Novartis AG
Investor Relations

Meet Novartis Management
Overview

Investor Presentation
May 23, 2019

NOVARTIS

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Our external environment is reshaping what it takes to lead in the long-term

- Explosion in data science
- New understanding of human biology
- New therapeutic platforms

- Rising standard of care
- Pricing pressure
- Convergence of tech and health

→ Companies that focus their capital on leading science, cutting-edge platforms, and medicines with substantial absolute efficacy, will win

NOVARTIS

We aim to become a leading medicines company

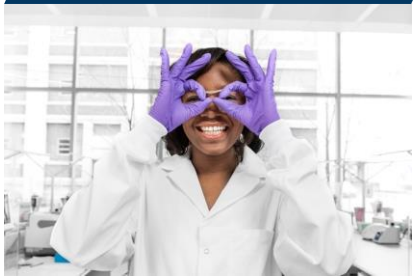
Powered by advanced therapy platforms and data science

We are a diversified medicines company

Driving growth through cutting-edge platforms

Passionate about productivity and margins

Building a new culture and lasting impact



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Focused on medicines, diversified across therapeutic areas and platforms

Company	Revenue split, % medicines[1] Rx Gx Other	TAs[2]	Blockbusters[3]	Presence in advanced therapy platforms[4] Cell	Gene	RLT	RNAi
Novartis	100%	10	15	X	X	X	X
Company 1	100%	3	8				
Company 2	98%	6	3				
Company 3	97%	2	8	X			
Company 4	96%	4	6	X			
Company 5	94%	6	7				X
Company 6	93%	6	8				
Company 7	82%	9	8		X		
Company 8	81%	2	4				
Company 9	80%	6	6				X
Company 10	71%	8	11				
Company 11	70%	9	5				
Company 12	63%	10	4		X		
Company 13	48%	9	11				X
Company 14	44%	11	4				
Company 15	41%	4	4	X			

EvaluatePharma data for FY 2018 See appendix for references

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Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS					BIOPHARMA
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory	
Select commercial assets	PROMACTA (eltrombopag) · Tafinlar + Mekinist (dabrafenib / trametinib) · KISQALI (ribociclib) · JAKAVI (ruxolitinib) · LUTATHERA (lutetium Lu 177 dotatate) · KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod) capsules · MAYZENT (siponimod) tablets · aimovig (erenumab-aooe) [1]	LUCENTIS (ranibizumab injection) · LUXTURA (weak epidermal growth factor receptor (EGFR) ophthalmic solution 5%) [4] · xiidra (lifitegrast) ophthalmic solution 5% [3]	Xolair (Omalizumab)	ZARXIO (filgrastim-sndz) · Erelzi (etanercept-szzs) · RIXATHON (rituximab) · Zessly (infliximab) · Hyrimoz (adalimumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®** [2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma	**Pegfilgrastim**
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma	**Trastuzumab** [5]
	Crizanlizumab (SEG101) Sickle cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma	**Insulins** [6]
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic ocular pain	**QBW251** COPD	
	ABL001 CML		**LOU064** CSU				
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU				
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD				
			MOR106 AD				

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

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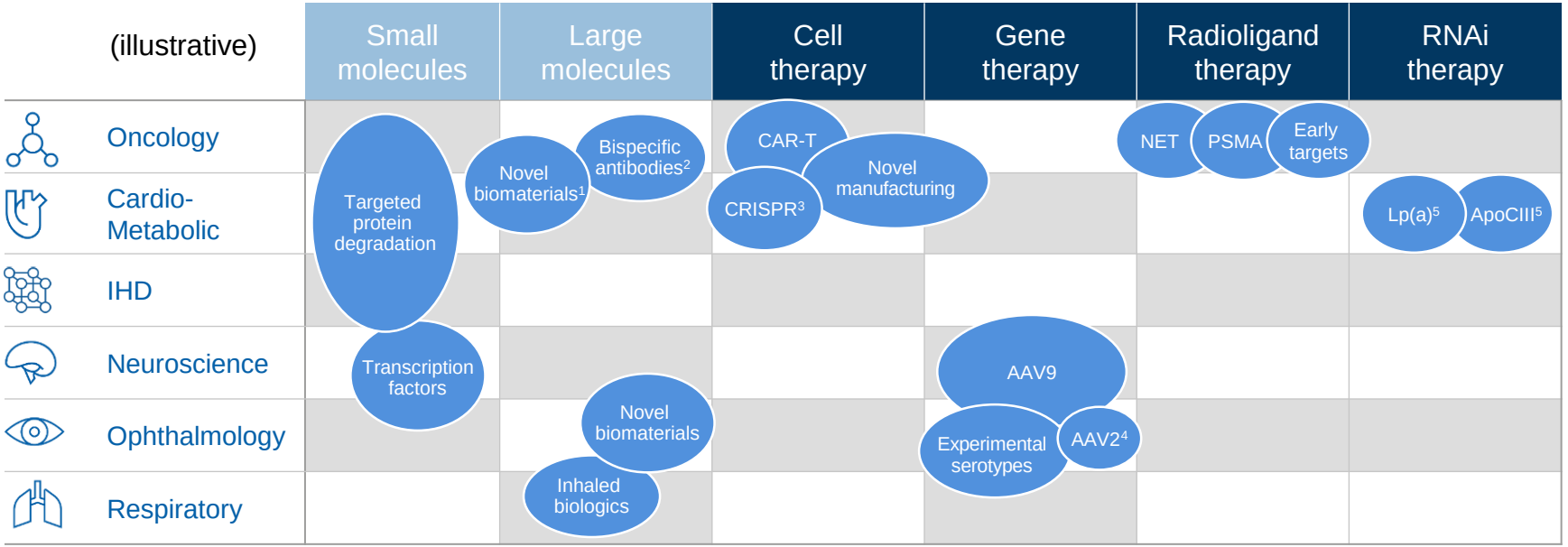
Expanding the game-board with advanced therapy platforms



1. Partnership with the Wyss Institute for Biologically Inspired Engineering at Harvard University and the Dana-Farber Cancer Institute 2. Collaboration with Xencor 3. Collaborations with Intellia Therapeutics and Caribou Biosciences
4. Collaboration with Spark on Luxturna® 5. Collaboration with Akcea

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Advancing a highly productive and valuable pipeline

Scale

200+ Projects in clinical development

500+ Ongoing clinical trials[2]

60+ Major submissions planned 2019-2021[3]

Value

25+ Potential blockbusters[1] in development

18 Advanced platform therapies in clinical development

#1 Most valuable pipeline according to external ranking[4]

1. Blockbuster defined as peak sales >USD 1bn for either a new molecular entity across all indications or for a single new indication of a previously launched product 2. Across NIBR and GDD 3. Submissions in US/EU/JP 2019-21
4. Source: Evaluate Pharma 2018, outlook to 2024. Ranked #1 in terms of: (1) value creation from advanced therapies, (2) highest pipeline value by sales 2018-24, and (3) value creation 2018-24 from recently launched and pipeline products.

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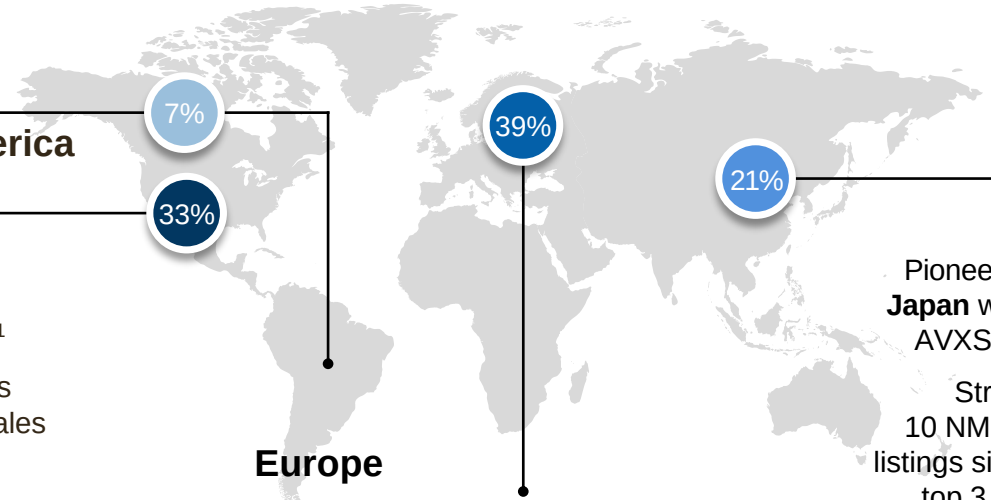
Global scale and leadership in strategic markets



Canada & Latin America

US

Limited exposure to US healthcare system reforms[1]

Multiple upcoming launches expected to increase our sales

Europe

#1 pharma company in Europe by sales[2]

Deep experience navigating difficult pricing and reimbursement environments

Rest of World

Pioneering advanced therapies in **Japan** with Kymriah® approval and AVXS-101 Sakigake designation

Strong position in **China** with 10 NME approvals and 14 NDRL listings since 2017; on track to be a top 3 market in the next 2 years

% of 2018 FY sales excluding Alcon and Sandoz proposed US portfolio sale to Aurobindo 1. Due to highly innovative and differentiated portfolio, limited exposure to Medicare Part B, 340B 2. Source: EvaluatePharma 2018 FY sales

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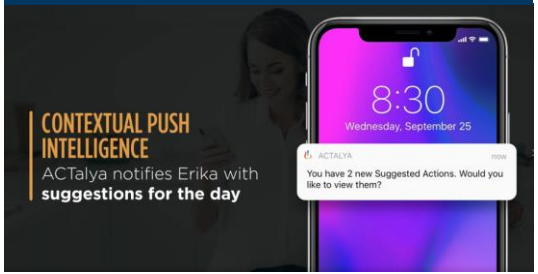
Building data science and digital capabilities

Sense Bridge
Transforming clinical trial operations

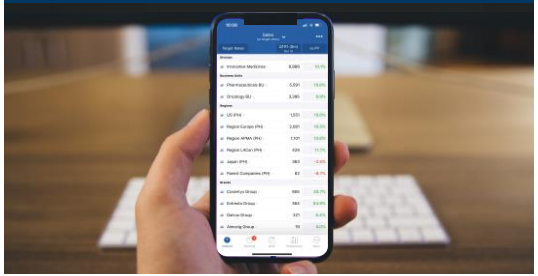
- Tracks, analyzes and predicts the status of 500+ active trials in 70+ countries involving 80k+ patients in real time
- Other modules enable selection of best trial sites, enrollment tracking, predicting trial risks, drug supply calculations, etc.

ACTalya
Making sales reps more efficient



- Combines predictive analytics with digital campaign management tools to guide our sales reps towards the “next best action” with each customer they serve
- Piloted in 2018 with 500 reps across 6 countries; scaling up to 7k reps in 2019

AI-driven Finance
Improving finance operations



- Leveraging AI to improve all planning, forecasting and resource allocation activities
- Initial focus is on sales, P&L and cash forecasting & optimization; results show AI is at least as good as internal plans

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We remain disciplined and shareholder-focused in our capital allocation

Novartis priorities	
1. Investments in organic business	Renewed focus on core medicines business with successful spin-off of Alcon
2. Growing annual dividend in CHF	Committed to maintain strong and growing dividend with no adjustment for Alcon spin-off
3. Value-creating bolt-ons	Announced acquisition of Xiidra®[1]; aim to spend up to ~5% of market cap per year on M&A and BD&L
4. Share buybacks	Repurchased 12.6m shares on the 2nd trading line 2019 YTD[2]; plan to complete share buyback[3] of up to USD 5bn by end of 2019

1. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions 2. As of May 17, 2019 3. Share buyback of up to USD 5bn announced on June 29, 2018

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Xiidra® acquisition: Strong strategic fit and attractive economics[1]

Strong strategic fit	with Novartis leading ophthalmic portfolio and pipeline
Clear blockbuster potential	given high unmet medical need with strong product profile
Significant synergies	with Novartis front-of-the-eye commercial infrastructure
Good financial return profile	strict financial discipline applied; expected to be profitable 2020 and margin accretive 2021; deal structure adds tax benefit

Xiidra® complements the Novartis ophthalmology portfolio

xiidra (lifitegrast) ophthalmic solution 5%

LUCENTIS[2] RANIBIZUMAB INJECTION

DUREZOL (difluprednate ophthalmic emulsion) 0.05%

ILEVRO™

Pazeo (olopatadine hydrochloride ophthalmic solution) 0.7%

Azopt®

TRAVATAN Z®

SIMBRINZA® (brinzolamide/brimonidine tartrate ophthalmic suspension) 1%/0.2%

LUXTURNA™[2] voretigene neparvovec-rzyl for subretinal injection

1. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions 2. Ex-US only

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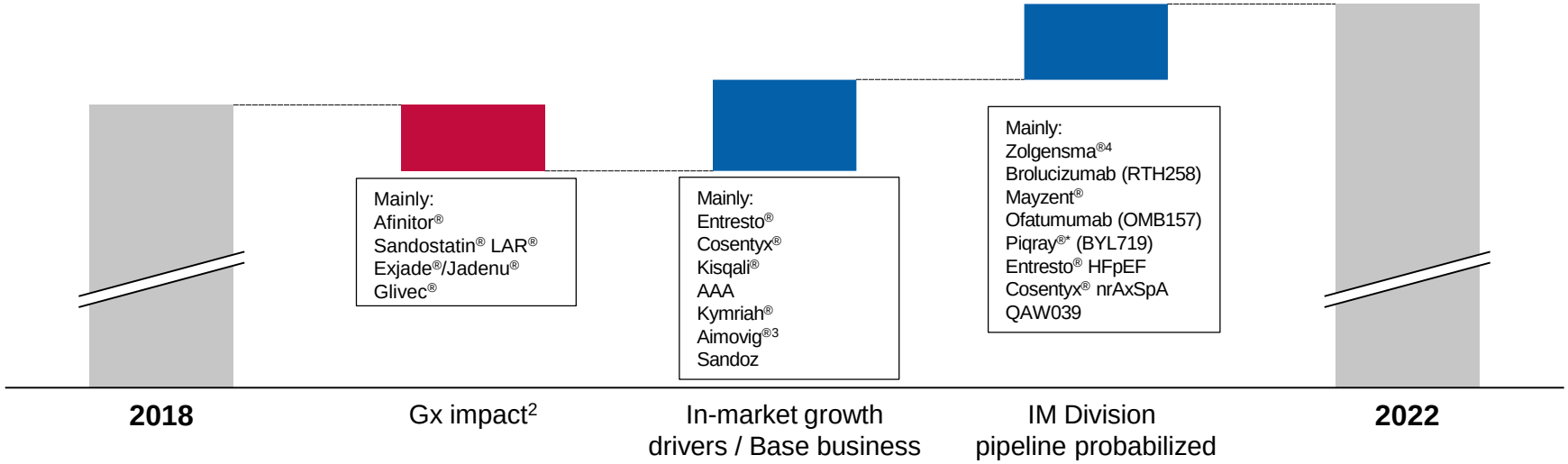
Our growth prospects are strong

Expecting strong sales growth regardless of Gilenya® Gx

Illustrative sales[1] FY 2018–2022

in cc



*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country See appendix for references

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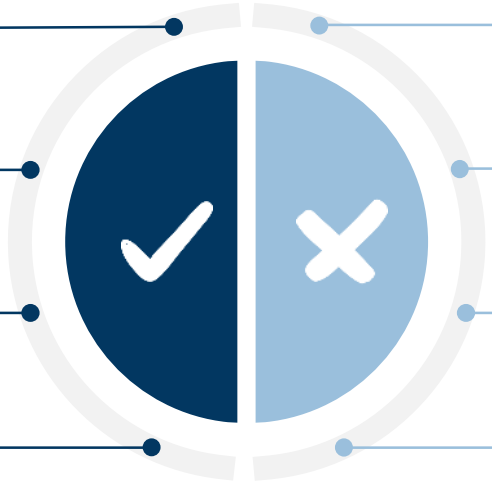
Benefits and risks to the new focused Novartis

Benefits

- Innovation-driven, which payers and patients value
- Able to focus management attention and capital
- Easier to deliver margin ambition in a less complex organization
- Potential for breakout financial performance



Risks

- Uncertain and evolving reimbursement environment
- More concentrated exposure to cyclical patent expiries
- Critical to stay on top of new advances in science
- Contingent on launch excellence and productivity efforts

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Driving growth through cutting-edge platforms

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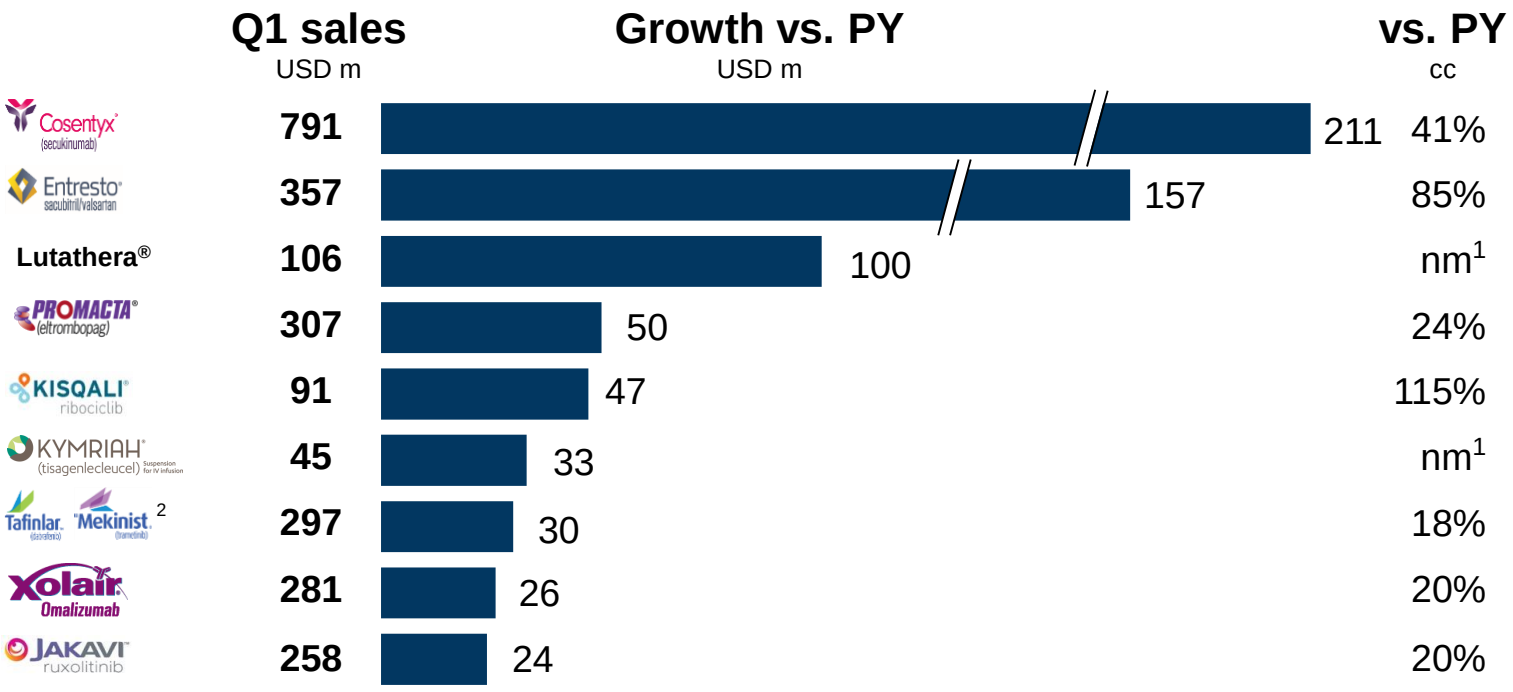
In-line brands provide strong foundation for growth



1. Not meaningful 2. Combined sales of Tafinlar® and Mekinist®

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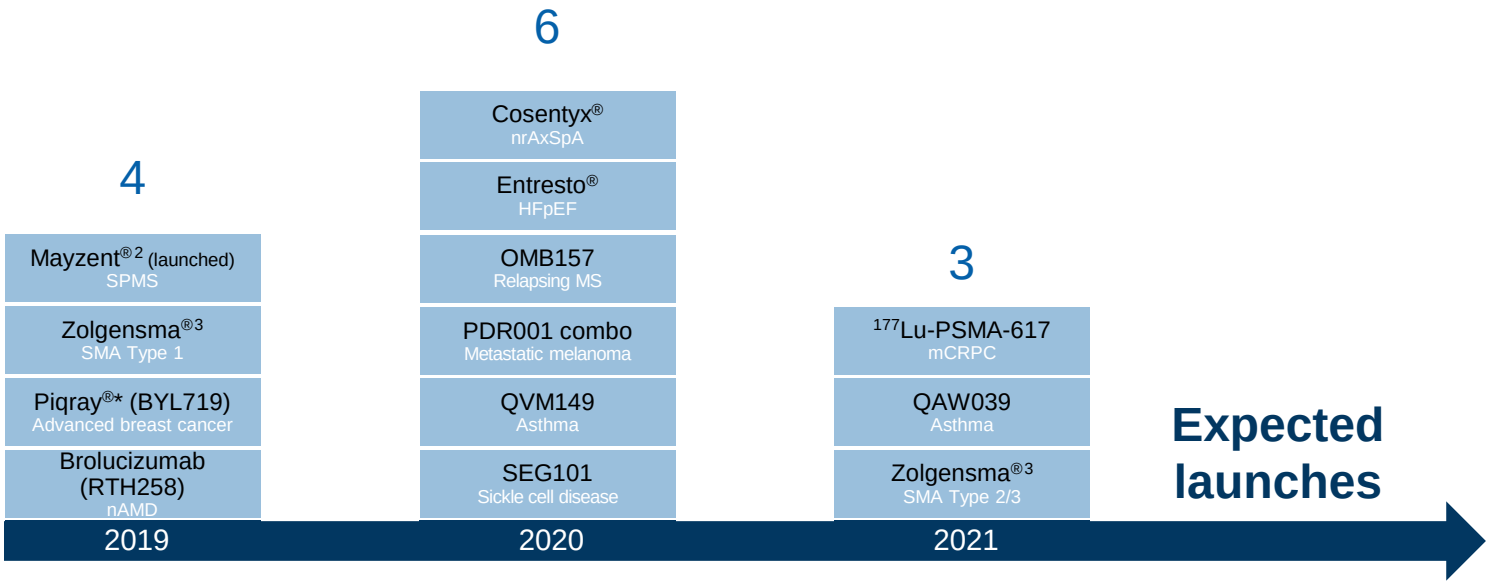
10+ potential blockbuster launches[1] planned up to 2021



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See appendix for references

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Zolgensma® (AVXS-101): Robust data show clinically transformative impact across broad spectrum of SMA

Pre-symptomatic

SPR1NT

Ph3, open-label, single-arm, multi-center trial to evaluate safety and efficacy of IV Zolgensma® in **pre-symptomatic SMA patients with 2 or 3 copies of SMN2 <6 weeks**

Type 1

STR1VE

Ph3, open-label, single-arm, single-dose, multi-center trial to evaluate efficacy and safety of IV Zolgensma® in **SMA Type 1 patients <6 months**

Type 1

START Long-term follow-up

Voluntary, ongoing, observational, long-term follow-up study in patients from the Ph1 open-label, single-site trial to evaluate safety and efficacy of IV Zolgensma® in **SMA Type 1 patients <6 months**

Type 2

STRONG

Ph1, open-label, dose-comparison, multi-center trial to evaluate safety and tolerability of intrathecal (IT) Zolgensma® in **SMA Type 2 patients 6 months – 5 years**

1. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities

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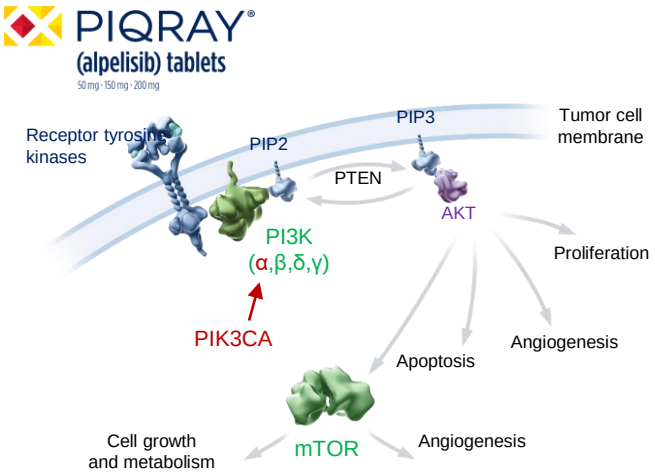
Piqray®* (BYL719): Potential to be the first and only therapy for the most common mutation in HR+ aBC

PI3K: Central oncogenic pathway deregulated in cancer



- Poised to be the first and only therapy for advanced breast cancer (aBC) patients with a PIK3CA mutation
- ~40% of HR+/HER2- breast cancer patients have a PIK3CA mutation, associated with poor prognosis[1,2]
- Nearly doubled median PFS in SOLAR-1 study[3]
- Ready to launch with FDA-approved companion diagnostic
- Initiating pivotal clinical trials in HER2+ aBC and TNBC; planning additional studies across PIK3CA-mutation driven cancers

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country See appendix for references

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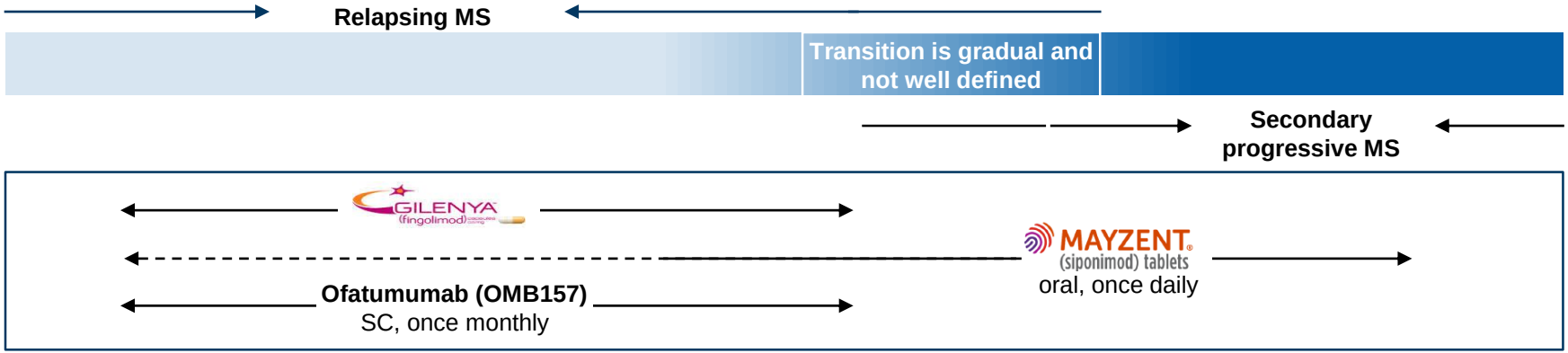
With new and planned launches, Novartis continues to lead across the MS disease spectrum



Patient Profiles	**25-35 years old** RMS patients, first line first switch	**~40 years old** Transitioning or have transitioned to SPMS
MS patient share[1,2]	**~85%** **of MS patients**	**~75-80%** **of RMS patients**

MS – multiple sclerosis; PPMS – primary progressive MS; RRMS – relapsing–remitting MS; SPMS – secondary progressive MS; EDSS – Expanded Disability Status Scale 1. National MS society 2. AntelJ et al. Acta Neuropathol2012;123:627–38.

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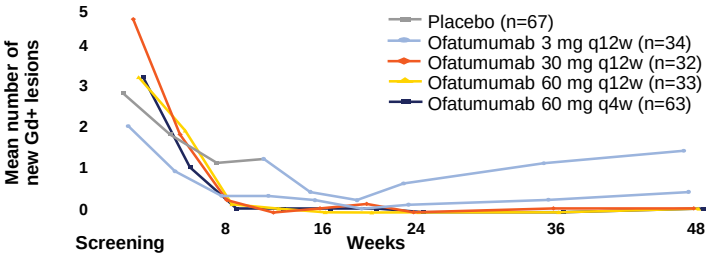
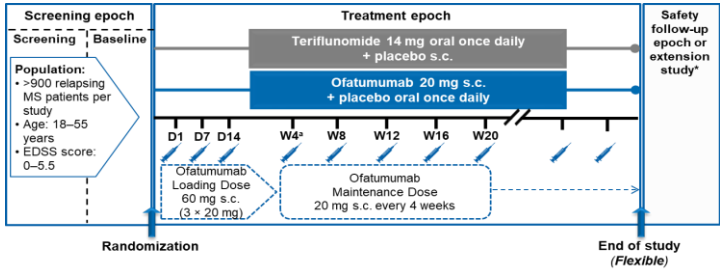
Ofatumumab (OMB157) subcutaneous anti-CD20 for relapsing MS on track for submission Q4 2019

OFA suppresses new MS lesions >90% (MIRROR Ph 2b)[1]



Phase 3 program for Ofatumumab[2]



Potential key benefits for patients:

- Similar efficacy to other anti-CD20s, but in a low dose (20mg) monthly subcutaneous administration, due to higher affinity to CD20[3]
- Faster B cell repletion upon discontinuation[4]
- Targeted to the lymph nodes with potential to partially preserve the immune system[5]
- No need for pre-medications; convenience of at-home injections

See appendix for references

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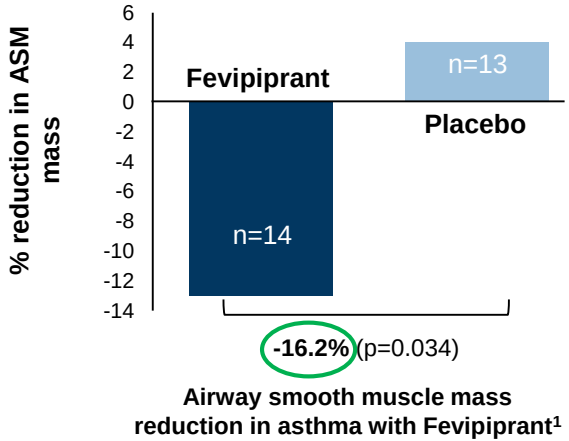
Fevipiprant (QAW039): Disease-modifying potential in asthma, Ph3 readouts on track for end 2019

Potential for disease modification



Airway smooth muscle mass reduction in asthma with Fevipiprant[1]

Robust clinical program to realize full potential

All five Ph3 enrolled	**LUSTER 1 & 2**	(GINA 4/5)	exacerbation trial
	SPIRIT	(GINA 3/4/5)	safety
	ZEAL 1 & 2	(GINA 3/4)	lung function FEV1
Ph2 data	Reduced sputum eosinophils by 72%[2,3]		
Pre-clinical data	Highly selective DP2 ▪ Superior potency ▪ High selectivity ▪ Clean safety profile		

1. Saunders et al. Sci Trans Med 2019; 11, eaao6451 1˚EP: primary endpoint; FEV_1: forced expiratory volume in one second; ASM: airway smooth muscle mass. 2. Gonem et al. Lancet Respir Med 2016;4:699–707. 3. Green et al. Lancet 2002:360(9347):1715–1721

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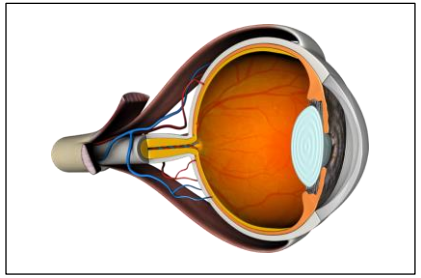
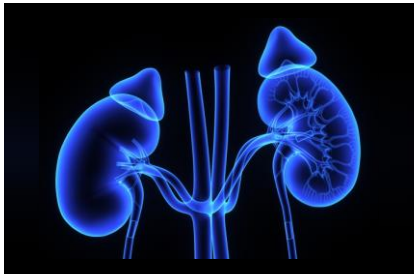
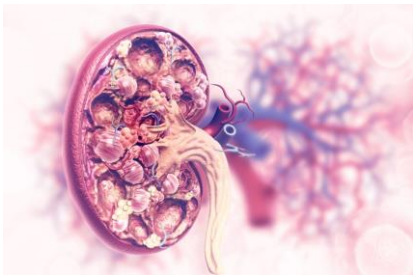
Phase 2 pipeline with multiple potentially transformational programs



Presbyopia



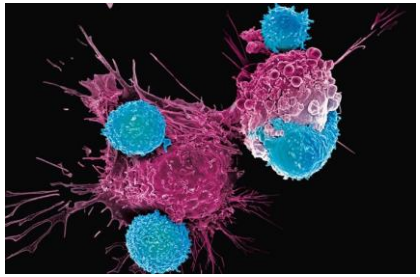
CNI-free transplantation



Chronic renal diseases

Cartilage regeneration

Stroke recovery



Novel CAR-T manufacturing

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Progressing gene, cell and radioligand platforms with 18[1] projects in development

Gene therapy

avexis

LUXTURNA™ 2
voretigene neparvovec-rzyl
for subretinal injection

Product	Indication	Preclinical PoC	IND Enabling	First-in-Human	Confirmatory	Launched
Zolgensma®	SMA (IV)					
AVXS-101 (IT)	SMA (IT)					
CGF166	Hearing loss					
CPK850	Retinitis pigmentosa					
AVXS-201	Rett Syndrome					
AVXS-301	Amyotrophic Lateral Sclerosis (ALS)					
AVXS-401	Undisclosed					
AVXS-501	Undisclosed					
AVXS-601	Undisclosed					

Cell therapy

KYMRIAH®
(tisagenlecleucel) Suspension for IV infusion

CAR-T type	Indication	Phase 1	Ph 2/Pivotal	Phase 3	Submitted	Approved
CD19 CAR-T	Pediatric & young adult r/r ALL					US, EU
CD19 CAR-T	r/r DLBCL					US, EU
CD19 CAR-T	DLBCL in 1st relapse			Starting 2019		
CD19 CAR-T	r/r FL		Started 2018			
CD19 CAR-T	r/r DLBCL in combination with pembrolizumab	Started 2018				
CD19 CAR-T	Adult r/r ALL			Starting 2019		
CD19 CAR-T	r/r CLL combination with ibrutinib		Starting 2019			
CD19 CAR-T	Pediatric NHL		Starting 2019			
CD19 CAR-T	1st L high risk pediatric and young adult ALL		Starting 2019			
CD19 CAR-T	r/r DLBCL combo with ibrutinib		Starting 2019			
Other targets (UPenn partner)	BCMA&CD19, CD22&CD19, CD123, EGFRv3	Started 2018				

Radioligand therapy

Advanced Accelerator Applications
LUTATHERA® (lutetium Lu 177 dotatate) injection, for intravenous use

ENDOCYTE

Product	Disease (target)	Preclinical	Phase I	Phase II	Phase III	Filing	Marketed	Status
177Lu PSMA-617	Prostate cancer (PSMA)	Therapeutic						Ph III VISION study initiated 2Q 2018
177 Lu PSMA-R2		Therapeutic						Ph I/II study initiated 2Q 2018
68Ga PSMA-R2		PET Diag.						Ph I/II study initiated 2Q 2018
18F CTT1057		PET Diagnostic						Ph I study completed
177Lu NeoB	Breast cancer GIST GBM Neuroblastoma Ovarian Head & Neck Oesophageal (GRPR)	Therapeutic						Phase I study to open 1H 2019
68Ga NeoB		PET Diagnostic						Phase II study initiated 2Q 2018
177Lu FF-10158	Glioblastoma (Integrin Alphavbeta 3/5)	Therapeutic						Preclinical
68Ga FF-10158		PET Diag.						Preclinical

1. Gene therapy: 3 (AVXS-101, CGF166, CPK850); cell therapy: 12 (DLBCL in 1st relapse, r/r follicular lymphoma, r/r DLBCL in combo with pembro, adult r/r ALL, r/r CLL in combo with ibrutinib, pediatric NHL, 1st line high risk pediatric and young adult ALL, r/r DLBCL in combo with ibrutinib, BCMA&CD19, CD22&CD19, CD123, EGFRv3); radioligand: 3 (177Lu-PSMA-617, 177Lu-PSMA-R2, 177Lu-NeoB) 2. Luxturna® marketed ex-US

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2019 expected catalysts to continue the momentum

Catalysts		Selected examples		
Key approvals	15	**Zolgensma®[1]** SMA Type 1 (US/EU/JP)	**Brolucizumab (RTH258)** Neovascular AMD (US)	
		Mayzent® SPMS (US/EU/JP)	**Piqray®[2] (BYL719)** Breast cancer (US)	
Major submissions	20	**Ofatumumab (OMB157)** Relapsing MS (US/EU)	**Brolucizumab (RTH258)** Neovascular AMD (US/EU/JP)	**PDR001 combo** Metastatic melanoma (US/EU)
		Crizanlizumab (SEG101) Sickle cell disease (US/EU)	**INC280** NSCLC (US/JP)	
Major late-stage readouts	6	**Zolgensma®[1]** SMA Type 2	**Entresto®** HFpEF	**Ofatumumab (OMB157)** Relapsing MS
		Fevipiprant (QAW039) Asthma	**Cosentyx®** nrAxSpA	**PDR001 combo** Metastatic melanoma

1. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities 2. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

We aim to become a leading medicines company

Powered by advanced therapy platforms and data science

We are a diversified medicines company

Driving growth through cutting-edge platforms

Passionate about productivity and margins

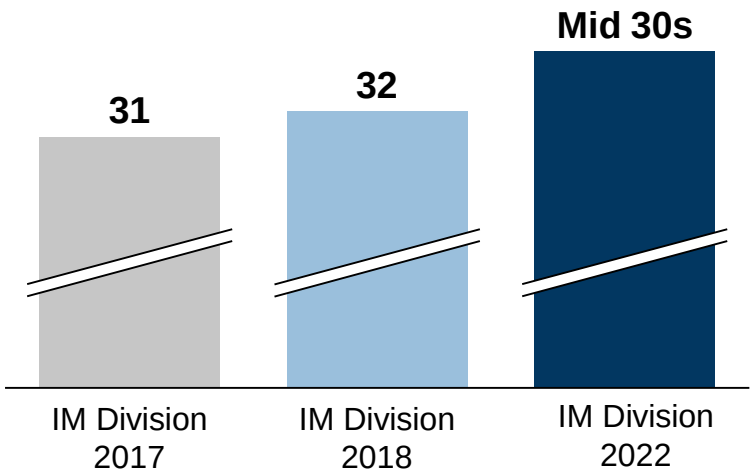
Building a new culture and lasting impact

NOVARTIS

Committed to driving consistent margin expansion

Innovative Medicines

Core margin (%)



1. Gilenya® US compound patent expiration August 2019; dosing regimen patent expiration December 2027

Key drivers:

\+ Acceleration of key growth drivers

\+ Resource allocation and productivity programs in commercial units

\+ Cross-divisional synergies: Novartis Technical Operations, Novartis Business Services, Procurement

\- Generics (mainly Afinitor®, Sandostatin® LAR®, Exjade®/Jadenu®, and tail end of Glivec®)[1]

\- Launch investments for potential future blockbusters

NOVARTIS

Strong focus on commercial excellence

To create successful, sustained and persistent global brands

Launch excellence

- Earlier, integrated planning for priority launches
- Deep insights into patient and physician journey
- Leveraging our scale and sharing learnings

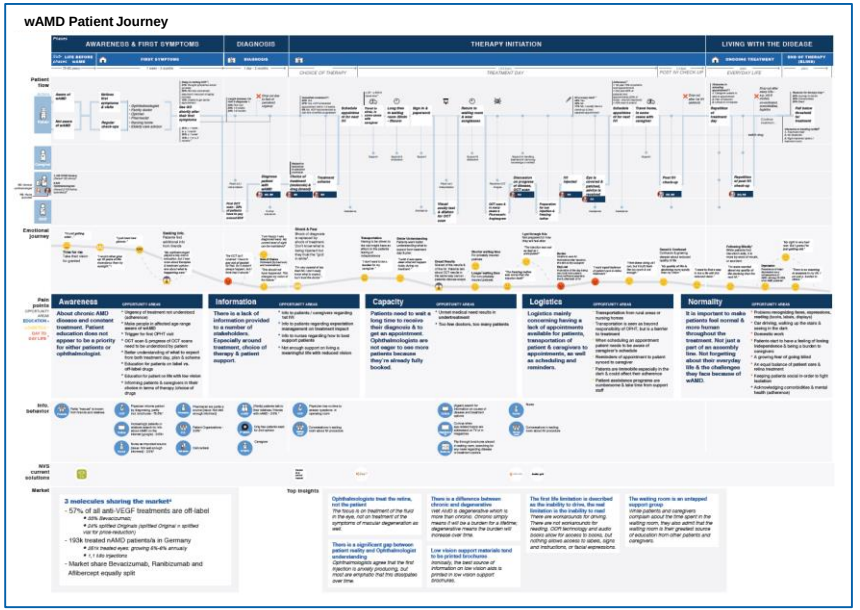
Post-launch excellence

- Functional upskilling, new capabilities
- Data and analytics to optimize marketing mix
- High-tech, high-touch customer engagement

Enabled by:

- Externally-focused culture, capabilities and competitive mindset
- Deep discipline in execution

Select example: In-depth patient journey map



NOVARTIS

NTO transformation well underway

Proof-points since end 2016 (post NTO integration, pre-transformation)

Network transformation

Announced 13 site exits

Headcount reduction

Reduced 1800+ FTEs

Warehouse consolidation

Eliminated 95 out of 210 commercial warehouses

Supplier consolidation

Reduced suppliers for indirect materials by ~30%

Reduced suppliers for FP and API[1] by ~20%

Data & digital improvement levers

Investing in automation and advanced analytics to drive better performance

Contributing to goal of ~USD 2bn savings overall[2] by 2020

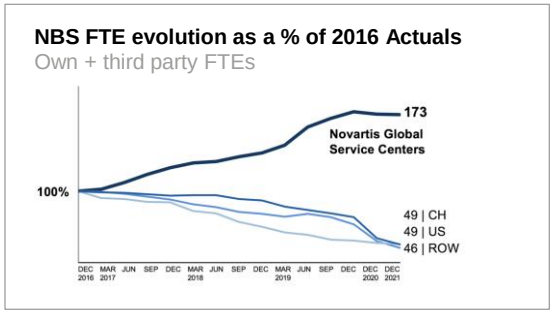
1. FP = finished product, API = active pharmaceutical ingredient 2. Across NTO, NBS and Procurement

NOVARTIS

NBS driving an ambitious efficiency agenda

Footprint

Accelerating footprint shift to low-cost locations



Procurement

Tightening our approach to Procurement

- ~USD 16bn of 3rd party spend across the company
- Revisiting terms with top 50 suppliers
- Consolidating broader supplier base
- Brought in procurement executive from Adidas to lead effort

Technology

Investing in automation and next-generation technology to improve efficiency across business services

- M&S content management
- Order-to-cash
- HCP experience platform
- Sales & operations planning

Contributing to goal of ~USD 2bn savings overall[1] by 2020

1. Across NTO, NBS and Procurement

NOVARTIS

Sandoz focused on a five-point transformation plan

Portfolio & Innovation Strategy

Shift portfolio to more differentiated areas

Portfolio Delivery

Ensure timely delivery to key markets

Cost-competitive & Flexible Supply

Drive COGS and generic mindset to increase margins

Resource Allocation

Agile M&S allocation in fast-changing markets

Operating Model & Governance

Simplify how we work

NOVARTIS

We aim to become a leading medicines company

Powered by advanced therapy platforms and data science

We are a diversified medicines company

Driving growth through cutting-edge platforms

Passionate about productivity and margins

Building a new culture and lasting impact

NOVARTIS

Culture transformation is key to our success

Strong focus on developing leaders and empowering associates in 2019

Developing leaders	Immersion course for top 300 leaders
	Upward feedback for all leaders
	Candid Conversations series
Empowering associates	Crowdsourcing initiatives
	Continuous learning platform
	Bold parental leave policy

NOVARTIS

Focused effort to build lasting trust with society

Sub-committee of the Executive Committee tracking progress

Ethical Standards

Embedding principles-based decision-making

Strengthened approach to risk management

Established Ethics, Risk & Compliance function

Pricing and Access

Ranked #2 in Access to Medicines Index

Brought LIC & LMIC prices in line with EU5 average

Reduced delay from first launch to LMIC to <1 year

Global Health Challenges

Renewed commitment to malaria and leprosy

Launched sickle cell disease partnership in Ghana

Joined Global Chagas Disease Coalition

Corporate Citizenship

Joined the UN Equal Pay International Coalition

Became the first major pharma company to support the UN LGBTI standards

New climate targets endorsed by the Science Based Targets initiative

Stakeholder Engagement

Published Novartis in Society report with increased level of transparency

Increased reporting on Financial, Environmental and Social (FES) impact on society

NOVARTIS

Concluding thoughts

Group key messages

1. Transformation of Novartis into diversified medicines company is progressing well
2. Strong foundation for growth with 15 in-market blockbusters, catalyst-rich pipeline and leadership in advanced therapy platforms
3. Clear path to expand margins through acceleration of key growth drivers, together with productivity efforts in NTO and NBS
4. Continuing a multi-year journey to build a new culture and lasting impact on society

NOVARTIS

Novartis AG
Investor Relations

Meet Novartis Management 2019 Development: advanced therapy platforms and pipeline summary

May 23, 2019

NOVARTIS

Catalyst-rich pipeline and strong focus operational execution

1. Catalyst-rich pipeline with over 25 submissions with blockbuster potential
2. Multiple 2019 pipeline milestones with potential to accelerate 5-10 year growth trajectory
3. Building out advanced therapy platform capabilities to complement small molecule / biologics
4. Strengthening operational execution with extensive use of data and digital technologies

NOVARTIS

Novartis development pipeline leads the industry in its scale and value

Scale

200+ Projects in clinical development

500+ Ongoing clinical trials[2]

60+ Major submissions planned 2019-2021[3]

Value

25+ Potential blockbusters[1] in confirmatory development

18 Advanced platform therapies in clinical development

#1 Most valuable pipeline according to external ranking[4]

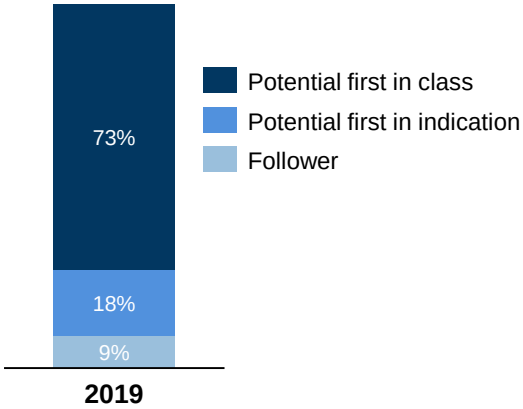
1. Blockbuster defined as peak sales >$1bn for either a new molecular entity across all indications or for a single new indication of a previously launched product. 2. Across NIBR and GDD. 3. Submissions in US/EU/JP 2019-21.
4. Source: Evaluate Pharma 2018, Outlook to 2024. Ranked #1 in terms of: (1) value creation from advanced therapies, (2) highest pipeline value by sales 2018-24, and (3) value creation 2018-24 from recently launched and pipeline products.

NOVARTIS

Novartis size offers unique benefits

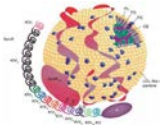
A pipeline to transform Standard of Care

% of pipeline
No. of programs[1]



Size and scale to make big bets targeting areas of high unmet need

TQJ230:
antisense oligonucleotide against Lipoprotein(a) for CVRR[2]



UNR844:
R-Lipoic acid (R-LA) choline ester (LACE) for presbyopia

Establishing advanced therapy platforms

Gene therapy

avexis
LUXTURNA voretigene neparvovec-rzyl

Cell therapy

KYMRIAH (tisagenlecleucel)

Radioligand therapy

LUTATHERA[3]
ENDOCYTE

Internal Data: GDD pipeline as of April 2019. 1. Novartis internal assessment. 2. CVRR = cardiovascular risk reduction. 3. Market ex-US.

NOVARTIS

We are delivering on all near-term catalysts ...

Catalysts		Selected examples		
Key approvals	15	**Zolgensma™[1]** SMA Type 1 (US/EU/JP)	**Brolucizumab (RTH258)** Neovascular AMD (US)	
		Mayzent™[2] SPMS (US/EU/JP)	**Piqray®[3] (BYL719)** Breast Cancer (US)	
Major submissions	20	**Ofatumumab (OMB157)** Relapsing MS (US/EU)	**Brolucizumab (RTH258)** Neovascular AMD (US/EU/JP)	**PDR001 combo** Metastatic Melanoma (US/EU)
		Crizanlizumab (SEG101) Sickle Cell Disease (US/EU)	**INC280** NSCLC (US/JP)	
Major late-stage readouts	6	**Zolgensma™[1]** SMA Type 2	**Entresto®** HFpEF	**Ofatumumab (OMB157)** Relapsing MS
		Fevipiprant (QAW039) Asthma	**Cosentyx®** nrAxSpA	**PDR001 combo** Metastatic Melanoma

1. The brand name Zolgensma™ has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities 2. Approved by the FDA in Q1 3. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

... and building a pipeline with 25+ potential blockbusters

Potential blockbusters[1] by planned submission year[2]

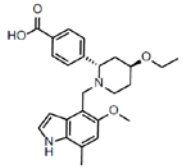
2019	2020	2021	2022	≥ 2023		
Cosentyx® nrAxSpA						
Entresto® HFpEF						
OMB157 Relapsing MS						QBW251 COPD
PDR001 combo Metastatic Melanoma				CFZ533 Transplant	LJN452[4] NASH	SAF312 COSP
QVM149 Asthma	^{177}Lu-PSMA-617 mCRPC	ABL001 CML	ECF843 Dry Eye	CNP520 Alzheimer's Disease	LNP023 Nephropathy	TQJ230 CVRR
RTH258 nAMD	QAW039 Asthma	ACZ885 Lung cancer	UNR844 Presbyopia	CSJ117 Severe Asthma	LOU064 CSU	VAY736 Sjoegren's syndrome
SEG101 Sickle Cell Disease	Zolgensma™[3] SMA Type 2/3	QGE031 CSU / CIU	ZPL389 Atopic Dermatitis	HDM201 AML	MOR106 Atopic Dermatitis	VPM087 CRC / RCC

1. Blockbuster defined as peak sales >$1bn for either a new molecular entity across all indications or for a single new indication of a previously launched product. 2. For NMEs submission year represents year of lead indication. 3. The brand name Zolgensma™ has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities. 4. Including NASH portfolio of combination products.

NOVARTIS

Early innovative assets target areas of high unmet need

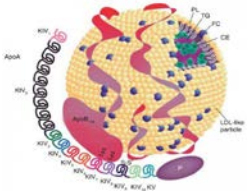
LNP023



Oral complement Factor B inhibitor

Potential first disease modifying treatment option for several rare renal diseases

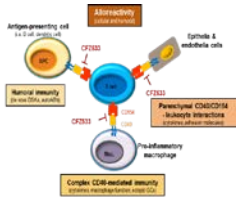
TQJ230



Antisense oligonucleotide

Potential to be first medicine approved to treat high Lp(a)

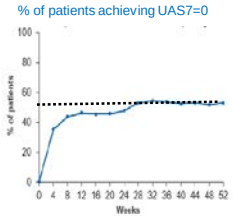
Iscalimab (CFZ533)



Fully human IgG1 mAb against CD40

Potential for one organ transplant to last the patient's lifetime

Ligelizumab (QGE031)



Humanized anti-IgE Antibody

Potential for disease modification in chronic spontaneous urticaria

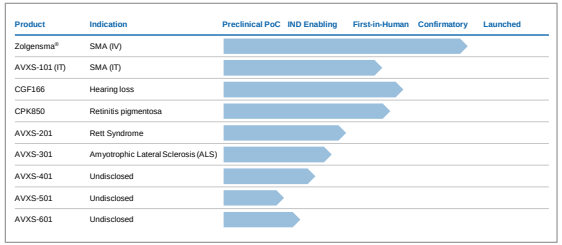
NOVARTIS

Progressing gene, cell and radioligand platforms with 18[1] projects in development

Gene therapy

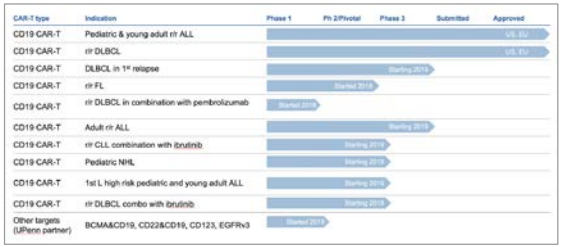
avexis

LUXTURNA™[2]
voretigene neparvovec-rzyl
for subretinal injection



Cell therapy

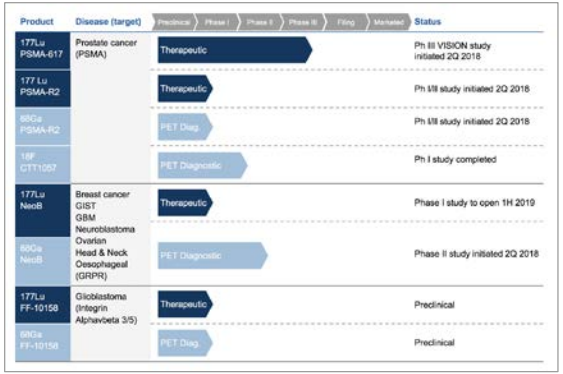
KYMRIAH®
(tisagenlecleucel) Suspension for IV infusion



Radioligand therapy

Advanced Accelerator Applications
LUTATHERA®
(lutetium Lu 177 dotatate)
injection, for intravenous use

ENDOCYTE



1. Gene therapy: 3 (AVXS-101, CGF166, CPK850); cell therapy: 12 (DLBCL in 1st relapse, r/r follicular lymphoma, r/r DLBCL in combo with pembro, adult r/r ALL, r/r CLL in combo with ibrutinib, pediatric NHL, 1st line high risk pediatric and young adult ALL, r/r DLBCL in combo with ibrutinib, BCMA&CD19, CD22&CD19, CD123, EGFRv3); radioligand: 3 (177Lu-PSMA-617, 177Lu-PSMA-R2, 177Lu-NeoB) 2. Luxturna® marketed ex-US

NOVARTIS

Reimagining Novartis as a medicines company powered by data and digital technologies

Data for insights

BIG DATA INSTITUTE

UNIVERSITY OF OXFORD

Patient engagement

FOCAL VIEW

TrialSpark

PEAR THERAPEUTICS

Process effectiveness

TriNetX

BIOME
Digital Innovation Lab by Novartis

NOVARTIS

Focus on operational excellence through Data & Digital

Time

Indicator	2017	2018	Trend
Study start-up[1]	7.3	4.1	↘
Enrollment[2]	41.9	39.6	↘
Data-analysis & reporting[3]	27.5	22.5	↘

Cost

Indicator	2017 vs 2018	Trend
Patient recruitment cost[4]	-24%	↘
Site visit cost[5]	-11%	↘
Data analysis cost[6]	-53%	↘

Productivity

Indicator	2017 vs 2018	Trend
Monitoring efficiency[7]	+12%	↗
Dataset production[8]	+37%	↗
Tables, listings and figures production[9]	+34%	↗

1. Time from final protocol to final protocol package 2. Time from first patient first visit to 25% enrollment (weeks) 3. Time from database lock to clinical study report 4. Grant cost paid to investigators per patient 5. Resources cost per monitoring visit 6. Resources cost per page 7. Monitoring visits per clinical research associate per week 8. Datasets per FTE 9. Tables, listings, figures per FTE

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Conclusion - Development

- Robust mid- and late-stage pipeline in place, including advanced platform technologies
- Focus on operational excellence, on track to deliver all near-term pipeline goals
- Early pipeline focus addressing significant unmet need
- Embracing data & digital technologies to accelerate innovation in drug development

NOVARTIS

Planned filings 2019 to ≥ 2023

2019	2020	2021	2022	≥ 2023		
Cosentyx® nr-axSpA[12]	177Lu-PSMA-617 mCRPC[26]	ABL001 CML[4] 3rd line	ACZ885 Adjuvant NSCLC[6]	ABL001 CML[4] 1st line	KAF156 Malaria	MOR106 Atopic Dermatitis
Entresto® Heart failure (PEF)[13]	Cosentyx® PsA H2H[17]	ACZ885 1st Line NSCLC[6]	AVXS-201 Rett Syndrome	BYL719 HER2+ adv. breast cancer	Kisqali® HR+, HER2 (-) BC[9] (adjuvant)	QBW251 COPD[21]
INC280 NSCLC[9]	Entresto® Post-acute myocardial infarction	ACZ885 2nd Line NSCLC[6]	Cosentyx® AS H2H[19]	BYL719 TNBC[2]	Kymriah + pembrolizumab - r/r DLBCL	PDR001 combo Metastatic Melanoma
OMB157 Relapsing multiple sclerosis	Jakavi® Chronic GVHD[14]	Kymriah® r/r Follicular Lymphoma	Cosentyx® Hidradenitis suppurativa	CAD106 Alzheimer's disease	LJC242 NASH[18]	RTH258 Retinal vein occlusion
PDR001+Tafinlar®+Mekinist® Metastatic BRAF V600+ melanoma	Jakavi® Acute GVHD[14]	Kymriah® r/r DLBCL[10] in 1st relapse	ECF843 Dry eye	CFZ533 Solid Organ Transplant	LJN452 NASH[18]	SAF312 Chronic ocular surface pain
QMF149 Asthma	QAW039 Asthma	LAM320 MDR[8] tuberculosis	Kymriah® CLL[8]	CFZ533 Sjorgen's Syndrome	LNP023 IgA nephropathy	TQJ230 CVRR[1]
QVM149 Asthma	Zolgensma® SMA Type 2/3[25]	QGE031 CSU/CIU[15]	Rydapt® AML[20] (FLT3 wild type)	CNP520 Alzheimer's disease	LNP023 Membranous nephropathy	VAY736 Autoimmune Hepatitis
SEG101 Sickle cell disease		RTH258 Diabetic macular edema	UNR844 Presbyopia	CSJ117 Severe Asthma	LNP023 C3 glomerulopathy	VAY736 Primary Sjoegren's syndrome
Xolair® Nasal Polyps			ZPL389 Atopic dermatitis	HDM201 Acute myeloid leukemia	LMI070 Spinal muscular atrophy	VAY785 NASH[18]
				KAE609 Malaria	LOU064 Chronic spontaneous urticaria	VPM087 CRC 1L/RCC 1L[24]

1. Secondary prevention of cardiovascular events in patients with elevated levels of lipoprotein (a)
2. Triple negative breast cancer
3. Paroxysmal nocturnal hemoglobinuria
4. Chronic myeloid leukemia
5. Long-acting release
6. Non-small cell lung cancer
7. Neovascular age-related macular degeneration
8. Chronic lymphocytic leukaemia
9. Breast cancer
10. Diffuse large B-cell lymphoma
11. Indolent Non-Hodgkin's lymphoma
12. Non-radiographic axial spondyloarthritis
13. Preserved ejection fraction
14. Graft-versus-host disease
15. Neuroendocrine tumors
16. Chronic spontaneous urticaria / chronic idiopathic urticaria
17. Psoriatic arthritis head-to-head study versus adalimumab
18. Non-alcoholic steatohepatitis
19. Ankylosing spondylitis head-to-head study versus adalimumab
20. Acute myeloid leukemia
21. Chronic Obstructive Pulmonary Disease
22. Secondary Progressive Multiple Sclerosis
23. IV formulation Spinal Muscular Atrophy Type 1
24. 1st line colorectal cancer / 1st line renal cell carcinoma
25. IT formulation Spinal Muscular Atrophy Type 2/3
26. Metastatic castration-resistant prostate cancer

Combination abbreviations:

fulv	fulvestrant
tmx	tamoxifen
gsn	goserelin
NSAI	Non-steroidal aromatase inhibitor
Taf	Tafinlar® (dabrafenib)
Mek	Mekinist® (trametinib)

NOVARTIS

Novartis AG
Investor Relations

Meet Novartis Management 2019
Pharmaceuticals pipeline and in-market brands

May 23, 2019

NOVARTIS

Index – select pipeline and in-market brands

Select pipeline

In-market brands

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag) · Tafinlar (dabrafenib) + Mekinist (trametinib) · KISQALI (ribociclib) · JAKAVI (ruxolitinib) · LUMYKRAS (sotorasib) · KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod) · Aimovig[1] · MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection) · LUXTURNA (voretigene neparvovec-rzyl)[4] · xiidra (lifitegrast) ophthalmic solution 5%[3]	Xolair (Omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
	Crizanlizumab (SEG101) Sickle Cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic Ocular Pain	**QBW251** COPD
	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Cosentyx®, Entresto® and multiple near-term potential blockbuster launches expected to drive strong growth

1. Continued strong momentum for key growth drivers Cosentyx® and Entresto®, based on growing evidence base

2. Ready to launch 5 blockbuster candidates – Mayzent®, Zolgensma®[1], Brolucizumab (RTH258), Ofatumumab (OMB157), Fevipiprant (QAW039)

3. With recently launched products and rich pipeline, Novartis expects double-digit growth in China, capitalizing on faster and broader access

1. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag), Tafinlar (dabrafenib) + Mekinist (trametinib), KISQALI (ribociclib), JAKAVI (ruxolitinib), KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod), Aimovig[1], MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection), LUXTURNA[4], xiidra[3]	Xolair (Omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
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	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Entresto® expected to expand into new indications to become the foundational treatment in all HF

HFrEF
2m and 2.5m eligible patients EU/US[1]

- Foundational therapy approved in most major markets
- In-hospital growth momentum accelerating post PIONEER-HF
- Japan submission on track for Q3 2019
- China NDRL inclusion expected Q4 2019

HFpEF
1.7m and 2.5m patients EU/US[1]

- Potentially first therapy ever to treat pEF based on PARAGON expected Q3 2019
- PARAGLIDE to study in-hospital initiation given ~50% of all HF hospitalizations are due to pEF[2]
- PARALLAX (biomarkers and functional capacity) on track for readout ahead of launch Q1 2020

HF prevention in post-AMI
0.3m eligible patients p.a. across EU/US

- Entresto® as prevention of HF and CV death in high-risk post-AMI patients with LVD (40% of post-AMI population)
- PARADISE expected to readout in Q3 2020

CV = Cardiovascular; HF = Heart Failure; HFrEF = Heart Failure with reduced Ejection Fraction; HRpEF = Heart Failure with Preserved Ejection Fraction; AMI = Acute Myocardial Infarction; LVD = Left Ventricular Dysfunction; NDRL = National Drug Reimbursement List; Post-AMI: post-acute myocardial infarction; eGFR = glomerular filtration rate. 1. Based on NYHA II-IV and eGFR criteria 2. Goyal 2016; DOI:10.1016/j.amjmed.2016.02.007

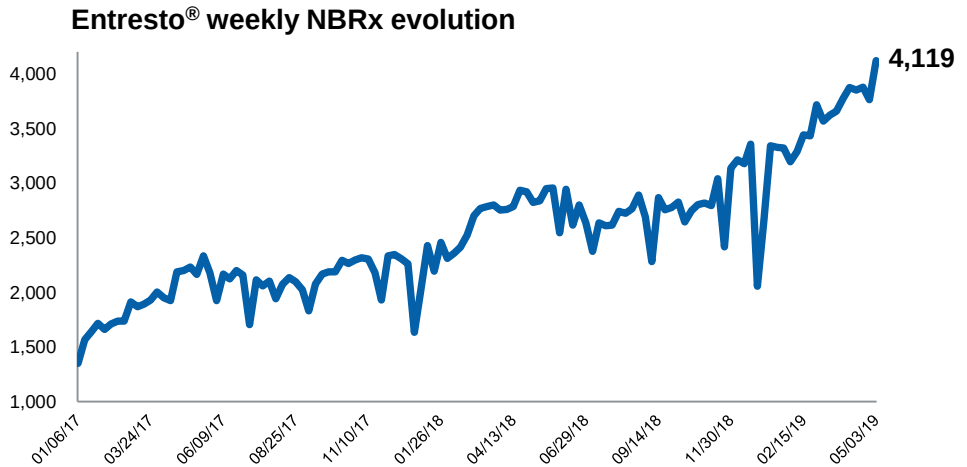
NOVARTIS

Entresto® NBrx acceleration driven by operational excellence and PIONEER data

New data on beneficial and safe in-hospital initiation in significant part of patient population...

- HF Prevalence 7.4m in US and 6.2m in EU5 of which 50% are HFrEF patients[3]
- 0.5m hospitalizations in US and 0.7m in EU5 due to HFrEF p.a.[2]
- Hospitalizations are an important trigger point to initiate and change treatment
- PIONEER-HF and TRANSITION provided the evidence for safe and beneficial in-hospital initiation of Entresto®[4]

... showing positive impact on overall U.S. prescriptions[1]



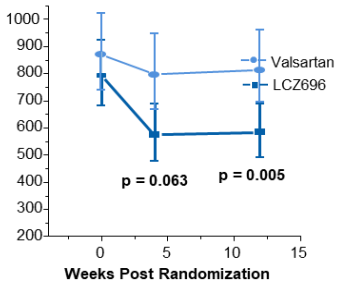
NBRx = New-to-Brand prescriptions; HF = Heart Failure; HFrEF = Heart Failure with reduced Ejection Fraction. See appendix for references

NOVARTIS

Entresto® dataset in HFpEF to exceed 8000 patients

PARAMOUNT[1] – successful Ph2

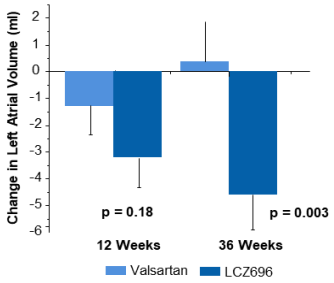
Hemodynamic
Cardiac stress – prognostic of outcome[2]



Prim. Endpoint: NT-proBNP

23% reduction by week 12

Structural
Left ventricular pressures – prognostic of outcome[2]



Sec. Endpoint: Atrial size

7.6% reduction by week 36

LVEF ≥45%, N=301 vs. valsartan

PARAGON – pivotal Ph3
PARALLAX, PARAGLIDE – supportive data

Trial	Indication / population	Endpoints	Next expected milestones
PARAGONHF	LVEF ≥45% N=4822 vs. valsartan	Novel primary composite endpoint: CV death and total (first & recurrent) HF hospitalization	FIR Q3 2019 Basis for planned filing in Q4 2019
PARALLAXHF	LVEF >40% N=2500 vs. valsartan, enalapril, placebo	NT-proBNP, functional measures, symptoms	Fully enrolled, FIR Q1 2020 Supportive data at launch

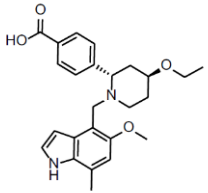
HFpEF- heart failure with preserved ejection fraction LVEF - left ventricular ejection fraction ADHF – acute decompensated heart failure FIR – first interpretable results FPFV – first patient, first visit

1. Solomon et al. LANCET 2012 2. Komajda 2011; Anand 2003; Massie 2008; 3.Zile 2011; Brenyo 2011; Meris 2009; Geris 2007.

NOVARTIS

The next wave of cardiometabolic programs are now advancing into late stage development

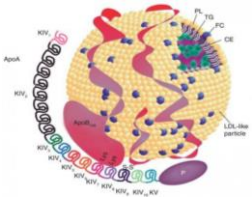
LNP023



Oral complement Factor B inhibitor

- Potential first disease modifying treatment option for several rare renal diseases
- Under development for IgA and Membranous Nephropathies, and C3 Glomerulopathy
- Single Ph2a/b studies in all 3 indications potentially enabling direct initiation of single Ph3 studies in coming years

TQJ230



Antisense oligonucleotide against Lipoprotein(a)

- Lp(a) is an independent inherited CV risk factor and 20-30% of patients with established CV disease have elevated Lp(a)
- Estimated pt potential 4m in US and 5m in EU[1,2]
- Currently, no medicines are approved to treat high Lp(a)
- TQJ230 demonstrated 80% Lp(a) reduction in patients with CV disease in Ph2b
- Ph3 trial to assess TQJ230 effect on CV outcomes to be initiated in Q1 2020

Lp(a) = Lipoprotein a; CV = cardiovascular; 1.Potential patients are defined by the indication to be studied in the planned phase III trial for patients with elevated Lp(a) and MI, stroke or PAD. Potential eligible population dependent on trial results and label. 2. US AHA (Heart Disease & Stroke Stats 2018 update), EU5 & JP Kantar Health EPI database, DRG Database, REACH Registry, Odyssey Outcome Trial. Estimates vary based on regional/ethnic variability.

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag), Tafinlar + Mekinist (dabrafenib + trametinib), KISQALI (ribociclib), JAKAVI (ruxolitinib), KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod), Aimovig[1], MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection), LUXTURNA[4], xiidra[3]	Xolair (Omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
	Crizanlizumab (SEG101) Sickle Cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic Ocular Pain	**QBW251** COPD
	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

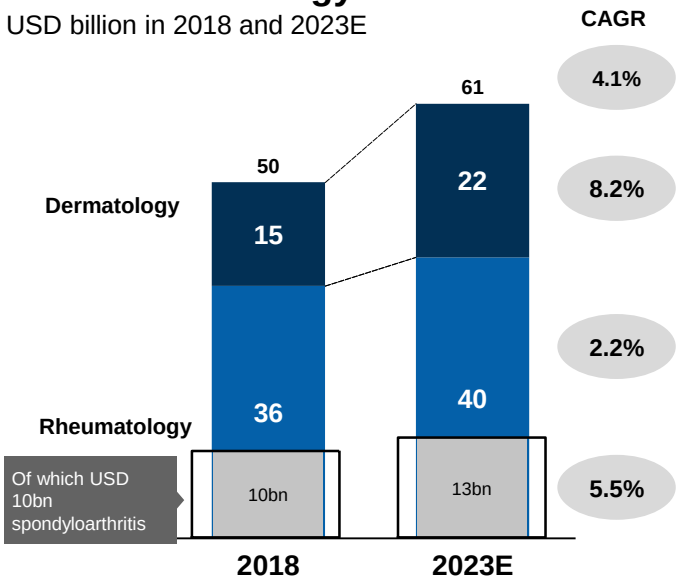
See appendix for references

NOVARTIS

Cosentyx® well-positioned to continue to grow in attractive segments of the immunology market

Global immunology[1] market

USD billion in 2018 and 2023E



PsA = Psoriatic Arthritis. See appendix for references

Psoriasis

- USD 15bn market expected to grow >8% p.a. through 2023 mainly driven by expansion of biologics usage[16]
- Cosentyx® uniquely positioned to win based on strong evidence
  - Cosentyx® superiority to Enbrel® and Stelara®[2,3]
  - 5-year data on sustained control of signs and symptoms[4]
  - Strong data in joints in PsA patients and hard-to-treat persistant manifestations[5-9]
  - ARROW study comparing IL-17 vs. IL-23 on track for read-out end 2019

Spondyloarthritis

- IL17s expected to grow faster than the market
- Mainly driven by increasing diagnosis rate and biologics usage
- Cosentyx® uniquely positioned compared to anti-TNFs and IL23s
  - Sustained control of signs and symptoms up to 5 years[10-13]
  - High level of enthesitis resolution[10]
  - Promising structural data across PsA and AS[14, 15]

NOVARTIS

Nr-axSpA indication would complete Cosentyx® label across the SpA spectrum

US and EU patient population by indication[1]

Thousands

	Spondyloarthritis								RA	
	PsA		AS		nr-axSpA		Total SpA			
	US	EU	US	EU	US	EU	**US**	**EU**	US	EU
Prevalence	1,642	1,541	894	789	904	807	**3,440**	**3,137**	2,588	2,308
Diagnosed patients[2]	832	738	532	509	360	396	**1,724**	**1,643**	2,254	1,956
% diagnosed	51%	48%	60%	65%	40%	49%	**50%**	**52%**	87%	85%
Patients treated[3]	437	397	452	432	252	278	**1,141**	**1,107**	1,623	1,392
% treated	53%	54%	85%	85%	70%	70%	**66%**	**67%**	72%	71%
Patients on biologics	136	107	92	90	10	22	**238**	**219**	885	552
% treated[4]	31%	27%	20%	21%	4%	8%	**21%**	**20%**	55%	40%

- SpA patient population is at least as big as RA population
- 1.7m patients in EU and US suffer from nr-axSpA
- 10–40% of patients progress from nr-axSpA to AS over a period of 2–10 years[5]
- Diagnosis of nr-axSpA based on MRI imaging and HLA-B27 biomarker[6,7] gradually increasing, but rates remain low
- Biologics penetration in nr-axSpA only 4-8%

SpA = Spondyloarthritis; nr-axSpA = non-radiographic axial Spondyloarthritis; PsA = Psoriatic Arthritis; AS = Ankylosing Spondylitis; RA = rheumatoid arthritis; HLA = Heuman Leukocyte Antigen. See appendix for references

NOVARTIS

Cosentyx® Ph3 PREVENT readout in non-radiographic axial spondyloarthritis expected in Q4 2019

A **Ph3**, randomized, double-blind, placebo-controlled, multicenter study to evaluate the **efficacy and safety of secukinumab** in patients with **non-radiographic axial spondyloarthritis**

Enrolled
555 patients

Population
NSAID-IR, open for biologic-IR and DMARD-IR

Study start date
April 2016

LPFV (enrollment) completion date
May 2018

Primary efficacy endpoint at Weeks 16 and 52

ASAS40 response rate with secukinumab vs. placebo

ASAS40, Assessment of SpondyloArthritis International Society criteria (ASAS) 40% criteria; biologic-IR, biologic inadequate responders; DMARD-IR, disease-modifying anti-rheumatic drug inadequate responders; NSAID-IR, non-steroidal anti-inflammatory drug inadequate responders; Biologic-IR patients are patients who have had an inadequate response to not more than 1 anti-TNF agent; ClinicalTrials.gov (NCT02696031)

NOVARTIS

Generating further evidence on sustained benefit of Cosentyx® across SpA indications

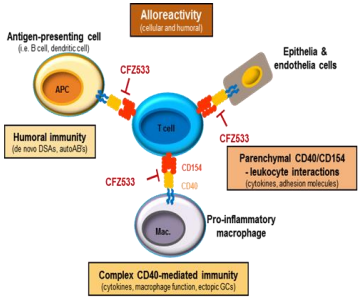
Trial	Objectives	Readout expected
PREVENT (nr-axSpA)	Efficacy and safety of Cosentyx® in nr-axSpA, compared to placebo and progression of structural changes (at 2 years)	Q4 2019
EXCEED (PsA)	Double-blinded H2H superiority vs. Humira® in active PsA patients who are intolerant or have inadequate response to DMARDs (e.g. methotrexate)	2019/ 2020
SURPASS (AS)	H2H vs. proposed adalimumab biosimilar on impact on radiographic progression (mSASSS) in active AS	2022

SpA = Spondyloarthritis; nr-axSpA = non-radiographic axial Spondyloarthritis; PsA = Psoriatic Arthritis; AS = Ankylosing Spondylitis; H2H = Head to Head; DMARDs = disease modifying anti-rheumatic drugs; mSASSS = modified Stoke Ankylosing Spondylitis Spinal Score 1. Humira® is a registered trademark of AbbVie Biotechnology Ltd.

NOVARTIS

Next wave of immunology programs well advanced in late stage development

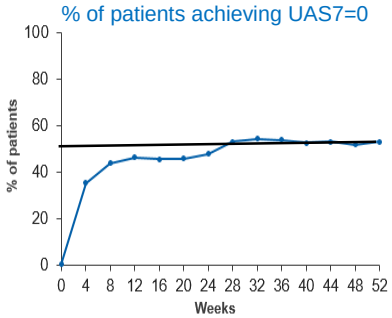
Iscalimab (CFZ533)



Fully human, Fc-silenced non-depleting, IgG1 mAb blocking the CD40 receptor

- Under development for renal / liver transplant and for Primary Sjögrens Syndrome
- Ph2b CIRRUS I Study (Renal Transplant) ongoing
- Ph2b TWINSS Study (Sjögren's) initiation expected in Q3
- Potential for first organ transplant to last the patient's lifetime

Ligelizumab (QGE031)



Humanized anti-IgE antibody, in Ph3 head-to-head superiority studies against Xolair® in CSU patients

- Under development for CSU/ CIU
- Ph2 data show complete responses (UAS7=0) sustained in over 50% of patients through 1 year of treatment
- LT (1 year) treatment well tolerated, no unexpected safety signals
- Potential for disease modification based on Ph2 data

CSU – chronic spontaneous urticarial CIU – chronic idiopathic urticaria

NOVARTIS

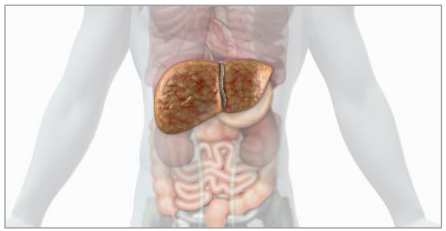
Tropifexor (LJN452) – an FXR agonist for the treatment of NASH

A novel and highly potent non-bile acid FXR agonist that has shown efficacy in preclinical models of NASH[1,2]

Safe and well-tolerated in healthy volunteers at single doses up to 3000 µg

Dose-dependent pharmacodynamic elevation of fibroblast growth factor 19 (FGF19) was demonstrated as a marker of target engagement in the gut[3]

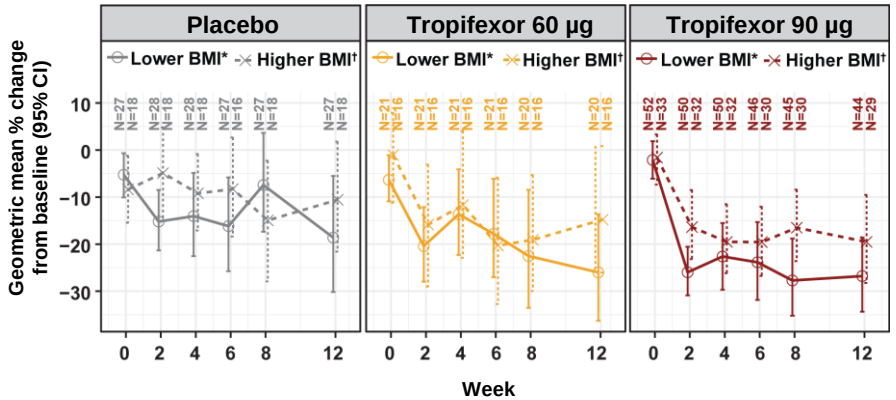
Currently being evaluated in FLIGHT-FXR, a Phase 2 clinical trial in patients with NASH



Effect of tropifexor on marker of hepatic inflammation: ALT

A rapid and sustained decline in ALT levels from baseline was observed with tropifexor 90 µg doses in patients from both BMI subgroups, more marked in the group with lower BMI

Geometric mean percentage change from baseline of ALT (U/L) at week 12 by BMI subgroups[4]

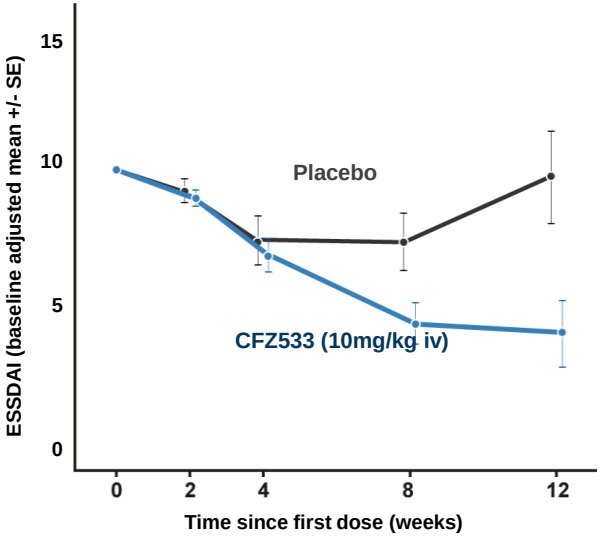


1. Tully DC, et al. *J Med Chem*. 2017;60:9960-73 2. Laffitte B, et al. *J Hepatol.* 2018;68:S341 3. Badman MK, et al. *Hepatology*. 2016;64:16A 4. Sanyal A, et al. *J Hepatol* 2019 70(S1) e796-797 Data is investigational. Efficacy & safety not yet established

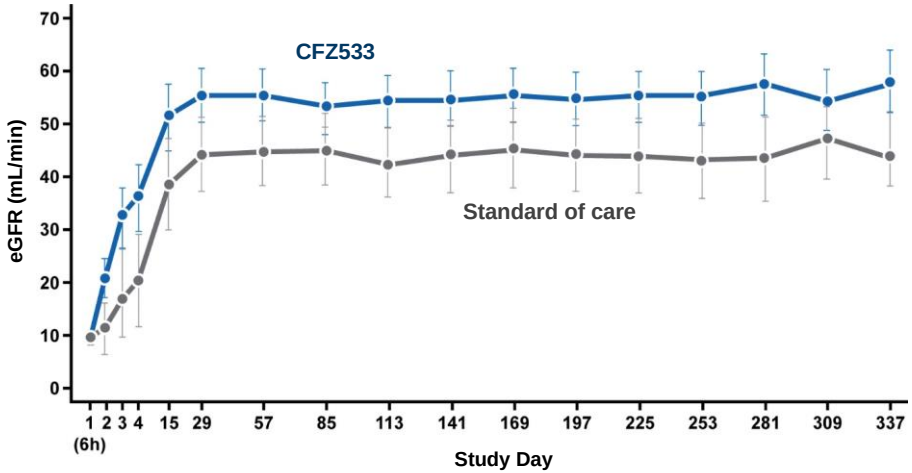
NOVARTIS

Iscalimab (CFZ533) – first-in-class anti-CD40 medicine for transplantation and autoimmune disease

Reduces disease activity in Sjögren's syndrome



Prevents rejection and improves kidney function after kidney transplantation



Data is investigational. Efficacy & safety not yet established.

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag) · Tafinlar (dabrafenib) + Mekinist (trametinib) · KISQALI (ribociclib) · JAKAVI (ruxolitinib) · KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod) · Aimovig (erenumab) · MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection) · LUXTURNA (voretigene neparvovec-rzyl) [4] · xiidra (lifitegrast ophthalmic solution 5%) [3]	Xolair (omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®** [2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
	Crizanlizumab (SEG101) Sickle Cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic Ocular Pain	**QBW251** COPD
	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Disease area leadership in multiple sclerosis supported by cutting edge innovation

Progression is recognized to start earlier than previously thought[1]

Patient relevant outcomes measured through digital is the expectation[2]

Real-world data and advanced analytics used to gain insights and inform decisions

Potential biomarkers, beyond MRI are becoming more accessible

Portfolio aligns to the full spectrum of Disease

- EXTAVIA®
- Glatopa® (glatiramer acetate injection)
- GILENYA® (fingolimod)
- GILENYA® (fingolimod) Pediatric
- MAYZENT™ (siponimod) tablets
- **Ofatumumab (OMB157)**

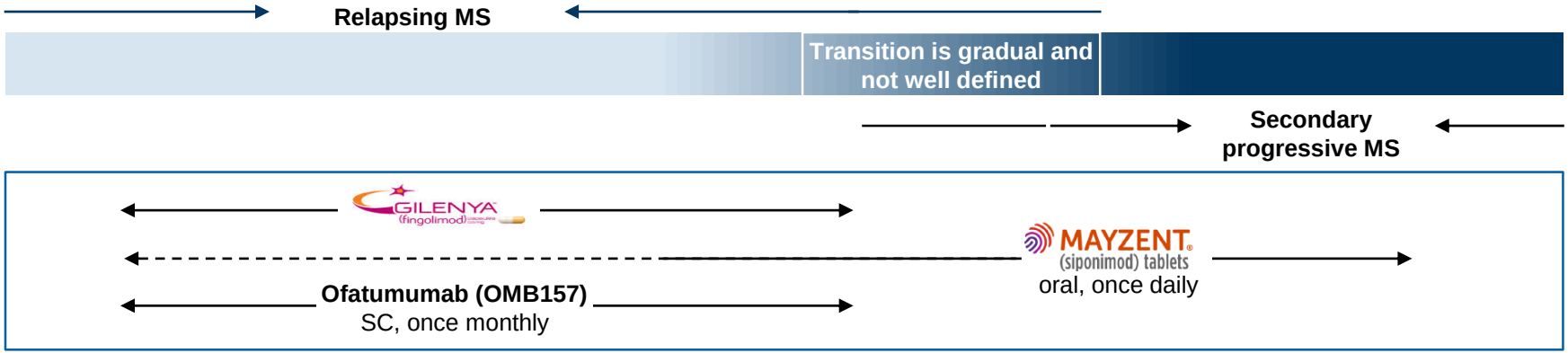
Category Leadership

- 1st oral
- 1st in NfLs
- 1st in pediatric MS
- 1st s.c. B-cell therapy
- 1st successful study in typical SPMS

1. Kremenchutzky M, et al. The natural history of multiple sclerosis: a geographically based study 9: observations on the progressive phase of the disease. Brain. 2006 Mar;129(Pt 3):584-94 NfL: Neurofilaments light chain, s.c. subcutaneous
2. https://www.novartis.com/news/media-releases/novartis-presents-first-its-kind-algorithm-based-tool-help-ms-patients-and-physicians-evaluate-and-discuss-early-signs-progression-secondary-progressive-ms

NOVARTIS

With new and planned launches, Novartis continues to lead across the MS disease spectrum



Patient Profiles	**25-35 years old** RMS patients, first line first switch	**~40 years old** Transitioning or have transitioned to SPMS
MS patient share[1,2]	**~85%** **of MS patients**	**~75-80%** **of RMS patients**

MS = multiple sclerosis; PPMS = primary progressive MS; RRMS = relapsing–remitting MS; SPMS = secondary progressive MS EDSS -Expanded Disability Status Scale.
1. National MS society. 2. AntelJ et al. Acta Neuropathol2012;123:627–38.

NOVARTIS

Mayzent® EXPAND study resulted in first and only oral drug proven to impact progression in typical SPMS patient

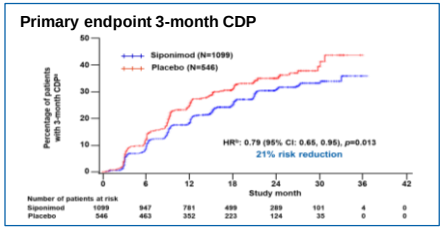
EXPAND study[2]: typical SPMS population with unmet need

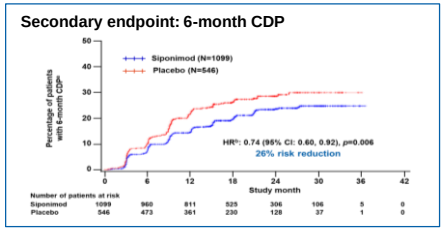
Age (mean): 48 years
Years since onset of MS (mean): 17 years
Moderate to severe disability: EDSS 5.4 / 6.0 (mean/ median)
Relapse-free for prior 2 years (%): 64%

Disability progression[3]

Reduction in risk of CDP vs. placebo

21%	3-month	p<0.013	Primary end-point
26%	6-month	p<0.006	





Confirmed relapses

55% reduction ARR[3] vs. placebo (p < 0.0001)

Cognitive processing[4]

SDMT[2]: 2.48 points improvement from baseline, vs. placebo[3] (p<0.0004)

Brain volume loss

23.4% reduction in brain volume loss vs. placebo[3] (p = 0.0002)

ARR – annualized relapse rate. CDP - confirmed disability progression. EDSS - Expanded Disability Status Scale. DMT – Disease modifying treatment See appendix for references

NOVARTIS

Mayzent® showed significant effects on cognitive processing speed in SPMS patients[1]

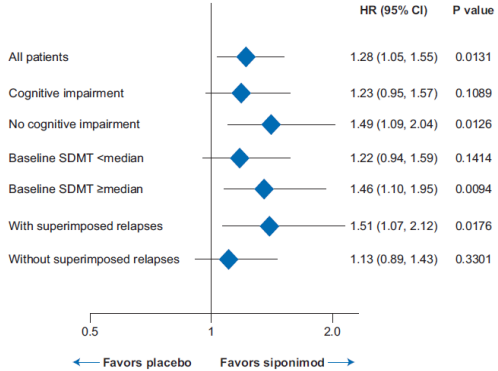
Decreased Cognitive Processing Speed (CPS) is a core underlying deficit in SPMS, affecting up to 70%[3] of the patients

EXPAND study (>1600 patients):

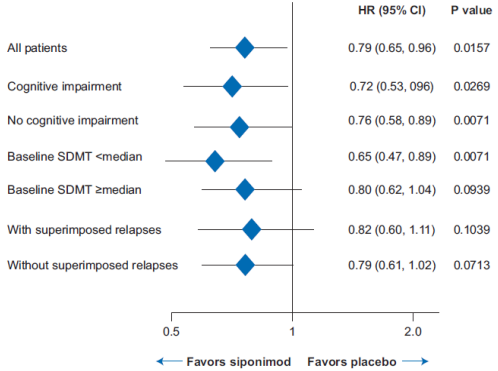
- Mayzent® (siponimod) is a brain penetrant $S1P_{1,5}$ receptor modulator that reduces brain volume loss, reducing disability progression in patients with SPMS
- CPS assessed with the Symbol Digit Modality Test (SDMT)

Subgroup analyses:

Higher proportions of sustained CPS improvement[2] with Mayzent® vs. placebo



Lower proportions of sustained CPS deterioration[2] with Mayzent® vs. placebo



HR = hazard ratios See appendix for references

NOVARTIS

Mayzent® the first and only oral treatment successfully studied and approved for active SPMS[1]

Unique label and clinical data

- ☑ Full range of RMS indication
- ☑ Active SPMS[2] (EDSS range: 3.0 to 6.0)
- ☑ Efficacy
- ☑ Safety and tolerability
- ☑ No FDO (~70%)[3]

For a large population with unmet need

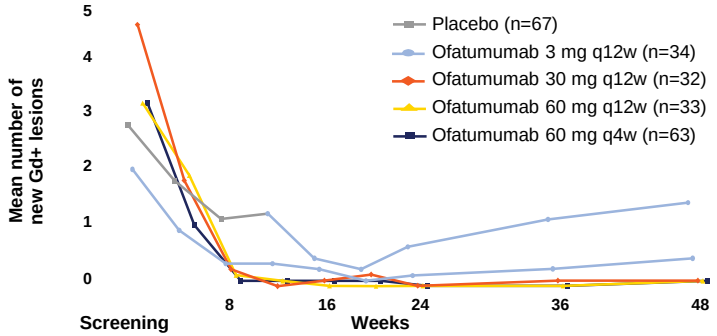
- ☑ ~250K target active SPMS patients in US
- ☑ Awareness of Mayzent® >50% of physicians in most major markets
- ☑ Initial focus on disease education
- ☑ MSProDiscuss™ launched to help target patient identification

RRMS – Relabping Remitting Multiple Sclerosis; SPMS – Secondary Progressive Multiple Sclerosis; CPS – Cognitive Processing Speed; FDO – first dose observation See appendix for references

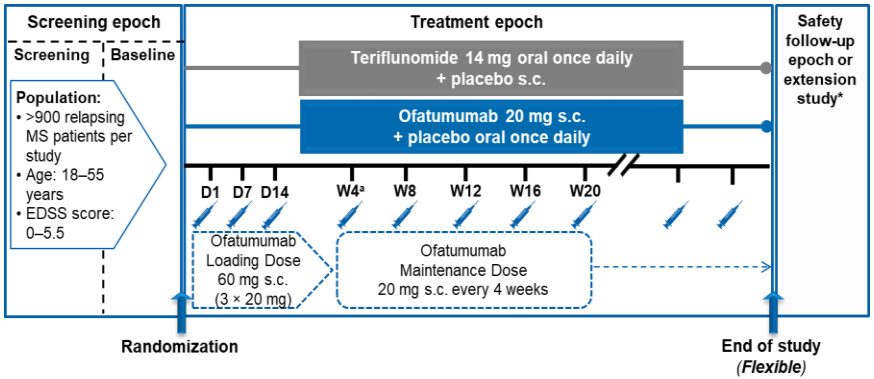
NOVARTIS

Ofatumumab (OMB157) subcutaneous anti-CD20 for relapsing MS on track for submission Q4 2019

Ofatumumab suppresses new MS lesions >90% (MIRROR Ph2b)[1]



Ph3 program for Ofatumumab[2] (ASCLEPIOS 1 & 2)



Ph3 ASCLEPIOS 1 & 2 readout expected Q3 2019

1. Bar-Or et al., April 2018, Neurology, 2018; 90:e1805-e1814. 2. Kappos L, et al. Presented at EAN 2017. EP2154. 3. Savelieva M, et al. Presented at AAN 2017. 4. Savelieva M. et al. Presented at ECTRIMS 2016. P730; P5.348.
5. Theil D, et al. Presented at ECTRIMS 2017. P657; Gd+ = gadolinium-enhancing

NOVARTIS

Ofatumumab (OMB157): potentially first and only highly potent precision B-Cell therapy tailored for MS patients

Maximizing unique B-cell biology ...

- More potent B-cell lysis as Ofatumumab binds to unique CD20 epitopes, with higher affinity[1,2,3]
- SC administration favorable vs. IV route due to improved lymph node targeting, sparing B-cells in the spleen, higher uptake in the spinal cord and improved CNS uptake[5,6,7]
- Low dose Q4W dosing: preservation of immunity through faster B-cell repletion[4] upon discontinuation

... with potential for best-in-class efficacy, safety and convenience

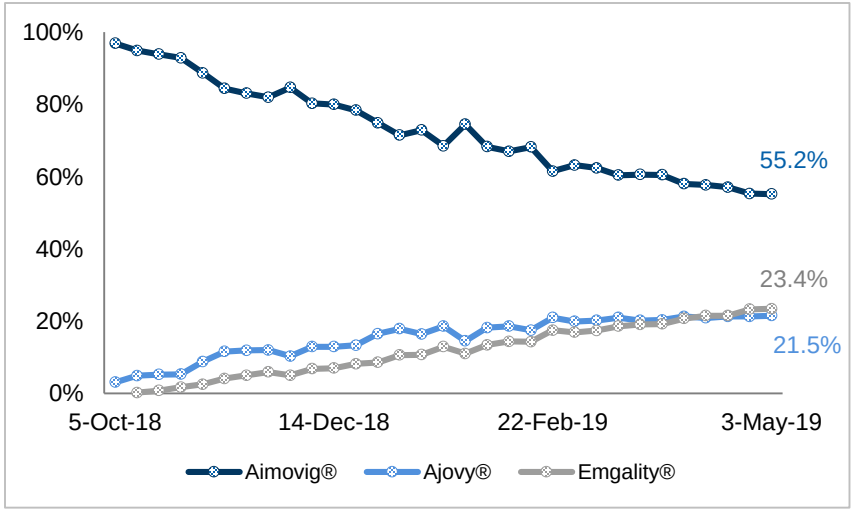
- Expected to have high efficacy on all key measures of disease activity enabling low dose
- Fewer side effects due to specific B-cell subset targeting and faster repletion[4]
- Potential for at-home once-a-month injection, requiring no pre-treatement, offering high degree of convenience

See appendix for references

NOVARTIS

Aimovig® the leading CGRP in US with further growth expected from ongoing ex-US launches

US CGRP Market TRx Share
Source IQVIA



- In US Aimovig® leads with 55% TRx share
- Further US opportunity in diagnosis rates (currently 13%) and penetration of preventive treatments (currently 12%)
- >200k patients treated to date worldwide
- Aimovig® now approved in 38 countries, available in 27 countries

 Aimovig is co-commercialized with Amgen in the US, where Amgen records sales, and Novartis has exclusive commercialization rights for all territories excluding US and Japan

NOVARTIS

Speed, efficacy and durability demonstrated by robust Zolgensma®[1] data at AAN

Please see posters/ AAN Novartis investor presentation (click link)

SPR1NT

Pre-symptomatic data show benefit of early treatment

Pre-symptomatic: 2 or 3 copies of SMN2, <6 weeks of age at dosing

Rapid, age-appropriate improvement in motor function and milestone achievement:

- 8.9-point increase from baseline in CHOP-INTEND one-month post-dosing
- 4 patients could sit without support for ≥30 secs; 1 patient could stand with assistance for ≥2 secs

All patients alive, with no new safety signals relative to other Zolgensma® studies

Supports use of Zolgensma® as a key therapy in SMA identified through newborn screening

Open label, data as of March 8, 2019
2 copies: median 5.4 months of follow-up
3 copies: median 2.2 months of follow-up

STR1VE

Rapid measurable gains in motor function, confirming START data

Type 1: <6 months of age at dosing

New interim data continued to show Zolgensma® has the potential to provide prolonged event-free survival, increases in motor function and significant milestone achievement:

- 11 infants (50%) sitting at a mean of 8 months post-treatment, mean age of 11.9 months
- 21/22 patients have achieved a CHOP-INTEND score ≥40

One death independently deemed unrelated

STR1VE continues to reinforce foundational role of Zolgensma® for SMA Type 1

Open label, data as of March 8, 2019
Median 10.1 months of follow-up

START Long-term follow-up

Long-term durability with no waning effect, reconfirms long-term value

Type 1: <6 months of age at dosing

No loss of milestones or waning of effect nearly four years post-dosing adds to evidence of long-term durability of Zolgensma®

All enrolled Cohort 2 patients (n=10) maintained motor function and milestone achievements

No patient experienced a worsening of nutritional or ventilatory requirements:

- 2 of 4 patients who used BiPAP at the start of the LTFU period no longer require it regularly

No new treatment-related adverse events have emerged during the follow-up period

Mean (range) age at last follow-up:
3.9 (3.4–4.8) years

Mean (range) time since treatment:
3.7 (3.3–4.3) years

STRONG

Rapid gains through IT administration, shows promise for Type 2

Type 2: 6 months - 5 years of age at dosing

Intrathecal data reported for 1st time show rapid motor function gains and promising milestone achievements in SMA Type 2:

- 22 milestones in 10 patients achieved after a median 6.5 months of follow-up
- In the lower age cohort at dosing, 2 patients could stand independently, 1 went on to walk; in the older age cohort at dosing, 1 patient could walk with assistance

Plan to initiate discussions with regulators to define the path to registration for intrathecal administration of Zolgensma®

Open label, data as of March 8, 2019
Median 6.5 months of follow-up

Source: Novartis investor presentation on Zolgensma® at American Academy of Neurology Annual meeting 2019 [1] The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities

NOVARTIS

Data show potential impact of Zolgensma® in broad spectrum of SMA

- ☑ START, STR1VE, SPR1NT data indicate Zolgensma® provides **rapid** improvement in motor function and durable milestone achievement
- ☑ SPR1NT data shows early treatment could lead to **near-normal development** for pre-symptomatic patients
- ☑ START long term follow-up shows the **long-term durability** of Zolgensma® with no waning effect
- ☑ Expansive program with >150 patients treated & <5% of patients excluded due to elevated anti-AAV9 antibodies[2]

Zolgensma® potentially transformational therapy for SMA

See appendix for references

NOVARTIS

Zolgensma®: on approval, ready to meet immediate launch demand independent of label scenario

Institutional	▪ >150 patients treated at 26 US sites ▪ Delivery infrastructure validated for HUB, AAV9 testing and rapid product delivery ▪ Expect >60 top centers ready at launch, covering 80% of infants with SMA
Manufacturing	▪ Continuing to build supply ▪ Footprint growing with ~1 million square-feet of manufacturing space (See supplement)
Access	▪ Engaged with >70 payers covering >80% of the SMA infant population ▪ High interest in innovative contracts, expect 30% of commercial lives contracted within 30 days

The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities

NOVARTIS

Broad clinical program for potentially transformative spinal muscular atrophy therapy

Delivery	SMA Type	2014-2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	2019	Completion
Intravenous (IV)	**Pre-symptomatic Type 1,2,3**			**SPR1NT Phase 3** 22 / 27 patients enrolled – *data at AAN 2019*				2021
	Type 1	**START** 15 patients	**START Long-term follow-up** START dose-escalation study to identify therapeutic dose 13 / 15 patients enrolled – *data at AAN 2019*					2033
			STR1VE Phase 3 22 / 22 patients, fully enrolled – *data at MDA 2019 and AAN 2019*					2020
				STR1VE-EU Phase 3 26 / 30 patients enrolled				2021
							STR1VE-AP *Planned start* Will enroll 6 patients	TBC
Intrathecal (IT)	**Type 2**		**STRONG Phase 1** 31 / 51 patients; fully-enrolled in low-, mid-dose cohorts – *data at AAN 2019*					2020
	Type 1,2,3						**REACH** Pending	TBC

Final design of REACH to be informed by STRONG; cutoff as of April 2019. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities.

Ongoing development program to address incident and prevalent populations across SMA types and regions

	Incident population			Prevalent population[4]		
Region	Type 1	Type 2	Type 3	Type 1	Type 2	Type 3
US	270-300[1]	135-150[1]	45-50[1]	1,260-1,400	4,590-5,100	3,150-3,500
Europe	330-360[2]	165-180[2]	55-60[2]	1,540-1,680	5,610-6,120	3,850-4,200
Japan	24-30[3]	12-15[3]	4-5[3]	112-140	408-510	280-350

- SPR1NT studies pre-symptomatic population, in patients with 2 or 3 copies of SMN2
- START and STR1VE studies Type 1
- STRONG studies Type 2

1. Symphony claims data 2. J Neurol. 2017 Jul;264(7):1465-1473 3. Data on file 4. Spinal Muscular Atrophy: Introduction to SMA families: SMA Foundation

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag), Tafinlar (dabrafenib) + Mekinist (trametinib), KISQALI (ribociclib), JAKAVI (ruxolitinib), KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod), Aimovig[1], MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection), LUXTURNA[4], xiidra[3]	Xolair (Omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
	Crizanlizumab (SEG101) Sickle Cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic Ocular Pain	**QBW251** COPD
	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Ophthalmology – building a portfolio to address high unmet need ocular surface diseases

Unmet needs

Ocular Surface Diseases
An incipient, poorly understood epidemic with high unmet patient needs

Heterogeneic population with lack of consistent diagnosis and segmentation

Limited Rx therapies available, and diverse scientific hypotheses

Superior response rates, tolerability and onset of action are needed for better treatment outcomes

Widespread use of OTC therapies

Medical Experts expect an Ocular Surface Disease epidemic

Ocular surface diseases strategy

Segmented approach targeting transformative best- or first-in-class disease-modifying treatments; Novartis has capabilities and assets in each key segment

Inflammation induced Dry Eye Disease	Treat signs and symptoms by inhibiting the inflammatory cascade	**Xiidra®**[1] LFA-1 antagonist
Dry Eye Disease & Primary Sjogren's Syndrome	Next generation multi-modal biologic restoring ocular homeostasis	**ECF843** *rh*Lubricin
Ocular Surface Pain	Ocular pain	**SAF312** TRPV1 antagonist
Meibomian Gland Dysfunction	Targeting underlying disease pathophysiology	**Preclinical Asset**

1. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions

NOVARTIS

Xiidra® acquisition: Strong strategic fit and attractive economics[1]

Strong strategic fit	with Novartis leading ophthalmic portfolio and pipeline
Clear blockbuster potential	given high unmet medical need with strong product profile
Significant synergies	with Novartis front-of-the-eye commercial infrastructure
Good financial return profile	Strict financial discipline applied, expected to be profitable 2020 and margin accretive 2021; deal structure adds tax benefit

xiidra (lifitegrast) ophthalmic solution 5%

Xiidra® complements the Novartis ophthalmology portfolio

LUCENTIS[2] RANIBIZUMAB INJECTION

DUREZOL (difluprednate ophthalmic emulsion) 0.05%

ILEVRO™

Pazeo (olopatadine hydrochloride ophthalmic solution) 0.7%

Azopt®

TRAVATAN Z®

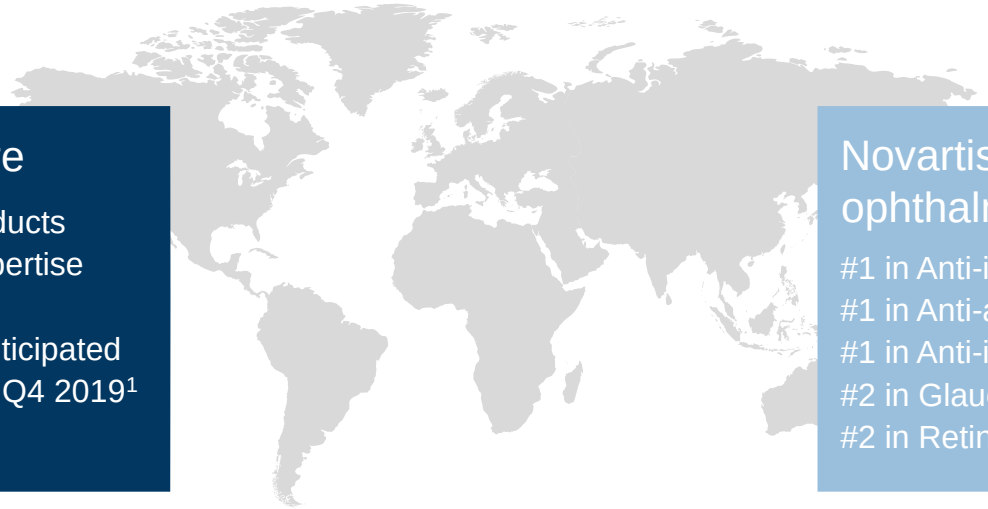
SIMBRINZA® (brinzolamide/brimonidine tartrate ophthalmic suspension) 1%/0.2%

LUXTURNA™[2] voretigene neparvovec-rzyl for subretinal injection

1. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions 2. Ex-US only

NOVARTIS

Novartis industry leadership and commercial infrastructure setup to continue Xiidra® success and maximize its potential



US Infrastructure

- 375 FF in-line products
- Market access expertise
- Field medical
- Retina team for anticipated RTH258 launch in Q4 2019[1]

Novartis global ophthalmic 2018 sales[2]

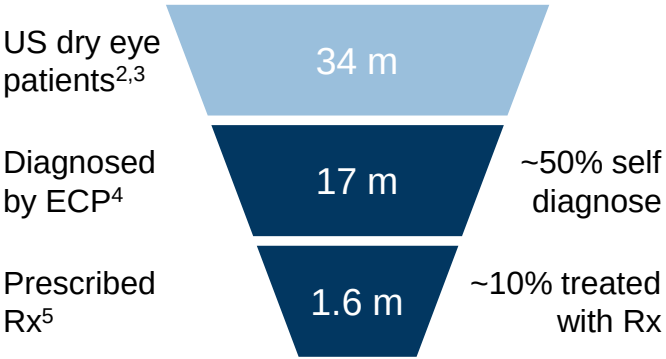
#1 in Anti-inflammatory
#1 in Anti-allergy
#1 in Anti-infective
#2 in Glaucoma
#2 in Retina (outside US)

1. Pending regulatory approval. 2. Rankings based on 2018 sales from IQVIA

NOVARTIS

Xiidra® uniquely positioned to treat both signs and symptom of dry eye disease

Dry eye disease underdiagnosed, undertreated[1], increasing in incidence



First and only treatment approved for both signs and symptom of dry eye that targets inflammation

- Fast onset of action, 2 weeks to 3 months
- Tolerable safety profile

Well positioned as 2nd line therapy – vast majority of ophthalmologists want additional treatment options[1]

US prescriptions expected to increase with increasing incidence and use of more effective therapies

See appendix for references

NOVARTIS

Brolucizumab (RTH258) achieved robust visual gains‡ and superior fluid resolution*– on track for 4Q19 US launch[1]

HAWK & HARRIER outcomes on primary and key secondary end points[2]

Visual acuity	▪ Non-inferior to aflibercept in BCVA change from baseline to Week 48‡
Anatomical outcomes	▪ Significantly fewer patients with IRF and/or SRF at Weeks 16 and 48*; difference maintained at Week 96† ▪ Superior reductions in CST at Weeks 16 and 48*; difference maintained at Week 96† ▪ Fewer patients with sub-RPE fluid at Weeks 16#, 48#, and 96† ▪ Significantly fewer patients with disease activity at Week 16*
q12w dosing	▪ >50% of patients maintained on q12w interval after loading through Week 48 ▪ Over 75% of those who completed Week 48 on a q12w interval were maintained on q12w interval until Week 96

- Global anti-VEGF market ~10bn USD in 2018, 70% of market nAMD[3]
- On track for launch Q4 2019 US[1], Q1 2020 Australia/ Canada[1], Q2 2020 Europe/Japan[1]
- DME submission expected Q2 2021
- Brandname Beovu™ has provisionally been approved by FDA for Brolucizumab[4]

See appendix for references

NOVARTIS

Building depth across our core therapeutic areas

	ONCOLOGY	PHARMACEUTICALS				
		Cardio-Metabolic	IHD	Neuroscience	Ophthalmology	Respiratory
Select commercial assets	PROMACTA (eltrombopag), Tafinlar (dabrafenib) + Mekinist (trametinib), KISQALI (ribociclib), JAKAVI (ruxolitinib), KYMRIAH (tisagenlecleucel)	Entresto (sacubitril/valsartan)	Cosentyx (secukinumab)	GILENYA (fingolimod), Aimovig[1], MAYZENT (siponimod) tablets	LUCENTIS (ranibizumab injection), LUXTURNA[4], xiidra[3]	Xolair (Omalizumab)
Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
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	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

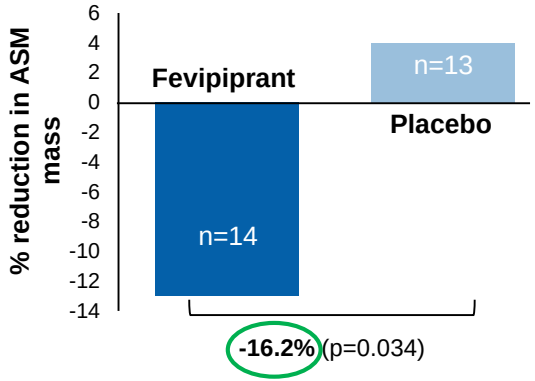
*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Fevipiprant (QAW039) showing asthma disease-modifying potential with Ph3 readouts on track end 2019

Potential for disease modification



Airway smooth muscle mass reduction in asthma with Fevipiprant[1]

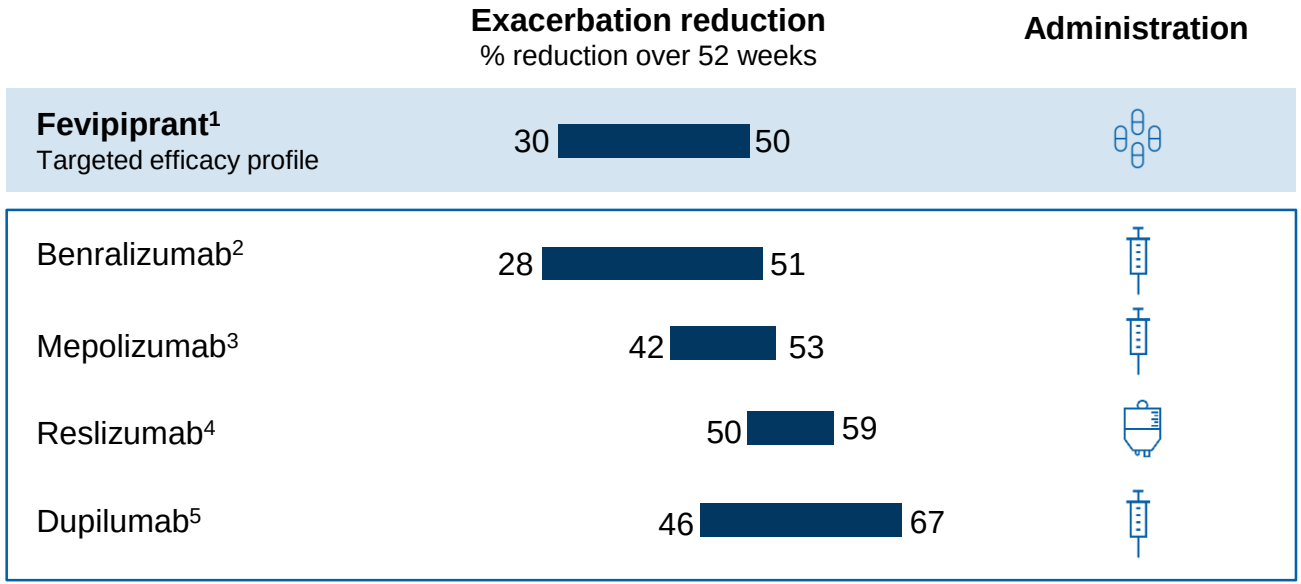
Robust clinical program to realize full potential

All five Ph3 enrolled	**LUSTER 1 & 2**	(GINA 4/5)	exacerbation trial
	SPIRIT	(GINA 3/4/5)	safety
	ZEAL 1 & 2	(GINA 3/4)	lung function FEV1
Ph2 data	Reduced sputum eosinophils by 72%[2,3]		
Pre-clinical data	Highly selective DP2 ▪ Superior potency ▪ High selectivity ▪ Clean safety profile		

1. Saunders et al. Sci Trans Med 2019;11, eaao6451 1˚EP: primary endpoint; FEV_1: forced expiratory volume in one second; ASM: airway smooth muscle mass 2. Gonem et al. Lancet Respir Med 2016;4:699–707 3. Green et al. Lancet 2002:360(9347):1715–1721

NOVARTIS

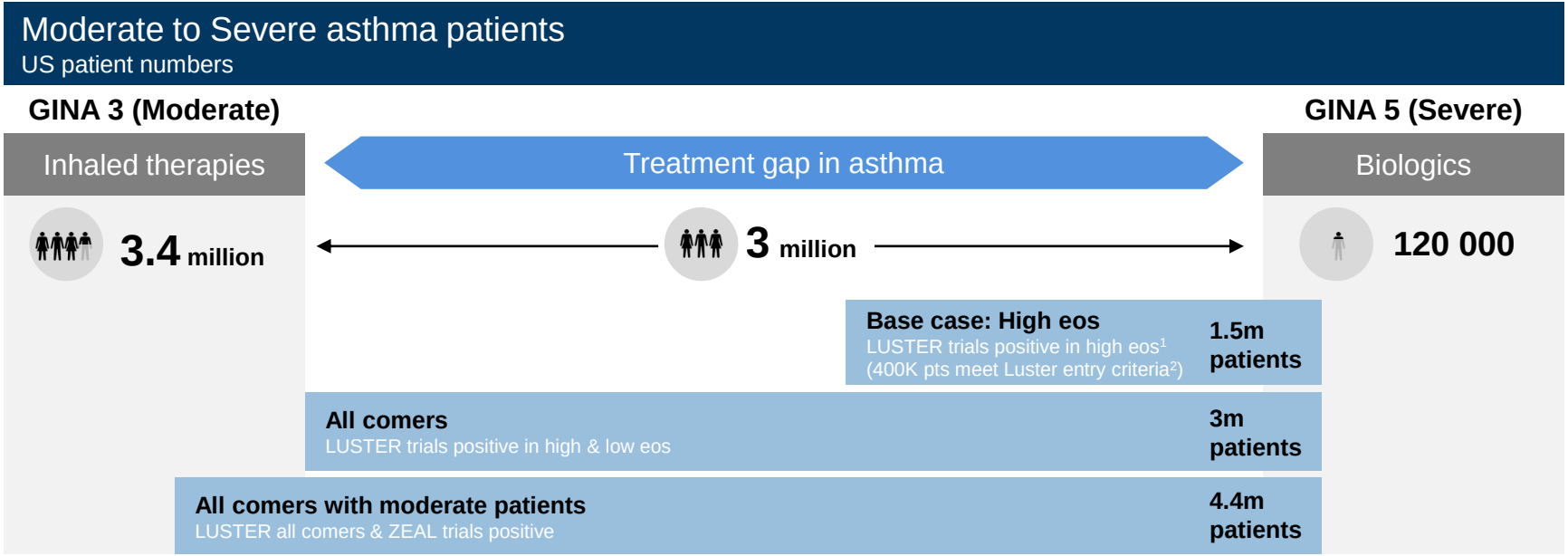
Fevipiprant (QAW039) development: targeting biologic efficacy with oral simplicity



See appendix for references

NOVARTIS

Fevipiprant (QAW039) has the potential to address significant treatment gap in patients with unresolved asthma



1. High eosinophils defined as ≥ 250 cells/µL 2. Moderate to Severe refers to patients on GINA step 4/5 therapies (i.e ICS/LABA ± LAMA). Sources: CDC: US claims data.

NOVARTIS

Ready for first- and best-in-class launches

2019 Pharma launch priorities in US

Brolucizumab (RTH258)	▪ U.S. FDA filing accepted in April with use of Priority Review Voucher ▪ Pending FDA approval, US launch anticipated in Q4 2019 ▪ Deep US Medical and Commercial team in place with extensive retina expertise
Zolgensma®[1]	▪ >150 patients treated at 26 US sites ▪ Delivery infrastructure validated for HUB, AAV9 testing and rapid product delivery ▪ Expect >60 top centers ready at launch, covering 80% of infants with SMA ▪ Manufacturing footprint growing with ~1 million square-feet of manufacturing space (See supplement) ▪ Engaged with >70 payers covering >80% of the SMA infant population ▪ High interest in innovative contracts, expect 30% of commercial lives contracted within 30 days
Xiidra®	▪ Strong US commercial presence of 375 field force associates promoting 7 in-line products ▪ Decades of experience within Optometry and Ophthalmology, deep customer relationships and insights ▪ Extensive commercial and market access expertise with payers ▪ Proven ability to successfully manage brands in a genericized marketplace

1. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities.

NOVARTIS

With recently launched products and rich pipeline, Novartis expects double-digit growth in China, capitalizing on faster and broader access

Novartis position in China is strong ...

Approvals
Novartis is one of the leading MNCs in NDA approvals

Reimbursement
All in-line brands launched before 2017 are reimbursed

Execution
Entresto® best ever primary care launch in China, even pre-reimbursement

... expected to expand significantly based on a rich pipeline

Year	Actual / pursued approvals	NDRL actual / pursued listings
2017	+6; incl. Entresto® HFrEF, Xolair® Asthma, Ultibro® COPD, Exelon® Patch AD, Galvus®[5], Diovan® FCT	+8: Lucentis® wAMD; Galvus®, Exforge®, Co-Diovan®, Onbrez®, Lescol XL®, Simulect®, Patanol®
2018	+6; Lucentis® DME/RVO/PM, Vigamox®, Seebri® COPD	(Oncology only)
2019e	+3; Cosentyx® PsO[3], Gilenya® MS	+6: Entresto®, Lucentis® RVO/DME/CNV, Vigamox®, Exelon® Patch, Ultibro®, Xolair®
2020e	+5; Cosentyx® AS, Mayzent® SPMS	+3
2021e	+5; Entresto® HFpEF, Xolair® CIU/CSU, Fevipiprant[4] Asthma;	+5
2022e	+1; Entresto® Post-AMI	+5
2023e	+3; Brolucizumab (RTH258) wAMD/DME; Aimovig® CM/EM	+1

NDRL expected to be updated dynamically

NDA – New Drug Applications NDRL – National Drug Reimbursement List COPD – Chronic Obstructive Pulmonary Disease AD – Alzheimer's Disease DME – Diabetic Macular Edema RVO – Retinal Vein Occlusion CNV – choroidal neovascularization PM – pathologic myopia CM – Chronic Migraine EM – Episodic Migraine See appendix for references

NOVARTIS

Enhancing productivity, patient care and engagement through digital solutions – examples

DRIVING PRODUCTIVITY

ACTalya Personal Assistant

Unleashing the power of data and technology to give our reps real-time, streamlined, personalized data to make their **100 000 daily interactions with HCPs more personalized, efficient and impactful**

PLAN OF SCALE & IMPACT:
Equip all Novartis sales reps with ACTalyla worldwide

TRANSFORMING ENGAGMENT

Patient Engagement Platform

★ myHealthTeams
★ Medisafe
★ ada
★ MIGRAINE BUDDY

Improving the patient experience from pre-diagnosis to post-Rx through transformative patient-centric solutions helping **address specific pain points along the patient journey**

PLAN OF SCALE & IMPACT:
Form large-scale partnerships across all major markets

IMPROVING PATIENT CARE

Automated inhaler tracking

Improving Respiratory Care by **combining a sensor and app together with the Breezhaler device**, uniquely enabling confirmation of the inhalation and providing precise medication reminders & objective reports

PLAN OF SCALE & IMPACT:
Partnership with Propeller Health to launch in major markets across the EU starting this year

*All Trademarks are property of their respective owners ★ Solution live in at least 1 market

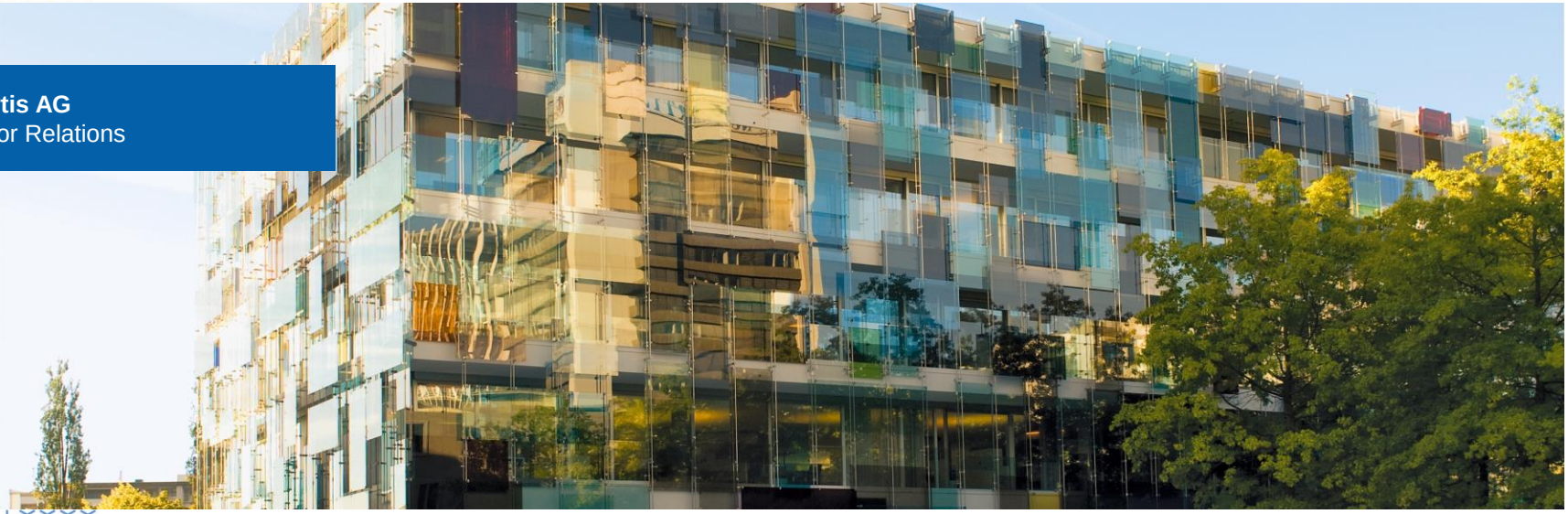
NOVARTIS

Conclusion - Pharmaceuticals

- Continued strong momentum for Cosentyx® and Entresto®
- Ready to launch 5 blockbuster near-term candidates
- With recently launched products and rich pipeline, Novartis expects double-digit growth in China

NOVARTIS

Novartis AG
Investor Relations



Meet Novartis Management 2019
Oncology pipeline and in-market brands

May 23, 2019

NOVARTIS

Index – select commercial and pipeline assets

Anchor commercial assets

Select pipeline assets

1. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

Building depth across our core therapeutic areas

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Select pipeline assets and opportunities	**Kymriah®** New indications	**Entresto®** HFpEF, post-MI	**Cosentyx®** nrAxSpA	**Zolgensma®**[2] SMA	**Brolucizumab** (RTH258) nAMD, DME, RVO	**Fevipiprant** (QAW039) Asthma
	Piqray®* (BYL719) Breast	**LNP023** Renal diseases	**CFZ533** Transplant / Sjögren's	**LMI070** SMA	**UNR844** Presbyopia	**QVM149** Asthma
	Crizanlizumab (SEG101) Sickle Cell	**TQJ230** CVRR	**Tropifexor** (LJN452) NASH	**Ofatumumab** (OMB157) MS	**ECF843** Dry eye	**CSJ117** Asthma
	PDR001 combo Metastatic Melanoma		**VAY785** NASH	**CNP520** Alzheimer's	**SAF312** Chronic Ocular Pain	**QBW251** COPD
	ABL001 CML		**LOU064** CSU			
	ACZ885 Lung		**Ligelizumab** (QGE031) CSU / CIU			
	^{177}Lu-PSMA-617 mCRPC		**ZPL389** AD			
			MOR106 AD			

*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

See appendix for references

NOVARTIS

Leading oncology business, driving growth in four distinct platforms

1. Novartis is one of the leading Oncology companies with growth opportunities in Targeted Therapy, Cell Therapy, Radioligand Therapy and Immunotherapy

2. Rich portfolio with 7 in-market blockbusters and 3 recent launches with blockbuster potential and a strong, unique pipeline across our 4 platforms

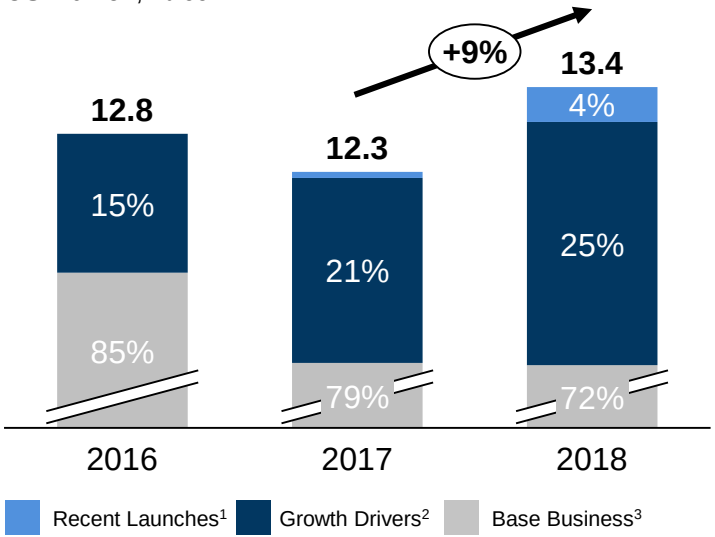
3. Promising pipeline, integrating the best from internal and external innovation, positions Novartis to continue to lead in Oncology with 4 potential blockbuster launches planned by 2021

NOVARTIS

2018 Oncology sales up +9% cc driven by recent launches[1] and growth drivers[2]

Net Sales Oncology BU

USD billion, % cc



Potential Future Growth

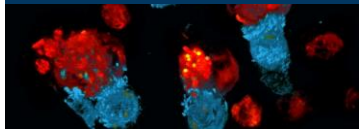
+ Strong uptake of recent launches
+ Growth drivers deliver double-digit performance
+ Resource allocation/productivity to fuel strategic investment (i.e. launches, China)

- Generic impact (Afinitor®, Exjade®, Glivec® and Sandostatin LAR®)
- Healthcare cost containment / pricing

1. Recent launches include Kisqali®, Kymriah®, Lutathera®. 2.Growth drivers include Promacta®/Revolade®, Jakavi® (marketed by Novartis ex-USA), Tafinlar®+ Mekinist®. 3. Base business – other brands.

NOVARTIS

Deep pipeline across four distinct platforms is expected to continue driving differentiation and growth

	Targeted therapies (TT)	Radioligand therapies (RLT)	Cell & Gene	Immunotherapies (IO)
				
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Select pipeline assets[1] and opportunities	**ABL001** in CML (3rd line & 1st line add-on) **Piqray®[2],** in PIK3CA mutated HR+/HER2- advanced breast cancer, HER2+ advanced breast cancer, TNBC **INC280** in NSCLC, single agent **SEG101** in sickle cell disease	**177Lu PSMA-617** in prostate cancer **177Lu PSMA-R2** in prostate cancer **177Lu NeoB** in breast cancer, GIST, GBM, neuroblastoma, ovarian, head & neck, esophageal	**Kymriah®** in – r/r DLBCL in 1st relapse – r/r follicular lymphoma – combinations (pembro; ibrutinib) in r/r DLBCL – 1st line high risk pediatric and young adult ALL – Adult ALL – CLL **Other targets:** BCMA&CD19, CD22&CD19, CD123, EGFRv3	**ACZ885** in – adjuvant NSCLC – 1st line NSCLC – 2nd line NSCLC **PDR001+Tafinlar®+Mekinist®** in metastatic melanoma **PDR001+LAG525+carboplatin** in TNBC **PDR001+INC280** in 2nd line NSCLC

Projects included are those with planned filings in US and/or EU 1. All select pipeline assets are either investigational or being studied for (a) new use(s). Efficacy and safety have not been established. There is no guarantee that they will become commercially available for the use(s) under investigation 2. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

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			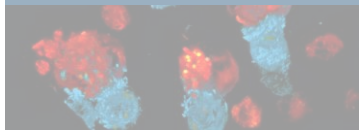	
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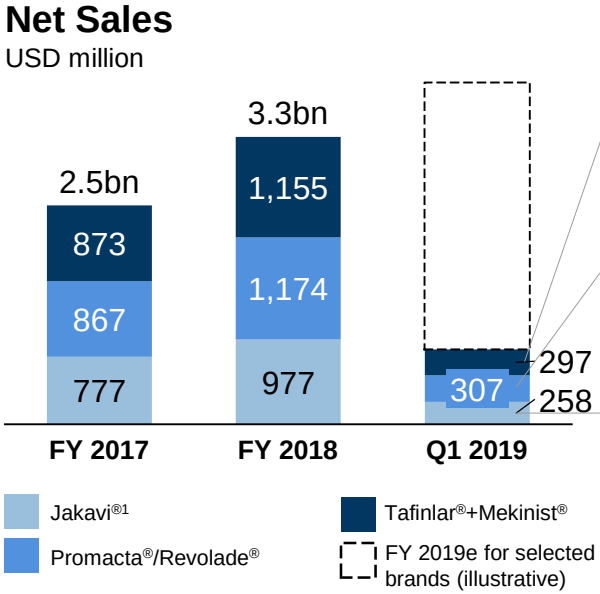
NOVARTIS

Key in-market Oncology blockbusters delivering high double-digit growth since 2017



Tafinlar® + Mekinist® (grew +18% cc in Q1 2019 vs. PY)

- 28k BRAF+ melanoma and NSCLC patients p.a. in G7
- Standard of care in BRAF+ targeted therapy
- Launch of lung and adjuvant melanoma progressing well
- Ph3 triplet with PDR001 study in 1L BRAF+ metastatic melanoma read out expected H2 2019

Promacta®/Revolade® (grew +24% cc in Q1 2019 vs. PY)

- 86k eligible ITP patients p.a. in G7
- Market leader in TPO-RA class and gaining share outside of the class in ITP
- Launched 1L SAA in US
- Implemented unique analytical tool, DROID[2], to optimize marketing mix

Jakavi®1 (grew +20% cc in Q1 2019 vs. PY)

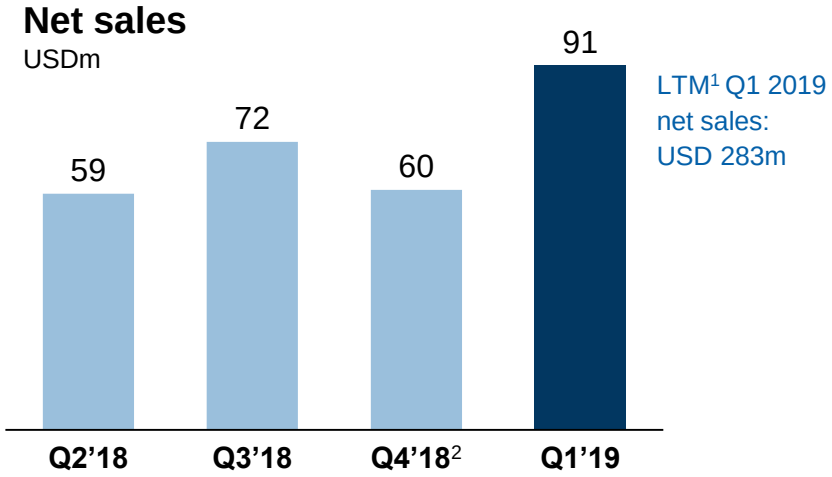
- 37k MF and PV patients treated with Jakavi ex-US
- Standard of care in 1L MF and in 2L PV in most countries, where launched
- Ph3 studies in acute and chronic GVHD results expected in H2 2019 12,5k new GVHD cases per year in G6[3])

1. Jakavi is a registered trademark of Novartis AG in countries outside the United States. Jakafi is a registered trademark of Incyte Corporation. 2. DROID is an acronym that stands for data repository for optimization, insights and decision-making
3. UK, France, Germany, Italy, Spain and Japan.

NOVARTIS

Kisqali® gaining share in front line

KISQALI® ribociclib



- **CDK 4/6 with largest body of first line evidence** regardless of combination partner or menopausal status while maintaining patients' quality of life
- **Overall survival results from MONALEESA-7** with Kisqali® (ribociclib)* plus endocrine therapy in premenopausal women with HR+/HER2- advanced breast cancer, to be presented at ASCO

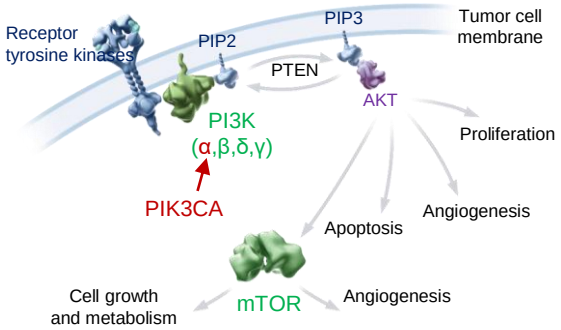
1. Last twelve months 2. Reimbursement agreements in Europe had a temporary impact on Q4 growth in the region Kisqali® was developed by the Novartis Institutes for BioMedical Research (NIBR) under a research collaboration with Astex Pharmaceuticals

NOVARTIS

Next pioneering medicine, Piqray®* (BYL719), expected to be the first and only therapy for aBC patients with PIK3CA mutation

PI3K: Central oncogenic pathway deregulated in cancer

PIQRAY®
(alpelisib) tablets
50 mg · 150 mg · 200 mg



- ~40% of HR+/HER2- breast cancer patients have a PIK3CA mutation, associated with poor prognosis[1,2]
- Nearly doubled median PFS in SOLAR-1 study[3]
- Ready to launch with FDA-approved companion diagnostic
- Initiating pivotal clinical trials in HER2+ aBC and TNBC; planning additional studies across PIK3CA-mutation driven cancers

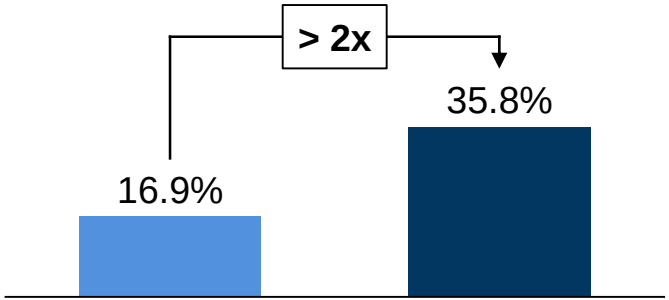
*The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

1. Sabine V, Crozier C, Brookes C, et al. Mutational analysis of PI3K/AKT signaling pathway in tamoxifen exemestane adjuvant multinational pathology study. Journal of Clinical Oncology. 2014;32:2951-2958. 2. Juric D, Ciruelos EM, Rubovszky G et al. Alpelisib (ALP) + fulvestrant (FUL) for advanced breast cancer (ABC): Phase 3 SOLAR-1 trial results. Presented at the San Antonio Breast Cancer Symposium (SABCS) (Abstract #GS3-08) on December 6, 2018.

NOVARTIS

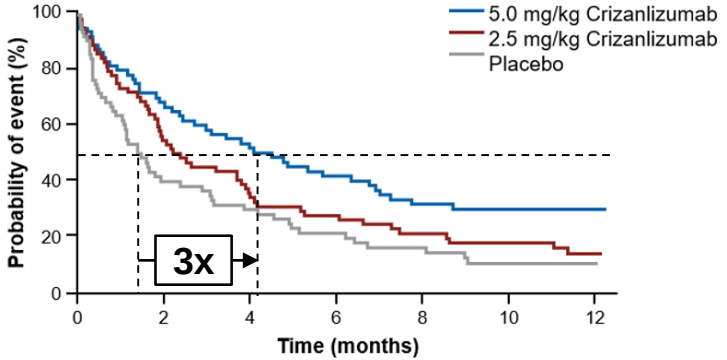
SEG101 (crizanlizumab) increased proportion of patients free from VOC and delayed these crises

Proportion of patients free from VOC for the study period[1]



p = 0.013

Time to first VOC[1]



Median for crizanlizumab 5 mg/kg vs. placebo
4.07 vs 1.38 months

VOCs are associated with increased morbidity / mortality, can result in stroke, as well as organ damage or failure[2]

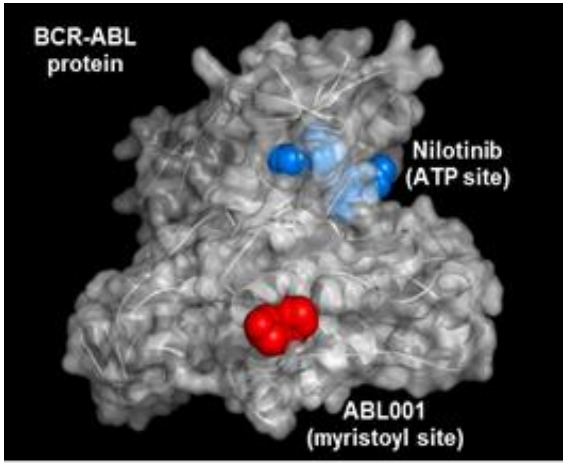
1. VOC that led to healthcare visit; p= 0.001 (log rank p-value); HR (95%CI) = 0.50 (0.33, 0.74); Kutlar et al, Am J Hematol. 2018 Oct 8. doi: 10.1002/ajh.25308. 2. Piel F, Steinberg M, Rees D. Sickle cell disease. N Engl J Med. 2017; 376(16):1561-1573.

NOVARTIS

ABL001: Potential game changer to address unmet needs in CML with a unique mechanism of action

Asciminib (ABL001)
Chronic myeloid leukemia

- 50-70% of patients do not achieve MR[4.5] by 5 years with existing treatments[1,2]
- ABL001 is a first-in-class, potent and selective allosteric BCR-ABL inhibitor, which has a complementary mode of action with TKIs
- A potential game changer in CML which may bring more patients into deeper response faster, enabling the opportunity for TFR
- Expect to file in 3L by 2021 and in 1st line add-on in 2024



1. Hochhaus A, et al. Leukemia.2016;30:1044-1054
2. Cortes JE, et al. J Clin Oncol. 2016;34:2333-2340;

NOVARTIS

Preparing for potential first- and best-in-class launches; select launch examples in US

Piqray®[1] (BYL719)	▪ Anticipated to be launched with FDA approved companion diagnostic for PIK3CA testing (Qiagen) ▪ Entered into agreement with Foundation Medicine to develop plasma and tissue test ▪ Engaged with payers covering over 80% of the target population in the US
SEG101 (crizanlizumab)	▪ Breakthrough therapy designation granted by FDA in December 2018 for the prevention of vaso-occlusive crisis in sickle cell disease ▪ Filing on track to be completed by 1H 2019 ▪ Engagements with payers and legislators ongoing ▪ Expected to launch in H1 2020
INC280 (capmatinib)[2]	▪ Achieved Breakthrough Therapy Designation from FDA ▪ Developing NGS-based CDx for submission using tumor tissue, with plasma-based “liquid biopsy” version to follow ▪ Expected to launch in H2 2020

RTR = Real-Time Review 1. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country
2. Capmatinib (INC280) licensed to Novartis by Incyte Corporation

NOVARTIS

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			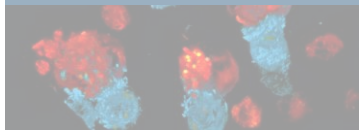	
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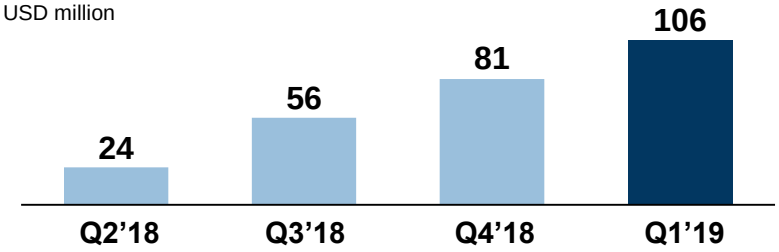
NOVARTIS

Successful launch of Lutathera® demonstrates high potential of targeted radioligand therapies (RLT)

Lutathera® strong uptake continues

Net sales
USD million

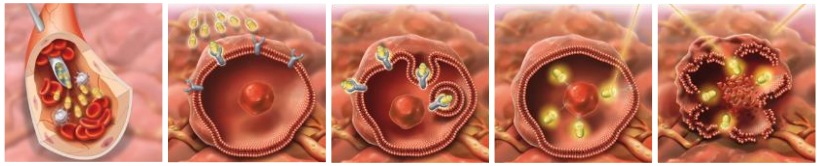
LTM[1] Q1 2019 sales: USD 267m



- Over 2,000 NET patients treated in the US since Jan 2018 launch
- Broad US payer coverage with over 85% of lives covered
- Positive momentum in EU launch w/ several favorable reimbursement decisions expected this year
- Expected to reach blockbuster status

Lutathera® is an innovative RLT

- RLT involves the systemic administration of a radiopharmaceutical to deliver cytotoxic radiation to a tumor
- The peptide is designed to target somatostatin receptors with high binding affinity



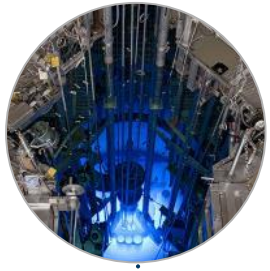
Intravenous infusion	Lutathera® binds to somatostatin receptor type 2 (SSTR2) overexpressed by GEP-NETs of the foregut, midgut, and hindgut for adults	Lutathera® is internalized into the NET cell	Lutathera® delivers radiation within the GEP-NETs cells	Radiation induces DNA strand breaks causing tumor cell death

1. Last twelve months

Novartis building leadership in RLT with highly-complex, scaled, on-demand manufacturing capability

1 Week

Order to Lu-177 supplier (1 week prior to shipment to factory)

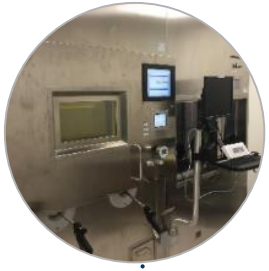


Irradiation of target (Lu-176) at Reactor to Lu-177 (6 days)

Lu-177 shipment (1 day)

1 Week

Receive Lu-177 at factory (1 day; or over weekend)



Lutathera production and shipment (Production 1-5 days after receipt)

Calibration time

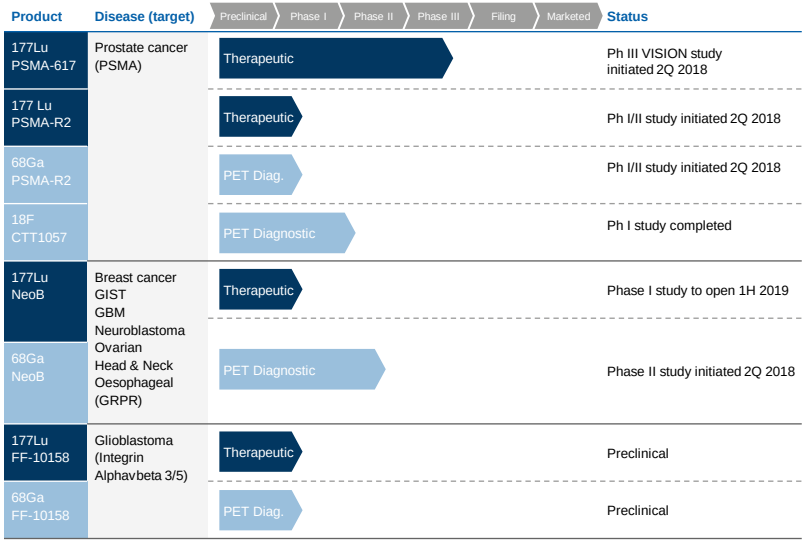
Time of injection (48 hours after end of production)

2 weeks

NOVARTIS

RLT platform with growing pipeline in solid tumors

RLT being explored across wide range of solid tumors



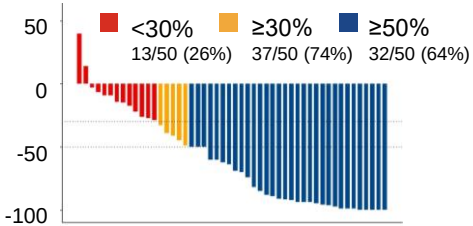
Endocyte further establishes leadership position

- **Expands Novartis RLT platform**
  - ^{177}Lu-PSMA-617 potentially first-in-class PSMA radioligand therapy in mCRPC
  - Opportunity to further develop ^{177}Lu-PSMA-617 to enter earlier lines of therapy
- **Ph3 VISION trial enrollment ongoing for ^{177}Lu-PSMA-617 in mCRPC**
  - Expected read-out and filing in 2020

NOVARTIS

^{177}Lu-PSMA-617 has strong Ph2 data in mCRPC[1,2]

PSA response % (N=50)

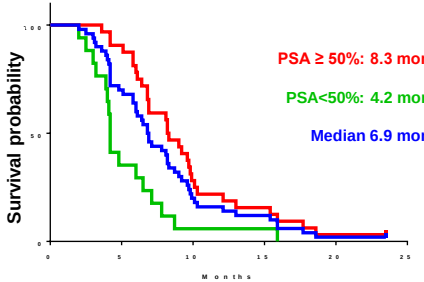


Treatment emergent adverse events attributable to ^{177}Lu-PSMA-617

	Grade 1	Grade 2	Grade 3	Grade 4
Dry mouth	29 (58%)	4 (8%)	0 (0%)	0 (0%)
Lymphocytopenia	7 (14%)	13 (26%)	16 (32%)	0 (0%)
Thrombocytopenia	11 (22%)	3 (6%)	4 (8%)	1 (2%)
Fatigue	15 (30%)	3 (6%)	1 (2%)	0 (0%)
Nausea	20 (40%)	4 (8%)	0 (0%)	0 (0%)
Anaemia	3 (6%)	6 (12%)	5 (10%)	0 (0%)
Neutropenia	6 (12%)	6 (12%)	3 (6%)	0 (0%)
Bone Pain	5 (10%)	4 (8%)	0 (0%)	0 (0%)
Vomiting	11 (22%)	2 (4%)	0 (0%)	0 (0%)
Anorexia	8 (16%)	0 (0%)	0 (0%)	0 (0%)
Dry eyes	4 (8%)	1 (2%)	0 (0%)	0 (0%)
Renal injury	4 (8%)	1 (2%)	0 (0%)	0 (0%)
Weight loss	3 (6%)	1 (2%)	0 (0%)	0 (0%)

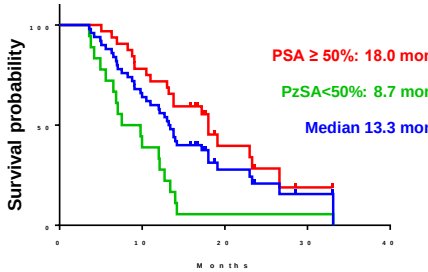
PSA PFS
50 patients

PSA ≥50% vs <50%: median PFS 8.3 vs 4.2 months (p<0.001)



Overall Survival
50 patients

PSA ≥50% vs <50%: median OS 18.0 vs 8.7 months (p=0.001)



1. Hofman, Michael et al (2019). Results of a 50-patient single-centre phase II prospective trial of Luteium-177 PSMA-617 theranostics in metastatic castrate-resistant prostate cancer. J Clin Oncol. 2019;37(suppl 7S): 228. 2. 177Lu-PSMA-617 is an investigational drug not approved for use - study protocol is not designed to confirm efficacy or safety.

NOVARTIS

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		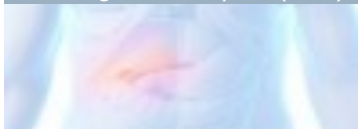	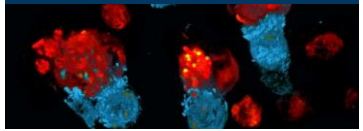	
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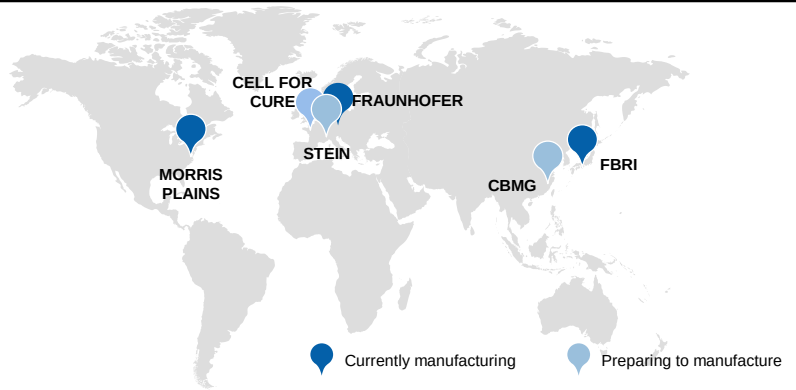
Select pipeline assets[1] and opportunities	**ABL001** in CML (3rd line & 1st line add-on) **Piqray®[2],** in PIK3CA mutated HR+/HER2- advanced breast cancer, HER2+ advanced breast cancer, TNBC **INC280** in NSCLC, single agent **SEG101** in sickle cell disease	**177Lu PSMA-617** in prostate cancer **177Lu PSMA-R2** in prostate cancer **177Lu NeoB** in breast cancer, GIST, GBM, neuroblastoma, ovarian, head & neck, esophageal	**Kymriah®** in – r/r DLBCL in 1st relapse – r/r follicular lymphoma – combinations (pembro; ibrutinib) in r/r DLBCL – 1st line high risk pediatric and young adult ALL – Adult ALL – CLL **Other targets:** BCMA&CD19, CD22&CD19, CD123, EGFRv3	**ACZ885** in – adjuvant NSCLC – 1st line NSCLC – 2nd line NSCLC **PDR001+Tafinlar®+Mekinist®** in metastatic melanoma **PDR001+LAG525+carboplatin** in TNBC **PDR001+INC280** in 2nd line NSCLC

Projects included are those with planned filings in US and/or EU 1. All select pipeline assets are either investigational or being studied for (a) new use(s). Efficacy and safety have not been established. There is no guarantee that they will become commercially available for the use(s) under investigation 2. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

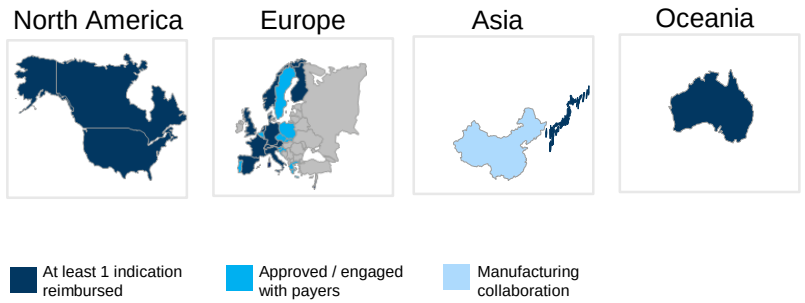
Progressing with capacity expansion and reimbursement to deliver Kymriah® to every patient in need

Global capacity expansion



- Completed CellforCure acquisition
- Wider commercial specifications are approved in EU, Switzerland, Australia, Japan, Canada
- Cleared by the FDA to further increase Morris Plains capacity

Global reimbursement expansion



- LTM[1] Q1 2019 net sales: USD 109 m
- Treated over 900 patients worldwide[2]
- Reimbursed at least with 1 indication in 16 countries

1. Last twelve months. 2. Includes patients treated with Kymriah® in both clinical trial and commercial settings.

NOVARTIS

Select pipeline examples for cell therapy platform

KYMRIAH® (tisagenlecleucel) Dispersion for IV infusion

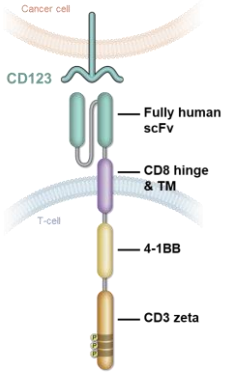
Pipeline of 10 clinical programs and 4 FIH, with large pre-clinical effort

CAR-T type	Indication	Phase 1	Ph 2/Pivotal	Phase 3	Submitted	Approved
CD19 CAR-T	Pediatric & young adult r/r ALL					US, EU
CD19 CAR-T	r/r DLBCL					US, EU
CD19 CAR-T	DLBCL in 1st relapse			Started 2019		
CD19 CAR-T	r/r FL		Started 2018			
CD19 CAR-T	r/r DLBCL in combination with pembrolizumab	Started 2018				
CD19 CAR-T	Adult r/r ALL			Starting 2019		
CD19 CAR-T	r/r CLL combination with ibrutinib		Starting 2019			
CD19 CAR-T	Pediatric NHL		Started 2019			
CD19 CAR-T	1st line high risk pediatric and young adult ALL		Starting 2019			
CD19 CAR-T	r/r DLBCL combo with ibrutinib		Starting 2019			
Other targets (UPenn partner)	BCMA&CD19, CD22&CD19, CD123, EGFRv3	Started 2018				

NOVARTIS

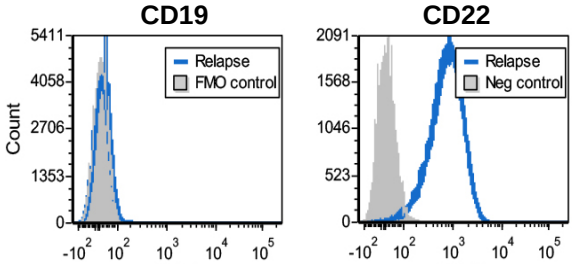
Advances in novel CAR-Ts as monotherapies and combination strategies in collaboration with UPenn

aCD123 CAR-T for AML



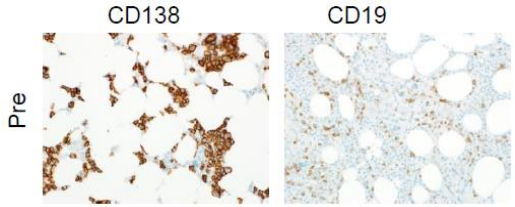
- JEZ567: lentivirally transduced T cells expressing anti-CD123 chimeric antigen receptors in r/r adult AML
- Opened Dec 2018, 2 patients treated and no safety issues

CAR-T aCD22 + CAR-T aCD19 combo for ALL



- JJO686 + LXG250 in r/r adult and ped ALL to prevent resistance
- Opened Oct 2018, 6 patients treated with aCD22 monotherapy and no safety issues
- Clinical activity to be presented at upcoming meeting

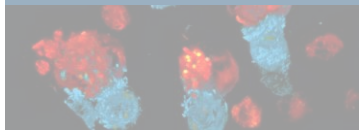
CAR-T aBCMA + CAR-T aCD19 combo for MM



- MCM998 + LXG250 in MM, opened June 2018
- Phase A – r/r MM responding to last line of therapy – 6 patients treated, no new safety signals
- Phase B – randomized, upfront MM – 2 patients treated

NOVARTIS

Deep pipeline across four distinct platforms is expected to continue driving differentiation and growth

	Targeted therapies (TT)	Radioligand therapies (RLT)	Cell & Gene	Immunotherapies (IO)
				
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Projects included are those with planned filings in US and/or EU become commercially available for the use(s) under investigation

1. All select pipeline assets are either investigational or being studied for (a) new use(s). Efficacy and safety have not been established. There is no guarantee that they will
2. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

Novartis is taking a rigorous approach to IO assets for development, setting a high bar for advancement

- Taking a rigorous approach to prioritizing assets for development
- Looking for single agent activity, or synergetic combinations with appropriate control arms

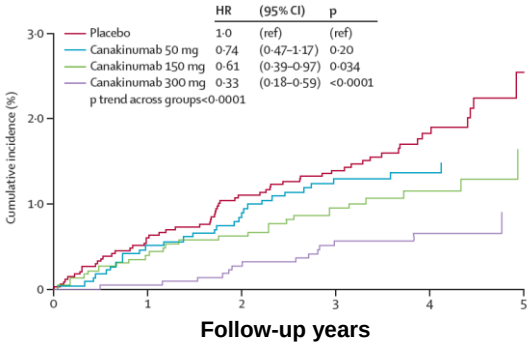
Asset	Indication	Phase 1	Phase 2	Phase 3
PDR001+Tafinlar®+Mekinist®	Melanoma			
ACZ885	NSCLC, 1st line			
ACZ885	NSCLC, 2nd line			
ACZ885	NSCLC, adjuvant			
Lutathera® + nivolumab	SCLC	Started in 2017		
PDR001+LAG525+carboplatin	TNBC	Started in 2018		
PDR001+INC280	2nd line NSCLC	Started in 2018		
Kymriah® + pembrolizumab	r/r DLBCL	Started in 2018		

NOVARTIS

ACZ885 (canakinumab) reduced lung cancer incidence and mortality based upon exploratory analysis in CANTOS

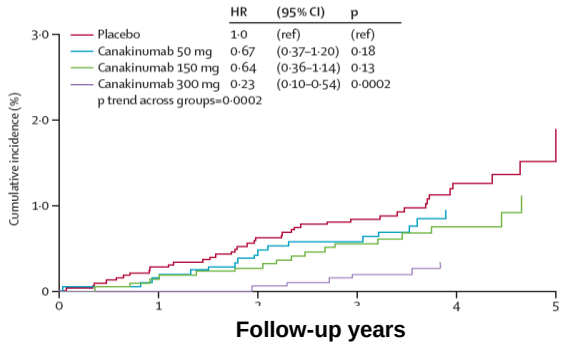
Lung cancer incidence

Dose-dependent effect, 67% relative risk reduction (canakinumab 300mg)



Lung cancer mortality

Dose-dependent effect, 77% relative risk reduction (canakinumab 300mg)



>70% baseline samples with detectable ctDNA with lung cancer driver mutations (p53, EGFR, etc.)

- In agreement with FDA in 2010, incident cancers were adjudicated by a blinded independent committeee of Oncologists
- Data on incident cancers including cancer deaths were collected as (serious) adverse events and analyzed in a prospective fashion

Source: Ridker PM, et al. Lancet. (2017); DOI: 10.1016/S0140-6736(17)32247-X

NOVARTIS

Development programs for three Ph3 trials (CANOPY) of canakinumab in NSCLC on track

Indication	Ph3 trial name and code	Patient population	Trial design	Planned filing
Adjuvant NSCLC	CANOPY-A NCT03447769	High-Risk Stage II-III	Canakinumab vs. placebo (N=1500 with 1:1 randomization) after post-resection chemotherapy	2022
1st line mNSCLC	CANOPY-1 NCT03631199	No prior therapy Stage IIIb or IV, Squamous or Non-Squamous, No EGFR, ALK alterations	Platinum doublet chemotherapy and pembrolizumab with or without canakinumab (N=627 with 1:1 randomization)	2021
2nd line mNSCLC	CANOPY-2 NCT03626545	Stage IIIb or IV, previously treated with platinum-based doublet chemotherapy and PD-(L)1 inhibitor, No EGFR, ALK alterations	Docetaxel with or without canakinumab (N=226 with 1:1 randomization)	2021

NOVARTIS

Uniquely positioned to create new standards of care through novel immuno-therapy and combinations

Novel Immuno-therapy (IO)	
Solo or combo	TGFβ (NIS793) +/- PD1 Adenosine R (NIR178) +/- PD1 CD73 (NZV930) +/- PD1 Het IL-15 (NIZ985) +/- PD1 TLR7 ISAC (NJH395) +/- PD1 TLR7 (LHC165) +/- PD1 LAG3 (LAG525) +/- PD1 Degrader (DKY709) +/- PD1 TIM3 (MBG453) +/- PD1 TIM3 (MBG453) + HMA +/- PD1 STING (MIW815)[1] +/- PD1 or CTLA4 CSF-1 (MCS110) +/- PD1 CSF-1R (BLZ945) +/- PD1
Solo	PD1 (PDR001) CD123 x CD3 (SQZ622)[2] GITR (GWN323)

Novel Combinations[4]	
IO/IO	CD73 + Adenosine R (NIR178) +/- PD-1 in multiple solid tumors PDR001 + TGFβ Multiple Solid Tumors
CAR-T/IO	CAR-T EGFRviii + pembrolizumab in Glioblastoma Kymriah® + pembrolizumab in DLBCL
TT/IO	Tafinlar® + Mekinist® + PDR001 in Melanoma MET (INC280) + PDR001 in Lung Cancer SHP2 (TNO155) + PDR001 in Lung Cancer
RLT/IO	Lutathera® + PD1 in Neuroendocrine Tumors PSMA-617 + PD1 in mCRPC[3]

1. Collaboration / licensing with Aduro 2. Collaboration / licensing with Xencor 3. Collaboration with Peter MacCallum Cancer Centre. 4. Selected trials

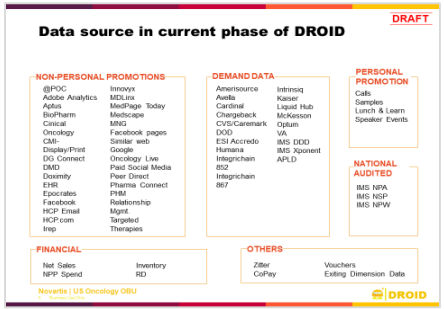
NOVARTIS

Novartis Oncology leveraging data and digital to enable customer engagement

DROID ENGINE

DROID[1] initiative is creating a platform to integrate high-quality data and provide actionable insights

DROID
Data Repository for Optimization, Insights and Decision-Making



Single "data lake" **repository** that will incorporate 90+ external and internal high-quality data sources

KPI	Description
Attributed Sales (TRx and $)	Sales (TRx) attributed to marketing activities
Percent Contribution to Sales	Percent Sales (TRx) attributed to marketing activities and base. Contribution for marketing activities plus the base add up to 100%.
Percent Contribution to Sales Growth	Marketing contribution to percent sales growth. For instance, the monthly sales growth is 4% and 2% (half of the growth) is attributed to marketing activities.
Average Marketing Return on Investment	Attributed $ sales / marketing spend
Marginal Return on Investment	Additional $ sales due to incremental (next dollar) investment
Marketing Effectiveness (Per Exposure)	Attributed $ sales / marketing exposure
Marketing Effectiveness (Per Engagement)	Attributed $ sales / marketing engagement
Sales impact over time	Quantification of the sales impact in terms of number of weeks/months after promotion ends

Faster, reliable assessment of 120 KPIs & complex algorithms to **translate data into predictive insights**

User-centric visualization to more rapidly identify actionable opportunities and solutions; all oncology brands are included

1. DROID is an acronym that stands for data repository for optimization, insights and decision-making

NOVARTIS

Conclusion - Oncology

- Unique position across 4 platforms with expertise in innovating within and across the platforms
- Growing our current and future in-market blockbusters and focused on success of new launches
- Robust pipeline across diverse platforms to create innovative medicines, alone and in combination, to treat cancer

NOVARTIS

Novartis AG
Investor Relations

Meet Novartis Management
Research overview

May 23, 2019

NOVARTIS

Leading center of therapeutics discovery research with proven record of delivering innovative therapies

1. Deep pipeline of ~90 new molecular entities prioritized and optimized for transformative potential and resourced for competitive advantage

2. Advanced therapy platforms and technologies, including targeted protein degradation, cell & gene therapy and expansive chemical libraries

3. Focused research strategy leveraging internal and external innovation, fueled also by strategic out-licensing to capture ROI and enable patient access

NOVARTIS

NIBR

6,000
Scientists

340
Discovery programs

8
Disease areas

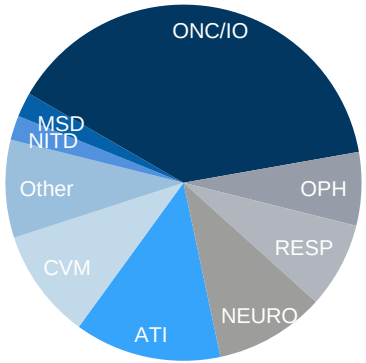
~90
New molecular entities

USD 2.6bn
Research & early development

NOVARTIS

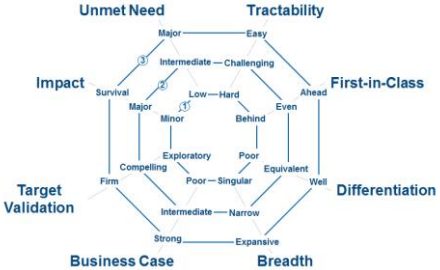
Portfolio perspective

Strategic disease area leadership



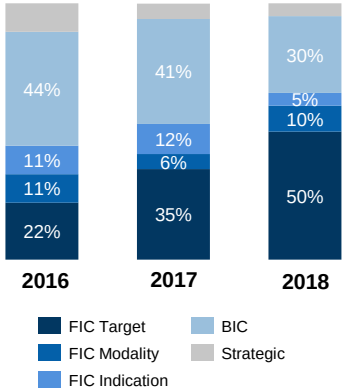
Focused commitment
in our disease areas

Disciplined project selection



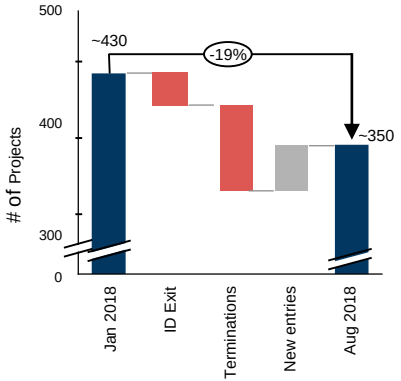
Critically evaluated against
expanded set of parameters

Best at first-in-class



With emphasis on pursuing
transformative innovation

Ruthless prioritization

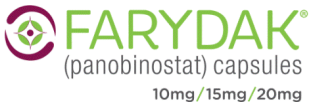


And commitment to making decisions
that enable focused resourcing

ONC/IO - Oncology/Immuno-Oncology; OPH - Ophthalmology; RESP - Respiratory; NEURO - Neuroscience; ATI - Autoimmunity, Transplantation, and Inflammation; CVM - Cardiovascular Metabolic; NITD - Novartis Institutes for Tropical Diseases; MSD - Musculoskeletal Diseases; FIC - First-in-Class; BIC - Best-in-Class; ID - Infectious Diseases

NOVARTIS

A productive internal therapeutics engine



1. Kymriah® and Gilenya® were in-licensed into NIBR pre-PoC

NOVARTIS

NIBR vital to delivering a promising pipeline through origination, execution and evaluation of external opportunities

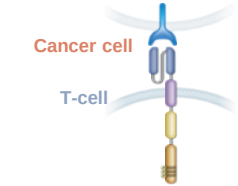
Oncology	Cardio-Metabolic	Neuroscience	IHD	Respiratory	Ophthalmology	Global Health
						
Kymriah® New indications	**LNP023** Renal disease	**Gilenya®** MS	**Cosentyx®** nrAxSpA	**Fevipiprant** (QAW039) Asthma	**Brolucizumab** (RTH258) nAMD, DME	**KAF156** Malaria
Piqray®[7] (BYL719) Breast cancer	**Entresto®** HFpEF	**Mayzent®** SPMS	**Tropifexor** NASH	**CSJ117** Asthma	**Lucentis®** AMD	**KAE609** Malaria
ACZ885, Capmatinib (INC280) Lung	**TQJ230** High Lp(a)	**LMI070** SMA	**Ligelizumab** CSU / CIU	**QBW251** COPD	**Luxturna®** RPE65 mutations	**Crizanlizumab** (SEG101) Sickle cell disease
PDR001 Combo Melanoma		**CNP520** Alzheimer's	**LOU064** CSU	**Xolair®** Asthma	**UNR884** Presbyopia	
^{177}Lu-PSMA-617 mCRPC		**Aimovig®** Migraine	**CFZ533** Transplant / Sjögren's	**QVM149** Asthma	**ECF843** Dry eye	
VPM087 CRC / RCC		**Zolgensma®[1]** SMA	**VAY736** Multiple diseases		**SAF312** COSP	
Lutathera® NET		**Ofatumumab** (OMB157) Relapsing MS	**VAY785** NASH			
			ZPL389 Atopic dermatitis			
			MOR106 Atopic dermatitis			

1. Aimovig® is developed in collaboration with Amgen. 2. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities. 3. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions. 4. Luxturna® marketed ex-US. 5. Per license agreement, EirGenix Inc. is responsible for development and manufacturing; Sandoz has rights to commercialize in all markets except China and Taiwan. 6. Per license agreement, Gan&Lee is responsible for development and manufacturing; Sandoz has rights to commercialize in EU, US, Switzerland, Japan, South Korea, Canada, Australia and New Zealand 7. The brand name Piqray® has been provisionally approved by the FDA for the investigational product alpelisib (BYL719), but the product itself has not been approved for sale in any country

NOVARTIS

Technology platforms accelerating drug discovery

CAR-T

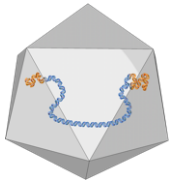


KYMRIAH (tisagenlecleucel)

CRISPR

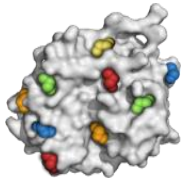
Intellia THERAPEUTICS · CARIBOU BIOSCIENCES

AAV



HOMOLOGY Medicines, Inc. · avexis

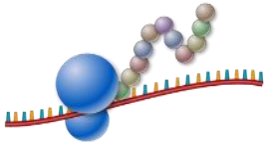
Covalent Binders



Berkeley

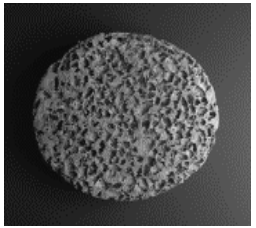
DNA Encoded Libraries

mRNA

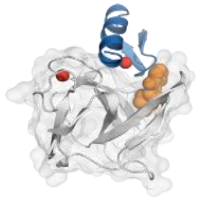


DARPA

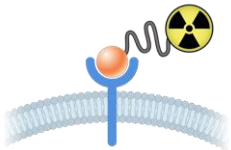
Novel IO Rx Delivery



Targeted Protein Degradation

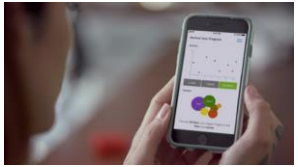


Radiopharmaceuticals



Advanced Accelerator Applications

Digital Therapeutics



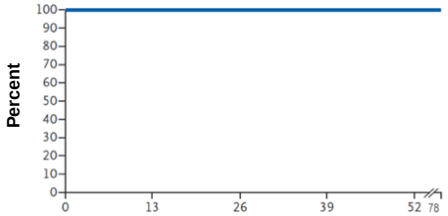
PEAR THERAPEUTICS

NOVARTIS

Novartis cell & gene therapy

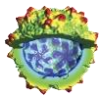
AAV[1]

Zolgensma®
Spinal muscular atrophy



Probability of event-free survival

avexis Spark THERAPEUTICS



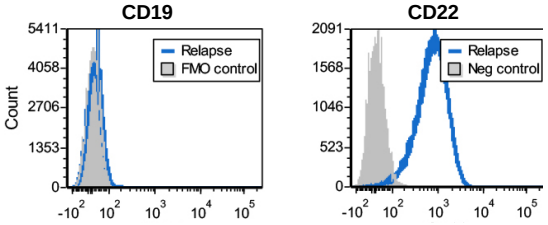
Recombinant AAV9 Capsid Shell

Neuroscience

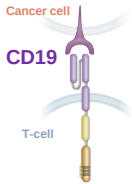
Ophthalmology

CAR-T[2]

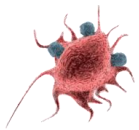
CD22 CAR-T (JJO686) in Ph1 studies in combination with CD19 CAR-T (LXG250) to prevent resistance



CD19- relapse patient



Penn Intellia THERAPEUTICS



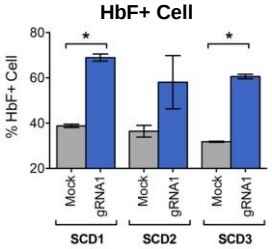
B-Cell malignancies

AML

Solid tumors

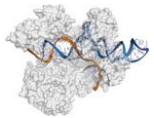
CRISPR[3]

Increase in F-cell number and HbF expression upon editing of SCD patient PB derived CD34+ cells



N=3/experiment, 4 independent experiments, data show mean+SEM

CARIBOU BIOSCIENCES Intellia THERAPEUTICS



CRISPR Machinery

Hematology

Ophthalmology

 1. Mendell JR, et al, N Engl J Med 2017; 377:1713-1722 Data is investigational. Efficacy & safety not yet established. 2,3. Data is investigational. Efficacy & safety not yet established.

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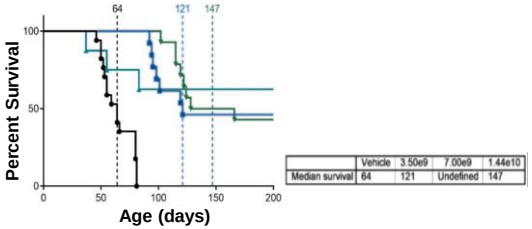
Establishing leadership in AAV gene therapy

AVXS-201[1]

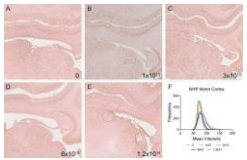
Rett Syndrome

Treatment of male rett mice with GMP AVXS-201 increases survival



	Vehicle	3.50e9	7.00e9	1.44e10
Median survival	64	121	Undefined	147

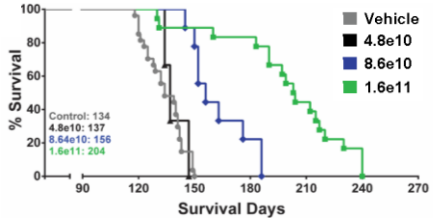
MeCP2 Immunohistochemistry in the Brains of Control and AVXS-201–Treated NHPs



AVXS-301[2]

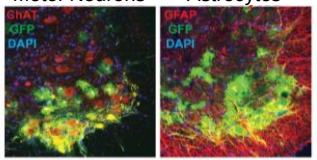
SOD-1 Amyotrophic lateral sclerosis (ALS)

AVXS-301 ICV dose response



AAV9-GFP Spinal cord transduction

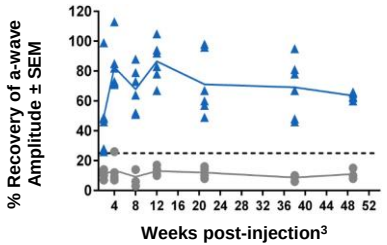
Motor Neurons Astrocytes

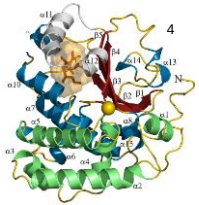


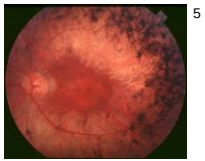
CPK850

Retinitis pigmentosa (RP)

Gene therapy improved dark adaptation in a mouse model of RP







1. “Efficacy and safety in mice and non-human primates of csf-delivered AVXS-201 for the treatment of Rett syndrome,” K. Foust, et al. ASGCT, 2019. Data is investigational. Efficacy & safety not yet established. 2. “Intrathecal administration of AVXS-301 for amyotrophic lateral sclerosis: survival extension and SOD1 reduction in mice and nonhuman primates,” G. Thomsen, et al. ASGCT, 2019. Data is investigational. Efficacy & safety not yet established 3. Choi et al., Mol Ther Methods Clin Dev. 2015 Data is investigational. Efficacy & safety not yet established. 4. He et al., PNAS, 2009. 5. Hamel, Orphanet Journal of Rare Diseases 2006.

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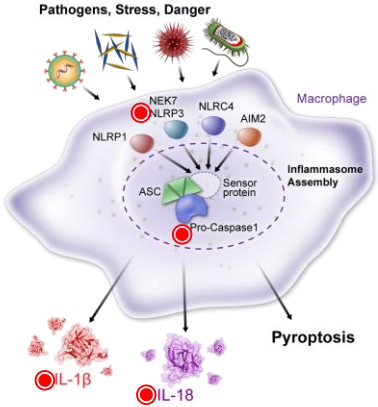
The inflammasome

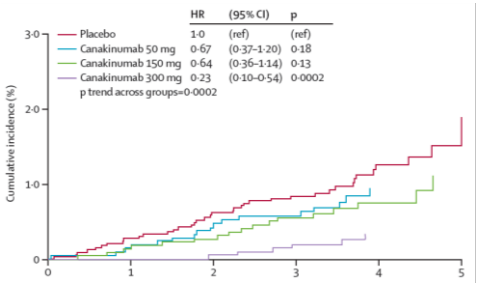


The **NLRP3** (nucleotide-binding domain, leucine-rich repeat-containing receptor pyrin domain containing 3) pathway plays a critical role in the body's innate immune system, serving as a danger sensor. When activated, NLRP3 triggers an inflammatory response via the assembly of a multi-protein complex called the inflammasome

IL-1β Inhibition as cancer therapy

Dose dependent risk reduction with canakinumab in fatal lung cancer incidence of up to 77%

Cumulative incidence fatal lung cancer[1]

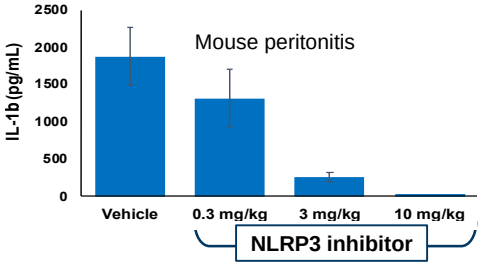


Hypothesis: Inhibition of IL-1β blocks the tumor-promoting effects of myeloid cells in the tumor microenvironment, inhibiting cancer cell growth and metastasis, and promoting a protective immune response augmented by PD-1 inhibition

Novartis Inflammasome pipeline

Description	Status	Indications
Canakinumab; Anti-IL-1β ACZ885	Ph3	Excl. marketed indications: Lung cancer, Bechet
Gevokizumab; Anti-IL-1β VPM087	Ph2	Colorectal, gastroesophageal, renal cell cancers
Anti-IL-18	Ph1	TBD
IFM2427 NLRP3	Ph1	TBD
NLRP3 LMW	Research	TBD

Identification of potent inhibitors with excellent overall profile[2]



1. Glynn et al., | Lancet | Vol 390 | October 21, 2017 Data is investigational. Efficacy & safety not yet established.
2. Data is investigational. Efficacy & safety not yet established.

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Novartis Oncology – balanced mid-stage pipeline

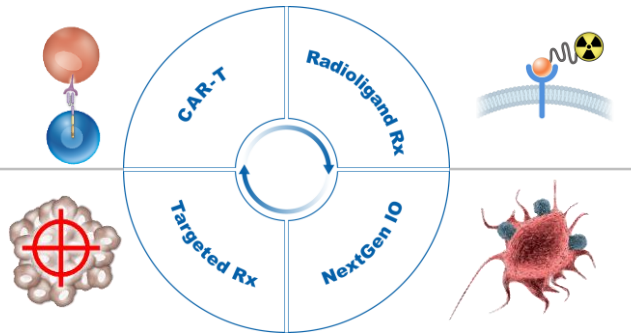
Uniquely positioned to create new standards of care through combinations of treatment approaches

Targeted Therapies	Immunotherapies	CAR-T	Radioligand Therapy
Tafinlar® + Mekinist®	**PDR001**	**Kymriah®**	**Lutathera®** (Somatostatin Receptor)
Capmatinib (INC280) (cMet)	**Anti-IL-1β**	**BCMA**	**PSMA-617 & PSMA-R2** (Prostate-Specific Membrane Antigen)
LXH254 (B,C Raf)	**CSF-1**	**CD22**	**NeoB** (Gastrin-Releasing Peptide Receptor)
TNO155 (SHP2)	**Anti-TGFβ**	**CD123**	**FF10158** (Integrin)

Potential next wave combinations - Integration of therapeutic approaches

Kymriah® + Pembro
EGFRviii + PDR001

Tafinlar® + Mekinist® + PDR001
INC280 + PDR001
LXH254 + Trametinib
SHP2 + PDR001



Lutathera® + Nivolumab
PSMA-617 + Pembro

Jakavi® + TGFβ
PDR001 + TGFβ

Selected compounds

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External innovation

300+ academic and 50+ industry alliances focused on areas of mutual scientific interest

Alliances bring ideas, capabilities and talent to complement internal innovation

Few companies bring scientific and platform expertise along with resources to purse external innovation so ambitiously

Bringing outside innovation inside

CODA BIOTHERAPEUTICS

ayala targeted therapies

ORIONIS BIOSCIENCES

avexis

PEAR THERAPEUTICS

Philogen innovating targeting

Advanced Accelerator Applications

ENDOCYTE

New paths to patients

resTORbio

magenta THERAPEUTICS

BOSTON pharmaceuticals

EVEREST MEDICINES

IDEAYA BIOSCIENCES

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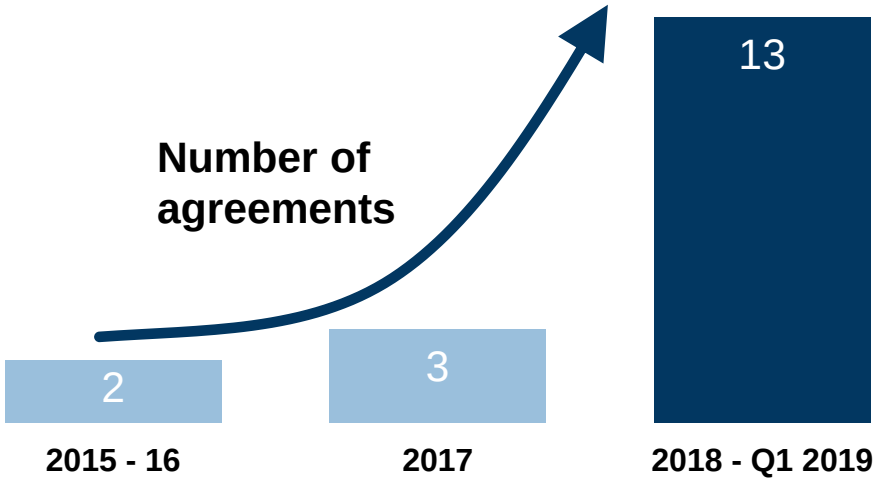
Strategic out-licensing to capture return on investment and enable patient access

18 agreements from 2015 to date

- Significant cash upfronts
- Equity stake
- Upside potential from future royalties



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Conclusion - Research

- Deliver transformative innovation and curate a first-in-class pipeline
- Partner of choice, unbiased acceleration of the most promising internal and early external opportunities
- Deploy a suite of advanced technology platforms in an effort to drug targets that were previously considered “undruggable”
- Sustain focus on targeted cancer therapies while expanding into new modalities alone and in combination

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Novartis AG
Investor Relations

Meet Novartis Management 2019
Sandoz

May 23, 2019

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Sandoz a global leader in generics and biosimilars, transforming to stay ahead of the competition

1. Sandoz a global leader in generic and biosimilar medicines, focusing on higher-margin differentiated products. Ex-US >70% of sales, driving gross margin expansion

2. Biosimilars remain key global growth driver
   Leading with 8 biosimilars on the market and 10+ in the pipeline

3. Sandoz becoming leaner and more agile to drive sustainable sales and margin growth in a rapidly-moving generics environment

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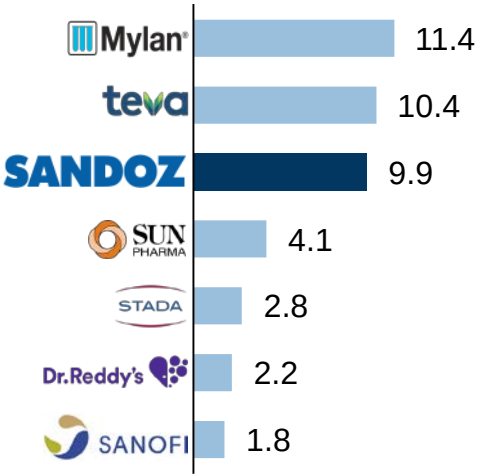
Sandoz outperforming key competitors in a challenging and fragmented environment

Top global Gx players
by 2018 net sales (USD bn)[1, 2]



	Growth USD %	Growth cc%
Mylan	-4	-4
teva	-12	-11
SANDOZ	-2	-3
SUN PHARMA	+3	+5
STADA	+6	+5
Dr.Reddy's	Flat	+2
SANOFI	-12	-1[3]

Global generics industry 2018[2]

Global USD 224bn sales (+3% vs. PY)

- US USD 71bn (-4%)
- Ex-US USD 153bn (+6%)

1. Sales based on published figures; absolute net sales for Sun, DRR, Stada and Sanofi were converted to USD using internal Novartis exchange rates; growth rates in cc are **organic** growth estimates, internal analysis. All trademarks are the property of their respective owners. 2. IQVIA figures, including Bio and OTC. 3. Sanofi organic growth rate includes negative impact of Zentiva divestment, while estimated cc growth rate is inorganic only.

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Sandoz shaping its portfolio to drive sustainable and profitable growth

Sandoz portfolio (sales 2018)			Expected market growth (CAGR 2018-23, approximate[4])
Biopharmaceuticals[1]			
	1.4	USD bn Sandoz sales	15%
	8	Products in market	
	10+	Assets in pipeline	
	80	USD bn originator product sales in scope	
Differentiated Therapeutics			
	~30-35%	of Sandoz Retail Gx sales, mostly branded Gx[2]	7%
	1st	Prescription digital therapeutics in US	
	20+	Value-added medicines[3] in development	
Standard generics			
	~65-70%	of Sandoz Retail Gx sales	1%
		Deep global development & production expertise	
		Strong capabilities in select segments (e.g. injectables)	

1. Biopharmaceuticals comprises biosimilars, contract manufacturing and Glatopa®. 2. Branded Gx are products that are promoted / branded, definition is internal and largely dependent on market type rather than molecule. 3. VAMs are known molecules that offer improvements, address unmet needs and add value by a) improving efficacy, safety or tolerability, b) Improving administration, ease of use, c) offering new therapeutic use (indication, population). Include 505(b)(2) in US. 4. Internal estimates.

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Sandoz is outperforming competition in Europe – Region Europe delivers 50% of total Sandoz sales

#1 off-patent medicines company with **11.3%** market share[1]

#1 or #2 generics player in **11** geographies[2]

Growing above market across **14** countries

European leader in **six** therapeutic areas[3]

Strong brands across Rx, OTC and biosimilar markets

PORTFOLIO SEGMENTS

Biosimilars

- Maximize value of launches
- Continue to drive market share of in-line brands

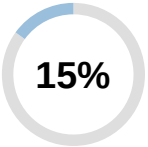
Differentiated Therapeutics

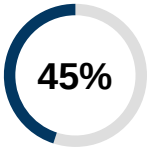
- Clear portfolio choices
- Expand presence in Western Europe
- Build OTC in markets with strong existing presence

Standard Generics

- Broad portfolio, covering >80% of market needs
- Competitiveness in future LoEs

% Total sales





1. EU Gx Market (Rx + OTC + Bio), excl. Mature Brands 2. 11 geographies represent 48% of EU Gx market sales 3. Cardiovascular and Metabolism, Pain, Oncology, Hormones, Derma, Transplant. Source: IQVIA Midas data (Feb. 19 except for growing above market: Full year 18), Internal sales FY 2018.

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Sandoz focused on a five-point transformation plan

Portfolio & Innovation Strategy

Shift portfolio to more differentiated areas

Portfolio Delivery

Ensure timely delivery to key markets

Cost-competitive & Flexible Supply

Drive COGS and generic mindset to increase margins

Resource Allocation

Agile M&S allocation in fast-changing markets

Operating Model & Governance

Simplify how we work

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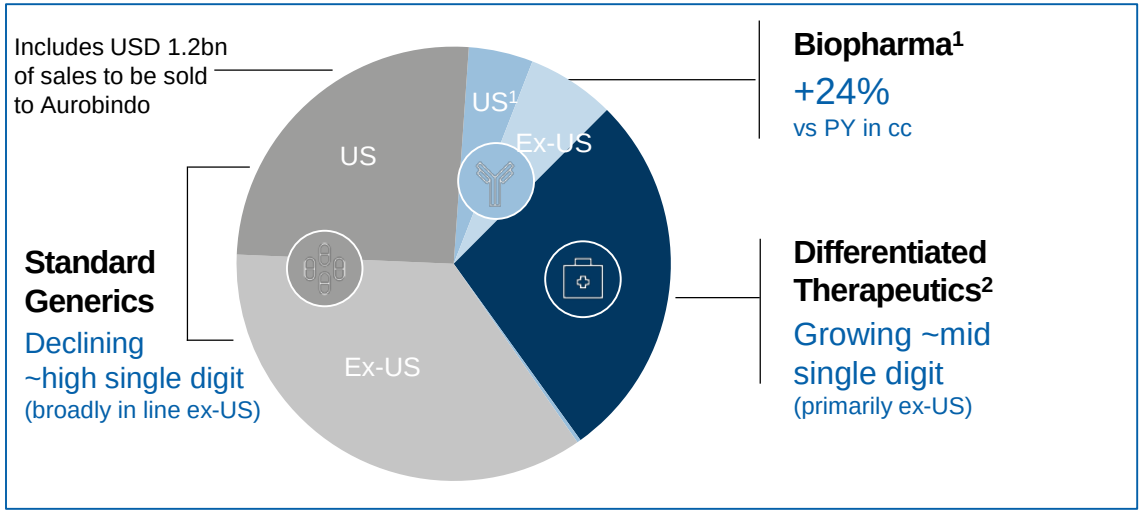
Sandoz continues to drive growth in Biopharmaceuticals and Differentiated Therapeutics

FY 2018 net sales USD 9.9bn

Illustrative sales split



Global leader in biosimilars, eight molecules on market

Global #1 in Gx oncology and antibiotics

#1 in Europe and #1-3 in >20 countries

1. Biopharmaceuticals comprises biosimilars, contract manufacturing and Glatopa®. 2. Differentiated Therapeutics comprise branded Gx, OTC, Value Added Medicines (VAMs), Digital Therapeutics (DTx).

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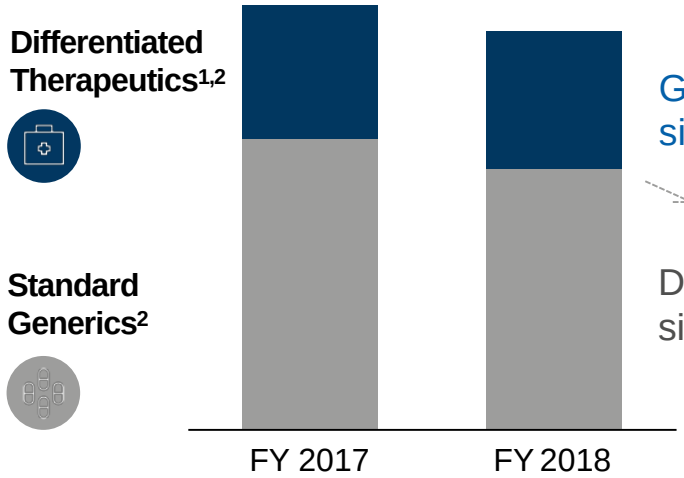
Sandoz driving growth in differentiated therapeutics and emerging markets, offset by US price erosion

Retail net sales
Illustrative sales split and growth



Growing ~mid single digit

- Growth driven by Europe and emerging markets
- Maintaining strong position across established markets

Declining ~high single digit

- Broadly in line ex-US
- Focusing US on complex generics and biosimilars, plus opportunities in digital therapeutics and VAMs; plan to divest standard Gx segments to Aurobindo

1. Differentiated Therapeutics comprise branded Gx, OTC, Value Added Medicines (VAMs), Digital Therapeutics (DTx). Standard Gx comprises other products (excluding Biopharma). 2. Sales by segment are approximate, non-audited figures.

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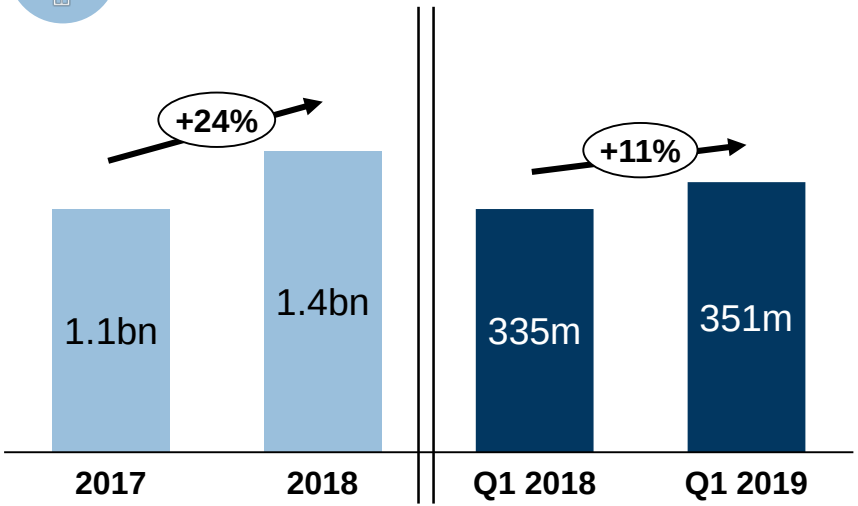
Biopharmaceuticals[1] continue to grow double-digit

Biopharma y-o-y sales growth
USD, % cc



- Europe growing high double-digit; Q1 slower due to US price competition
- Ongoing progress in all three key areas: oncology, immunology, endocrinology
- Omnitrope®, Binocrit® and Zarzio®/Zarxio® all #1 biosimilar globally
- Zarxio® the first US biosimilar, tracking ahead of originator since April 2018[2]
- Pipeline continues to advance, including strategic deals

1. Biopharmaceuticals comprises biosimilars, contract manufacturing, Glatopa®. 2. IQVIA

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Sandoz a leader in biosimilars; eight marketed products and a broad pipeline

	2006-2016	2017	2018	2019
EU / ROW	Omnitrope® Somatropin BINOCRIT® epoetin alfa ZARZIO® filgrastim	RIXATHON® rituximab Erelzi® etanercept	Hyrimoz® adalimumab Zessly® infliximab Ziextenzo™	ROW rollout Erelzi® etanercept RIXATHON® rituximab Hyrimoz® adalimumab Ziextenzo™
US	Omnitrope® Somatropin ZARXIO® (filgrastim-sndz)			Pending approval Ziextenzo™ Pending litigation Erelzi® etanercept
	Launch			

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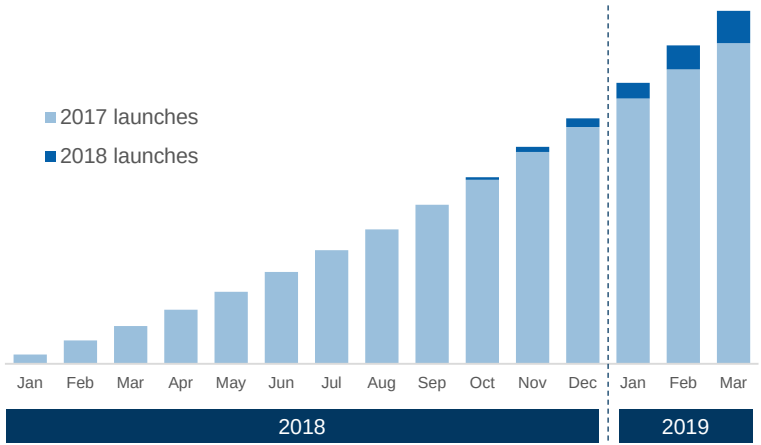
Biosimilar launches continue to drive Sandoz growth

Cumulative net sales from launches

USD million (illustrative only)



Erelzi etanercept

RIXATHON

Hyrimoz adalimumab

Zessly infliximab

Ziextenzo™

Leading pipeline

- **Strong pipeline of 10-plus molecules**, targeting ~USD 80bn in originator net annualized value
- Focus on **oncology, immunology and endocrinology**
- Further expanding portfolio through **partnerships[1]:**
  - Three insulins with Gan&Lee[2]
  - Several new molecules via collaboration with Biocon
  - Collaboration with EirGenix on biosimilar trastuzumab

1. Rights for each deal are for defined geographies 2. Glargine: Lantus®; Lispro: Humalog®; Aspart: NovoLog® (US), NovoRapid® (EU).

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Sandoz continues to be optimistic on the global biosimilar market outlook

Critical for healthcare systems

- Accessibility
- Affordability
- Sustainability

Opportunities

- Continued LoE opportunities (approx. USD 80bn in originator sales, 2019-2028)[1]
- Improving EU uptake, EGM potential
- Legislative reform potential in US (e.g. Medicare reimbursement)
- Positive early performance in Japan

Challenges

- Tender market dynamics
- US legislative and regulatory barriers
- Need to continue educating patients and physicians about biosimilars, particularly in the US, which has seen less biosimilar launches than Europe

1. Internal analysis: USD 10bn through 2018, USD 8bn 2019-21, USD 70 bn 2022-28. Represents value of molecules in our pipeline, not total market.

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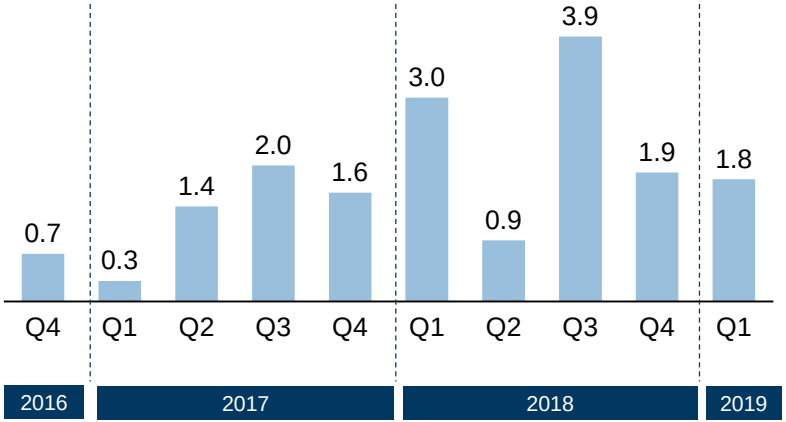
Sales growth ex-US and product mix drive 10 straight quarters of core gross margin expansion[1]

Core gross margin
in ppts vs. PY



Total **+5 ppts** core gross margin improvement since Q4 2016

- Ex-US sales growth (+4%, 72% of 2018 sales) fueled by higher-margin biosimilars
- Underlying Retail sales growth ex-US (+2%[2]):
  - Driven by all regions
  - Steadily moving to more differentiated portfolio
- Acting decisively to drive profitable growth in new US environment

1. Including segments planned to be divested to Aurobindo. 2. Underlying growth, excl. one-timers (i.e. items that are included in reported gross margin, but not in core gross margin). Incl. one-timers: +0%.

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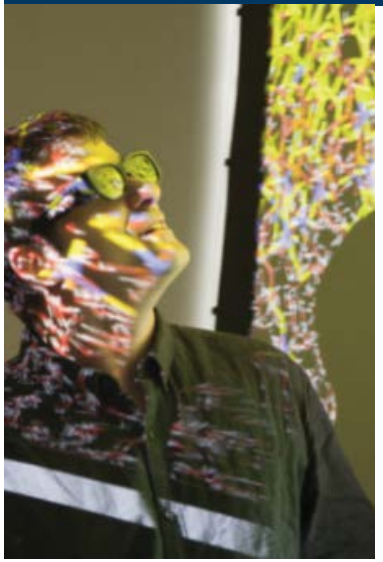
Sandoz leading in data and digital, aiming to drive further productivity and sales

Pioneering in digital therapeutics

- First FDA-cleared prescription digital therapeutic (reSET®[1])
- reSET-O®[2] launched in US in January 2019
- Working with Pear™ to expand access to these new cognitive therapies

Pioneering use of AI in tender markets



- Optimizing bidding strategies in tender markets by use of advanced algorithms
- Pilot in Germany already driving sales and margin
- Potential to create significant AI-based competitive advantage

1. For treatment of Substance Use Disorder. 2. For treatment of opioid use disorder

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Sandoz becoming leaner and simpler, in order to invest in innovation and growth tomorrow

Laying strong foundations

- Simplifying how we operate, with workforce **reduction of ~900 FTEs** (~7% of total workforce)[1]
- Aiming to realize **productivity gains** across total functional costs by end 2020
- **Streamlining development network**, with planned closure of Holzkirchen Development Center[1]

Building the future

- **Driving greater efficiency in manufacturing**[2], to achieve significant longer-term savings
- **Driving digital enablement** across every aspect of our business
- **Reinvesting into growth areas** and **securing core business** competitiveness – expected to drive core ROS towards mid-20s
- Creating a **sustainable growth mindset**

1. These are proposed plans for cost reduction, pending agreement by local works councils. 2. Part of USD 2bn manufacturing savings target for Novartis Group.

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Conclusion – Sandoz

- Transforming to succeed long-term in a rapidly-evolving global generics market
- Expects to continue to drive growth in biosimilars and Differentiated Therapeutics
- Continues to grow sales ex-US and margin globally

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References: Overview

Slide	Footnotes
Focused on medicines, diversified across therapeutic areas and platforms	1. Revenue split based on EvaluatePharma data for FY 2018. Revenue from medicines includes sales reported as Rx or Gx. Novartis revenue excludes Alcon and Sandoz proposed US portfolio sale to Aurobindo. 2. TA count if >$500m only 3. Blockbusters defined as sales >$1bn in Rx only 4. Presence = company expected to market a product in cell therapy, gene therapy and radioligand therapy (RLT) by 2024, according to EvaluatePharma; for RNA interference therapy (RNAi), presence based on review of available public information (EvaluatePharma, annual reports, press releases).
Building depth across our core therapeutic areas	1. Aimovig® is developed in collaboration with Amgen. 2. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities. 3. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions. 4. Luxturna® marketed ex-US. 5. Per license agreement, EirGenix Inc is responsible for development and manufacturing; Sandoz has rights to commercialize in all markets except China and Taiwan. 6. Per license agreement, Gan&Lee is responsible for development and manufacturing; Sandoz has rights to commercialize in EU, US, Switzerland, Japan, South Korea, Canada, Australia and New Zealand
Growth prospects	1. Chart reflects new focused medicines company, which excludes Alcon and Sandoz proposed US portfolio sale to Aurobindo from all periods, and does not include impacts from Xiidra announced acquisition. 2. Illustrative sales assume no Gilenya® US generic entry in the forecasted period. Gilenya® US compound patent expiration August 2019; dosing regimen patent expiration December 2027. 3. In collaboration with Amgen; companies co-commercialize in the US (Amgen to book Sales to third party), Novartis has exclusive rights in rest of world excluding Japan. 4. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities
10+ potential blockbuster launches	1. Launch of a new molecular entity or new indication with expected peak sales >USD 1bn. 2. Approved by the FDA in Q1 3. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities
Piqray®	1. Sabine V, Crozier C, Brookes C, et al. Mutational analysis of PI3K/AKT signaling pathway in tamoxifen exemestane adjuvant multinational pathology study. Journal of Clinical Oncology. 2014;32:2951-2958. 2. Lee JJX, Loh K, Yap Y-S. PI3K/Akt/mTOR inhibitors in breast cancer. Cancer Biol Med. 2015 ;12(4):342-354. 3. Andre F, Ciruelos EM, Rubovszky G et al. Alpelisib + fulvestrant for HR+, HER2- advanced breast cancer: Results of the Phase III SOLAR-1 trial. Presented at the European Society for Medical Oncology (ESMO) 2018 Congress (Abstract LBA3_PR) on October 20, 2018
Ofatumumab (OMB157)	1. Bar-Or et al., April 2018, Neurology, 2018; 90:e1805-e1814. 2. Kappos L, et al. Presented at EAN 2017. EP2154. 3. Savelieva M, et al. Presented at AAN 2017. 4. Savelieva M. et al. Presented at ECTRIMS 2016. P730; P5.348. 5. Theil D, et al. Presented at ECTRIMS 2017. P657; Gd+ = gadolinium-enhancing

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References: Pharmaceuticals (1/2)

Slide	Footnotes
Building depth across our core therapeutic areas	1. Aimovig® is developed in collaboration with Amgen. 2. The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xioi), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities. 3. Announced acquisition of global rights; closing expected in 2H19, subject to customary closing conditions. 4. Luxturna® marketed ex-US. 5. Per license agreement, EirGenix Inc is responsible for development and manufacturing; Sandoz has rights to commercialize in all markets except China and Taiwan. 6. Per license agreement, Gan&Lee is responsible for development and manufacturing; Sandoz has rights to commercialize in EU, US, Switzerland, Japan, South Korea, Canada, Australia and New Zealand
Cosentyx® is well-positioned to continue to grow in attractive segments of the immunology market	1. DRG disease landscape forecast for G7: Dec'18, PsA: Nov'18, RA: Jan'19, PSO: Nov'18. 2. Langley R, et al. NEJM 2014;371:326. 3. Blauvelt A., et al. JAAD 2017 Jan;76(1):60-69.e9 Enbrel® is a registered trademark of Wyeth LLC in Europe and Immunex Corporation in the US. Stelara® is a registered trademark of Janssen Biotech, Inc. 4. Bissonnette R., et al. JEADV 2018 Sep;32(9):1507-1514. 5. Bagel J et al. JAAD 2017;77:667-674. 6. Gottlieb A et al. JAAD 2017;76:70-80. 7. Reich K., et al. BJD 2018 doi: 10.1111/bjd.17351. [Epub ahead of print]. 8. Mease PJ, et al. RMD Open. 2018 Aug 13;4(2):e000723. 9. McInnesIB, et al. Lancet 2015;386:1137-46. 10. Mc Innes IB et al. Rheumatology (Oxford) 2017 Nov; 56(11): 1993–2003. 11. Mease PJ, et al. Ann. Rheum. Dis. 2017; 76 (suppl 2): 952. 12. Marzo-Ortega H, et al. Arthritis Care Res (Hoboken). 2017;69:1020–9. 13. Braun J, et al. Ann Rheum Dis. 2017;76:1070-1077. 14. Mease P et al. Ann Rheum Dis. 2018 Jun;77(6):890-897. 15. Braun J. et al. Rheumatology. 2018 Dec 19. doi:10.1093/rheumatology/key375. 16. DRG disease landscape forecast for G7
Nr-axSpA indication would complete Cosentyx® label across the SpA spectrum	1. DRG Epidemiology database - axSpA: release Dec'18; PsA: Nov'18; RA: Jan'19. Patients on biologics: PsA and AS - Calculated Patient equivalent based on IQVIA Midas volume Dec'18, Indication split IQVIA medical data Dec'18; nr-axSpA - DRG disease landscape forecast release Dec'18, RA: Corrona Study 2017. 2. Moderate-severe psoriasis diagnosis. 3. Systemic treated patients. 4. Out of patients treated. 5. Protopopov M and Poddubnyy D, Expert Rev Clin Immunol. 2018;14:525-533. 6. Sieper J, van der Heijde D, Arthritis Rheum. 2013;65:543-51. 7. Poddubnyy D, Rudwaleit M. Rheum Dis Clin North Am. 2012;38:387-403.
Entresto®: PIONEER landmark study demonstrated superiority to enalapril, unlocked new patient segment	1. Velazquez et al. N Engl J Med. 2019 Feb 7;380(6):539-548; Epub 2018 Nov 11. 2. Morrow et al. Circulation. 2019;139:00–00. ADHF: acute decompensated heart failure; SoC: standard of care; HFrEF: heart failure with reduced ejection fraction; HF: heart failure; CV: cardiovascular; NT-proBNP: N-terminal pro-brain natriuretic peptide.
Entresto® NBRx acceleration	1. IMS New to Brand w/e 03 May 2019. 2. The Global Health and Economic Burden of Hospitalizations for Heart Failure A. P. Ambrosy, G.C. Fonarow, et al. JACC Apr 2014, 63 (12) 1123-1133 and internal calculations 3. Savarese G, Lund LH. Global Public Health Burden of Heart Failure. Card Fail Rev. 2017;3(1):7–11. doi:10.15420/cfr.2016:25:2 4. Velazquez et al. N Engl J Med. 2019 Feb 7;380(6):539-548; Epub 2018 Nov 11 and TRANSITION: Wachter R. et al., Initiation of sacubitril/valsartan in hospitalized patients with heart failure with reduced ejection fraction after hemodynamic stabilization: Primary results of the TRANSITION study. Data presented at: ESC 2018, Aug 25-29; Munich, Germany.
Mayzent® the first and only oral treatment successfully studied in SPMS	1. Largest trial performed in SPMS; KapposL et al. Siponimod versus placebo in secondary progressive multiple sclerosis: a double-blinded randomized, phase 3 study. The Lancet. 2018; DOI 10.1016/S0140-6736(18)30475-6. 2. FDO is only recommended for patients with certain pre-existing cardiac conditions -sinus bradycardia, first or second-degree[Mobitz type I] AV block, or a history of myocardial infarction or heart failure.
EXPAND study results	1. Natalizumab failed trial to demonstrate delay in disability progression. Kapoor R, et al. Lancet Neurol. 2018;17:405-15 (composite endpoint included time to EDSS progression, 20% increase in timed 25-foot walk or 20% increase in 9-hole peg test). 2. Largest trial performed in SPMS; SDMT – Symbol Digit Modalities Test. 3. Kappos L et al. Siponimod versus placebo in secondary progressive multiple sclerosis: a double-blinded randomized, phase 3 study. The Lancet. 2018; DOI 10.1016/S0140-6736(18)30475-6. 4. SDMT measures cognitive processing speed; other cognition endpoints were not met.
Mayzent® showed significant effects on cognitive processing speed in SPMS	1. Benedict et al. Effect of Siponimod on cognition in patients with secondary progressive multiple sclerosis (SPMS): Phase 3 EXPAND study subgroup analyses. American Academy of Neurology, Philadelphia 2019. P2-051. 2. Sustained CPS improvement – SDMT ≥4-point increase from baseline; sustained CPS deterioration – SDMT ≥4-point decrease from baseline 3. Planche et al. 2015: Cognitive impairment in a population-based study of patients with multiple sclerosis: differences between late relapsingremitting, secondary progressive and primary progressive multiple sclerosis

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References: Pharmaceuticals (2/2)

Slide	Footnotes
Ofatumumab (OMB157): potentially first and only highly potent precision B-Cell therapy tailored for MS patients	1. Klein C, et al. mAbs. 2013;5:22–33. 2. Sawas A, et al. Br J Haematol. 2017; 177:243–253. Ab, antibody; aCD20, anti-CD20; EC50, concentration of a drug that gives half-maximal response; FACS, fluorescence-activated cell sorting. 3. Pacheco-Fernandez T, et al. Presented at AAN 2018. S52.003. 4. Marina Savelieva et al., poster presentation at ECTRIMS 2017; Paul Smith et al.; AAN 2017 scientific presentation. 5. Comparison of bio-distribution following subcutaneous and intravenous administration of a novel zirconium-89 labelled anti-CD20 antibody using imaging encore, e-presentation at EAN 2018, June 16–19, Lisbon, Portugal. 6 Torres et. Al. Distribution and efficacy of ofatumumab and ocrelizumab in humanized-CD20 mice following subcutaneous or intravenous administration. 2019 AAN P2.2-052. 7. Migotto et al. Effect of Route of Administration on the Biodistribution of a Novel Anti-CD20 Antibody in Experimental Autoimmune Encephalomyelitis-Variant Mice. 2019 ANN P2.2-081.
Data show potential impact of Zolgensma® in broad spectrum of SMA	The brand name Zolgensma® has been provisionally approved by the FDA for the investigational product AVXS-101 (onasemnogene abeparvovec-xxxx), but the product itself has not received marketing authorization or BLA approval from any regulatory authorities. 1. STRONG, STR1VE, SPR1NT, START long term follow up data presented at AAN 2019. 2. Day J. et al. “Adeno-Associated Virus Serotype 9 Antibodies in Patients With Spinal Muscular Atrophy Screened for Treatment With Onasemnogene Abeparvovec.” Muscular Dystrophy Association (MDA) 2019.
Fevipiprant (QAW039) targeting biologic efficacy with oral simplicity	1. Fevipiprant: Study defines high eosinophil levels ≥250 cells/µL. Targeted efficacy profile studied with GINA step 4/5 patients. 2. Benralizumab: Fitzgerald et al, CALIMA study - Lancet 2016;388: 2128-2141 & Bleecker et al. SIROCCO study - Lancet 2016, 388: 2115-2127. 3. Mepolizumab: Ortega et al. MENSA study - N Engl J Med 2014;371:1198-1207 & Chupp et al. MUSCA study - Lancet Resp Med 2017, 5:390–400. 4. Reslizumab: Castro et al. Lancet Respir Med. 2015;3:355-366. 5. Dupilumab: Castro et al. QUEST study - N Engl J Med. 2018; 378:2486-2496.
Xiidra® fits strategically within Novartis’ leading ophthalmic portfolio, pipeline and existing infrastructure	1. 2018 calendar year sales. 2. Ex-US only. 3. Paulsen AJ et al. Am J Ophthalmic. 2014;157(4):799-806. 4. US Census Bureau. Annual estimates of the resident population for selected age groups by sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipios: April 1, 2010 to July 1, 2014. 5. Schaumberg et al, 2013, Prevalence of diagnosed dry eye in the US, Marketscope 2018 report – Diagnosed Dry Eye patients in the US. 6. Novartis Dry Eye market forecasts in the US, Mar 2019, validated with IQVIA TRx and NBRx claims data
Xiidra® uniquely positioned to treat both signs and symptom of dry eye disease	Xiidra® acquisition closing expected in 2019, subject to satisfaction of customary closing conditions including regulatory approvals. 1. Nichols KK et al. Inv Ophthalmol & Vis Sci. 2016;57:2975-2982. 2. Paulsen AJ et al. Am J Ophthalmic. 2014;157(4):799-806. 3. US Census Bureau. Annual estimates of the resident population for selected age groups by sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipios: April 1, 2010 to July 1, 2014. 4. Schaumberg et al, 2013, Prevalence of diagnosed dry eye in the US, Marketscope 2018 report – Diagnosed Dry Eye patients in the US. 5. Novartis Dry Eye market forecasts in the US, Mar 2019, validated with IQVIA TRx and NBRx claims data. 6. US prescribing information and Semba CP, Gadek TR. Development of lifitegrast: a novel T-cell inhibitor for the treatment of dry eye disease. Clin Ophthalmol. 2016;10:1083-1094.
Brolucizumab achieved robust visual gains‡ and superior fluid resolution*– on track for 4Q19 US launch[1]	1. Pending regulatory approvals. 2. Data on file, HAWK & HARRIER Ph3 3. Source: Evaluate pharma (Accessed Mar 29 2019); Regeneron, Bayer, Novartis and Roche Annual Reports. Accounted anti-VEGF sales in nAMD, DME and RVO indications. 4. Brolucizumab (RTH258) has not received marketing authorization or BLA approval from any regulatory authorities. *Prespecified secondary endpoints in both HAWK and HARRIER, with confirmatory superiority analysis in HAWK only. ‡Primary endpoint. †Descriptive P-values at Week 96 related to prespecified secondary endpoints assessed at Weeks 16 and 48. # Prespecified secondary endpoint in both HAWK and HARRIER. BCVA - Best Corrected Visual Acuity; CST - Central Subfield Thickness; IRF - Intraretinal Fluid; RPE - Retinal Pigment Epithelium; SRF - Subretinal Fluid; MAA - Marketing Authorization Application; BLA - Biologic Licensing Application; DME - Diabetic Macular Edema.
China	1. IQVIA data. 2. CFDA website. 3.Approval received Q1 2019. 4.Best of best case. 5. Add-on insulin and add-on SU; scenario: China’s limited data from global studies could be accepted for NDA approval

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References: Oncology

Slide	Footnotes
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