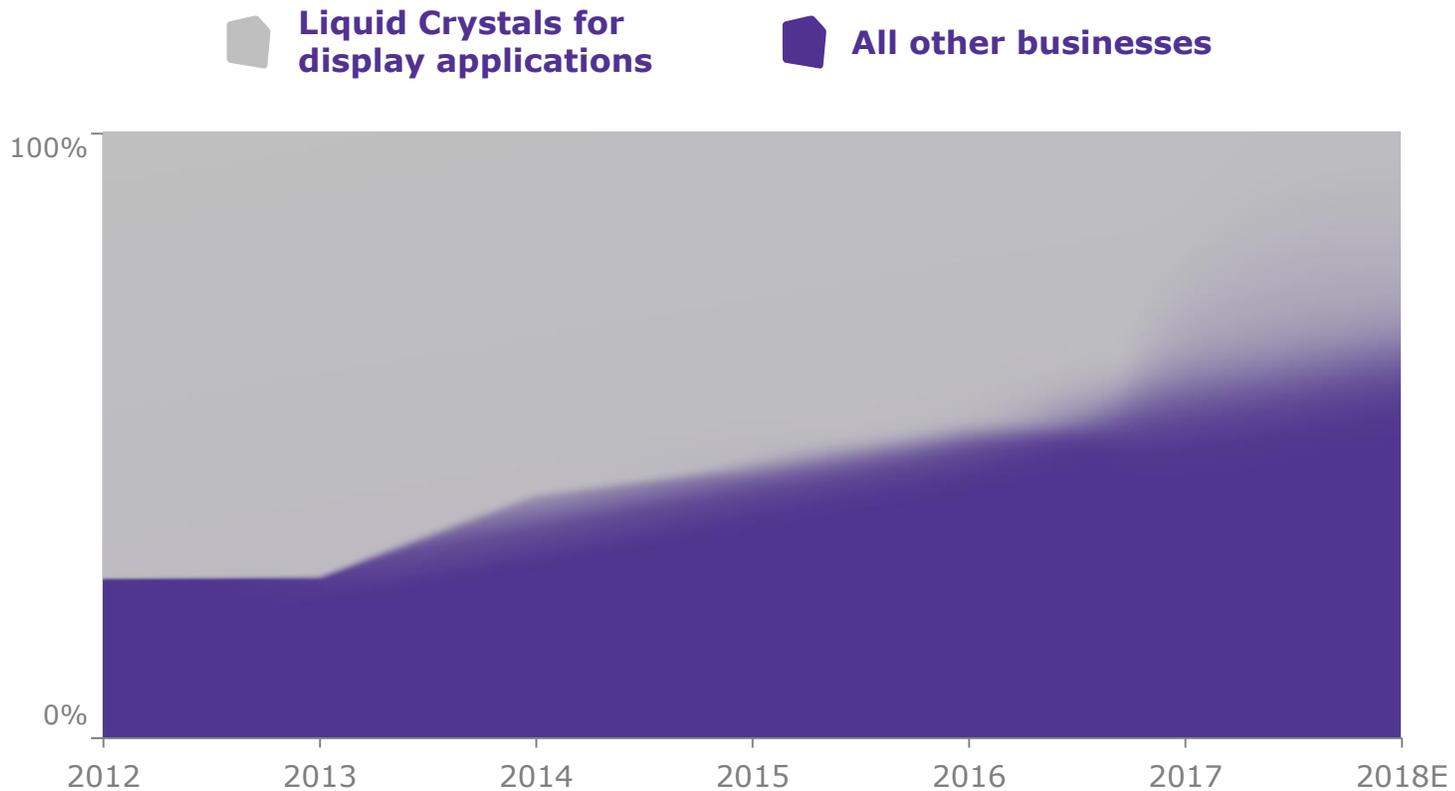
**PERFORMANCE
MATERIALS**

Diversifying mix and
managing liquid crystals

Performance Materials

Four-pillar-strategy raises level of diversification

Sales share of Liquid Crystals for displays versus all other businesses



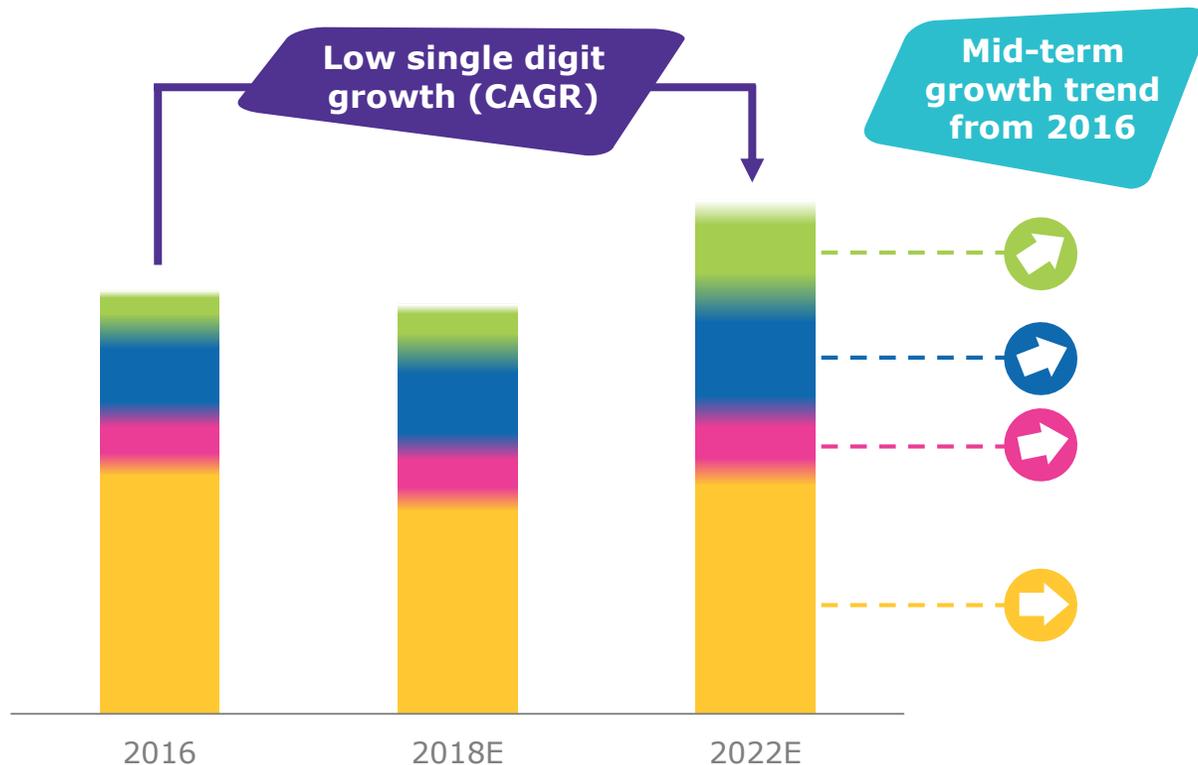
Diversification of Performance Materials increased due to

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

Performance Materials

On track to achieve low single digit growth

Performance Materials net sales development



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)

Display Materials

Challenges in LC displays amid various opportunities for novel applications

LC for display applications



Maintain leadership position in a more challenging environment:



Innovation

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



Know-how

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



Customer

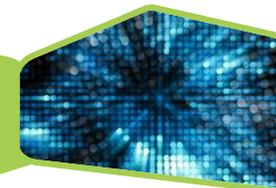
Presence in all customer locations versus more local focus of competitors



IP protection

>2,000 patents and rigorous enforcement of IP

NOVEL Liquid crystals applications



Drive innovation and create further market demand:



LC Windows

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



LC Antennas

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



Lighting guiding

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

Integrated Circuit Materials

Leading market positions in profitable niches supported by technology trends

ICM¹ sales by end use



- Memory
- Foundry²
- Other
- Logic
- Packaging

Product portfolio



Lithography materials



Dielectric materials



Conductive pastes



Process materials



Silica materials



Deposition materials

Growth drivers and differentiation

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

Pigments and Functional Materials

Driving innovation by combining color & function

Pigments & Functional Materials sales by end use



■ Decorative Materials

Product portfolio

Decorative



Color cosmetics

Plastics

Printing

Car coatings

Functional



Laser marking

Coating & Printing

Personal care

Security

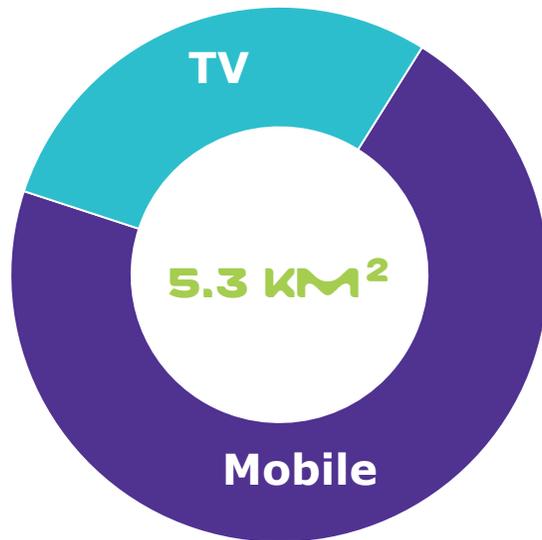
Growth drivers and differentiation

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

Advanced Technologies

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

OLED Shipment Area* [km²]



Product portfolio

Evaporable OLED Materials



Printable OLED Materials



Growth drivers and differentiation

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



05

EXECUTIVE SUMMARY

Group Executive Summary

growth

profitability

resilience

value creation

challenges

HC

Delivering

- + Sustainability of base business secured
- + Delivering on R&D pipeline

Managing

- + Maintaining leadership position in LC
- + Preparing mid-term return to growth

PM

LS

On track

- + Outperforming industry average
- + Successful synergy generation

Diligent execution

- + Disciplined deleveraging continued
- + Active portfolio optimization ongoing

M

prioritization

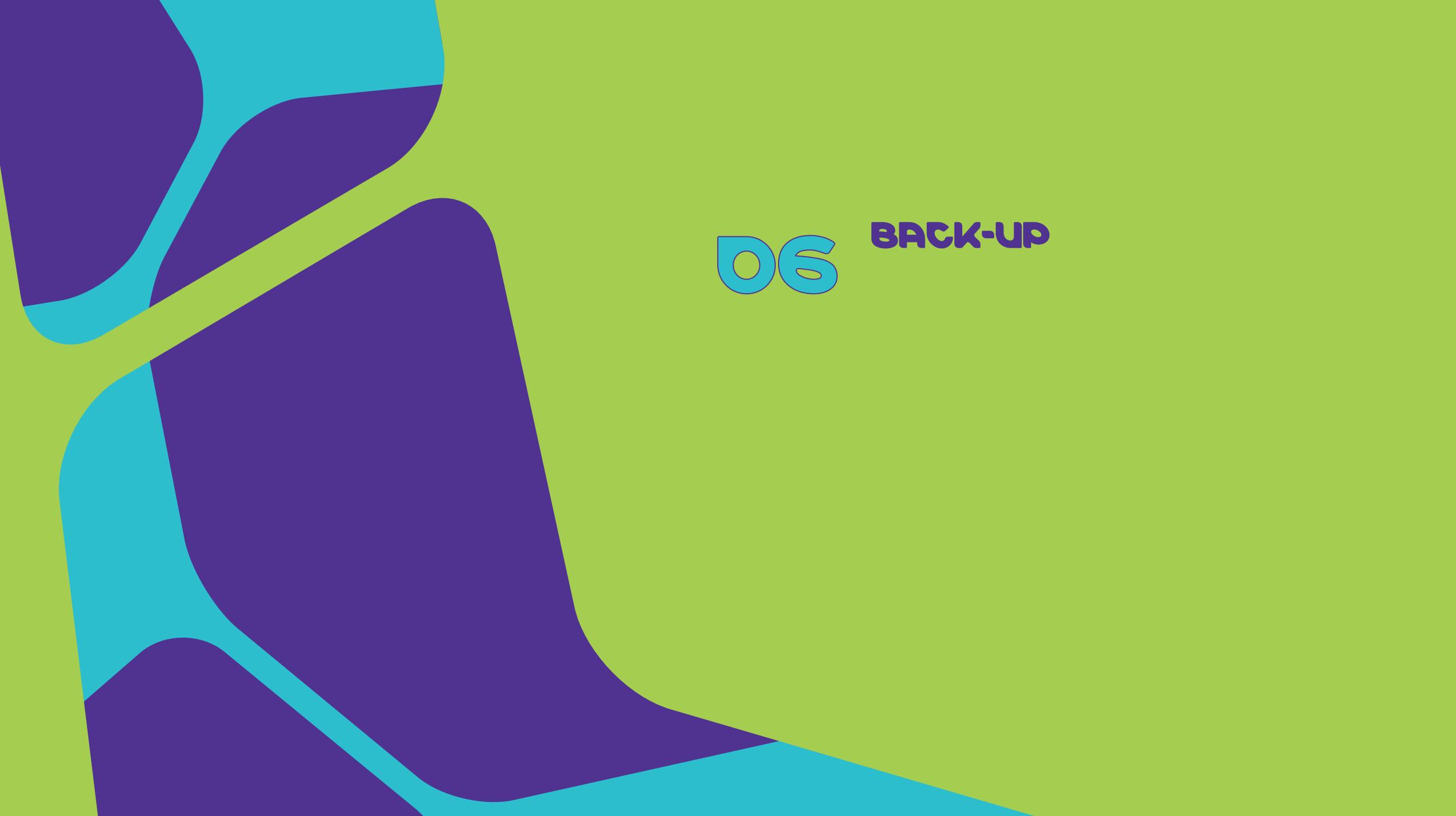
science

launches

innovation

technology





06

BACK-UP

Healthcare

Mavenclad® – Unique highlights of the label

Mavenclad®

patient-friendly approach
to managing highly
active RMS

1

4-year sustained efficacy

2

Maximum of 20 days of oral treatment

3

Lowest monitoring burden of all available
high-efficacy treatments

4

Selective reconstitution of the immune system with
minimal impact on innate immune functions

5

Opportunity for pregnancy planning in
year 3 and 4 of treatment

||

Improving patients' lives

Bavencio® – Oncology impact

1

mMCC: First and only approved anti-PD-L1 immunotherapy for patients in U.S., Europe and Japan with metastatic Merkel cell carcinoma (mMCC)¹

2

mUC: Indicated for previously treated patients with locally advanced or metastatic urothelial carcinoma (UC) in U.S.¹

3

Shown to engage both the adaptive and innate immune functions and in preclinical models, to induce ADCC² in vitro

4

33% response rate in mMCC 2L; 86% of responses still ongoing at 6 months and 45% still ongoing at 12 months

5

16% response rate in UC at 6 months; 85% of responses still ongoing at 6 months and 15% still ongoing at 12 months

Bavencio®

Reveal another side
of immunity

¹The U.S. Food and Drug Administration (FDA) granted accelerated approval for BAVENCIO for the treatment of (i) mMCC in adults and pediatric patients 12 years and older and (ii) patients with locally advanced or metastatic urothelial carcinoma (UC) who have disease progression during or following platinum-containing chemotherapy, or who have disease progression within 12 months of neoadjuvant or adjuvant treatment with platinum-containing chemotherapy. These indications were approved under accelerated approval based on tumor response rate and duration of response. Continued approval for these indications may be contingent upon verification and description of clinical benefit in confirmatory trials; ²ADCC = antibody-dependent cell-mediated cytotoxicity