SANOFI

Sustaining Innovation Analyst Day

Paris, December 13, 2017

Forward Looking Statements

This presentation contains forward-looking statements as defined in the Private Securities Litigation Reform Act of 1995, as amended. Forward-looking statements are statements that are not historical facts. These statements include projections and estimates and their underlying assumptions, statements regarding plans, objectives, intentions and expectations with respect to future financial results, events, operations, services, product development and potential, and statements regarding future performance. Forward-looking statements are generally identified by the words "expects", "anticipates", "believes", "intends", "estimates", "plans" and similar expressions. Although Sanofi's management believes that the expectations reflected in such forward-looking statements are reasonable, investors are cautioned that forward-looking information and statements are subject to various risks and uncertainties, many of which are difficult to predict and generally beyond the control of Sanofi, that could cause actual results and developments to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements. These risks and uncertainties include among other things, the uncertainties inherent in research and development of new products, including future clinical trial results and analysis of clinical data (including post-marketing data), decisions by regulatory authorities, such as the FDA or the EMA, regarding whether and when to approve any drug, device or biological application that may be filed for any such product candidates as well as their decisions regarding labelling and other matters that could affect the availability or commercial potential of such product candidates. There are additional risks that may cause actual results to differ materially from those contemplated by the forward-looking statements, such as the lack of commercial success of certain product candidates once approved, pricing pressures, both in the United States and abroad, including pharmaceutical reimbursement and pricing, the future approval and commercial success of therapeutic alternatives, risks associated with intellectual property and any related pending or future litigation and the ultimate outcome of such litigation, changes in applicable laws or regulations, the impact of cost containment initiatives and subsequent changes thereto, as well as those risks and uncertainties discussed or identified in the public filings with the SEC and the AMF made by Sanofi, including those listed under "Risk Factors" and "Cautionary Statement Regarding Forward-Looking Statements" in Sanofi's annual report on Form 20-F for the year ended December 31, 2016. Other than as required by applicable law, Sanofi does not undertake any obligation to update or revise any forward-looking information or statements.

Agenda

Opening Remarks

- Olivier Brandicourt - Chief Executive Officer

Strategic Focus of Sanofi's R&D Model 2.0

- Elias Zerhouni - President, Global R&D

Leading in Specialty Care

- Bill Sibold - EVP, Sanofi Genzyme

Building Immunology & Multiple Sclerosis

- Jorge Insuasty - SVP, Global Head of Development
- Frank Nestle - Global Head of Immunology & Inflammation Therapeutic Research Area

Sustaining Rare Disease

- Rand Sutherland - Therapeutic Area Head, Rare Disease Development

Q&A Session

BREAK

Building Oncology

- Jorge Insuasty - SVP, Global Head of Development
- Yong-Jun Liu - SVP, Global Head of Research

Sustaining Diabetes & Cardiovascular

- Stefan Oelrich - EVP, Diabetes & Cardiovascular
- Klaus Henning Jensen - Therapeutic Area Head, Diabetes Development
- Jay Edelberg – VP, Global Cardiovascular Development

Sustaining Vaccines

- David Loew - EVP, Sanofi Pasteur
- John Shiver - SVP, Vaccines R&D

Closing Remarks

- Elias Zerhouni - President, Global R&D

Q&A Session

Olivier Brandicourt

Chief Executive Officer

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Opening Remarks

Today We Will Focus on…

Sanofi Research and Development

71
projects in development for NMEs or additional indications(1)

9
potential submissions in next 18 months

7
NME and Vaccine approvals since 2015(2)

>10
pivotal study starts in next 12 months

(1) Includes 4 Phase 1 products and 1 Phase 2 product for which Sanofi has opt-in rights but has not exercised these rights
(2) Adlyxin®, Dengvaxia®, Dupixent®, Kevzara®, Praluent®, Soliqua™ /Suliqua™ 100/33, Toujeo®

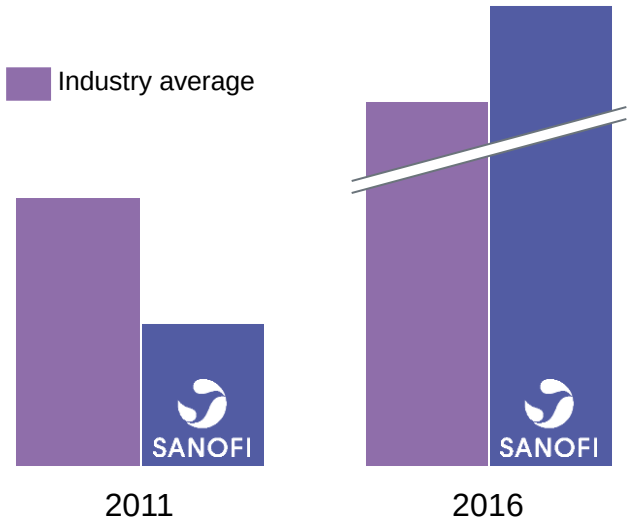
R&D Transformation Has Resulted in R&D Productivity Above the Industry Average

2014-2016

- Advanced high-value development projects
- Robust launch pipeline
- Rigorous portfolio prioritization processes
- Further improved R&D organization efficiency
- Developed proprietary technology platforms
- Strengthened biologic capabilities
- Focused and fully aligned R&D with GBUs

R&D Productivity

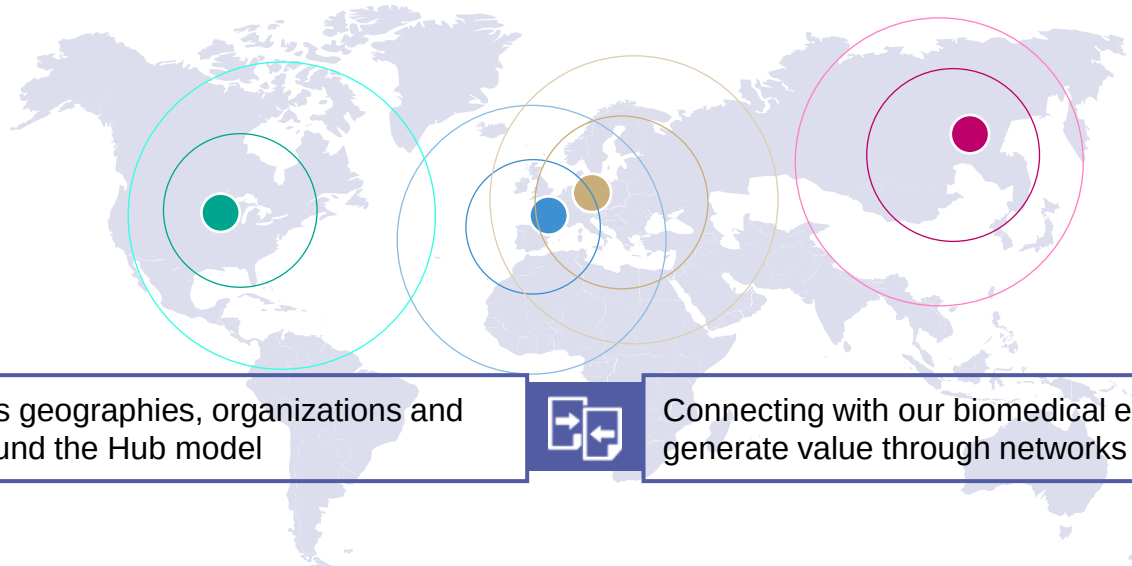
New product sales/R&D spending[(1)]



(1) KMR analysis; new product sales per year (products registered in the past 5 years) divided by R&D spend per year

Sanofi's R&D Hub Model to Capture Innovation Through Cutting Edge Platform Technologies and Capabilities

North America Hub	French Hub	German Hub	Asia-Pacific Hub	Partnered Tech
• Multi-Specifics • PRR Antibody Conjugates	• Multi-Specifics • PRR Antibody Conjugates	• Multi-Specifics • Peptides • siRNA	• Digital Hub	• BioNTech mRNA Mixture • Ablynx Nanobodies



Working across geographies, organizations and disciplines around the Hub model

Connecting with our biomedical ecosystem to generate value through networks

PRR= Pattern Recognition Receptor

A Focused and Commercially-Aligned R&D Organization

	Sanofi Genzyme			DCV	Sanofi Pasteur
	Immunology & MS	Oncology	Rare Disease	Diabetes & CV	Vaccines
Key Commercial Assets	Dupixent (dupilumab), Aubagio (teriflunomide), Kevzara (sarilumab), Lemtrada (alemtuzumab)	Jevtana (cabazitaxel), Taxotere (docetaxel), Mozobil (plerixafor injection)	Cerezyme (imiglucerase for injection), Cerdelga (eliglustat capsules), Myozyme (alglucosidase alfa), Lumizyme (alglucosidase alfa), Fabrazyme (agalsidase beta)	Lantus (insulin glargine), Toujeo (insulin glargine), Soliqua (insulin glargine/lixisenatide), Praluent (alirocumab)	Fluzone High-Dose Influenza Vaccine, Flublok Influenza Vaccine Quadrivalent, Hexaxim, VaxigripTetra, Pentacel, Menactra
Development Priorities	dupilumab *Asthma**	isatuximab *MM*	avalglucosidase alfa *Pompe*	Praluent® *CV events reduction**	MenQuad TT
	dupilumab *Nasal Polyps**	isatuximab+cemiplimab *Solid tumors**	olipudase alfa *ASMD*	sotagliflozin *T1D**	RSV mAb(6)*
	dupilumab *EoE**	cemiplimab *CSCC**	patisiran h*ATTR amyloidosis**	sotagliflozin *T2D**	RSV Vaccine
	dupilumab *Food Allergies**	cemiplimab *NSCLC**	fitusiran *Hemophilia**	efpeglenatide *T2D**	Fluzone® QIV HD
	dupilumab *Pediatric studies**	cemiplimab *BCC**	venglustat *Gaucher type 3*	GLP-1/GCG(5) *Obesity*	PR5i
	dupilumab *COPD**	cemiplimab *Cervical Cancer**	venglustat GBA-*Parkinson's*	GLP-1/GCG(5) *NASH*	
	IL33(1) *Asthma**	TGF-Beta mAb *Solid tumors*	venglustat *ADPKD*	GLP-1/GIP *T2D*	
	IL33(1) *COPD**	LAG3(2) *Advanced Cancers***		mavacamten *HCM**	
	IL33(1) *Atopic Dermatitis**	Anti-CA6(3) *TNBC*			
	sarilumab *GCA*	Anti-CEACAM5 ADC(4) *Solid tumors*			
	sarilumab *PMR*	SERD *MBC*			
	alemtuzumab *PPMS*				
	BTK inhibitor[7]* *MS*				

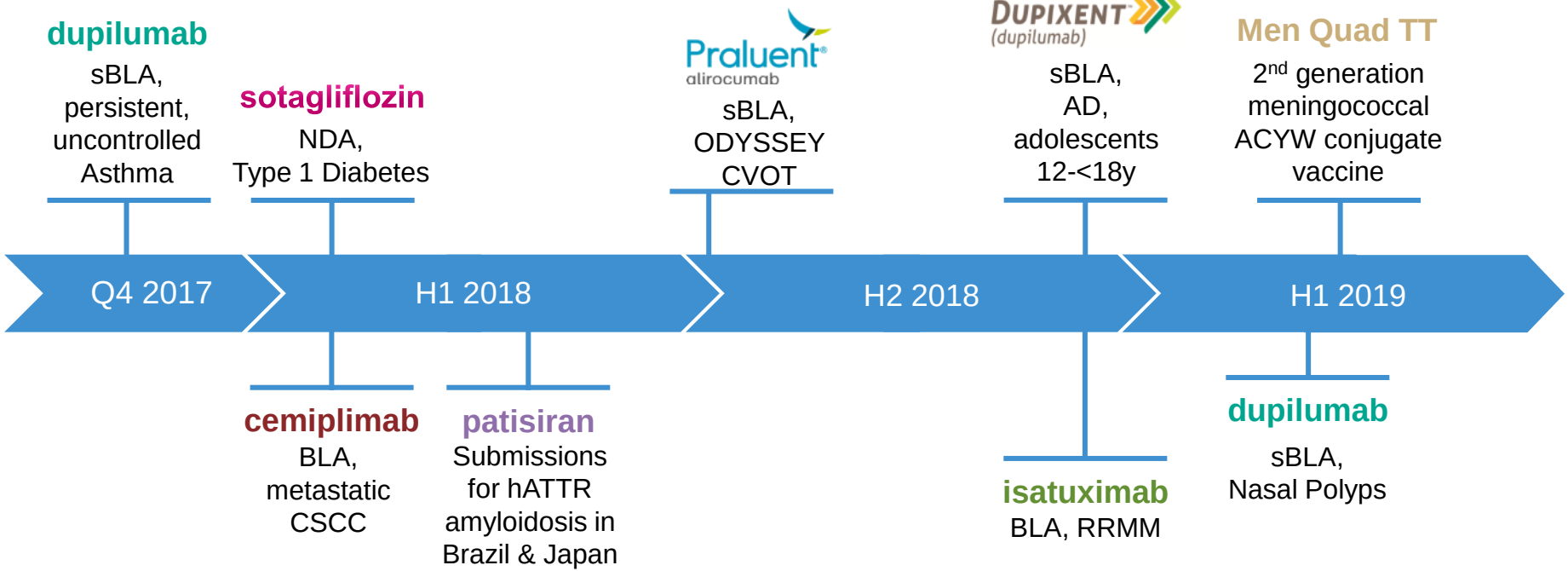
EoE= Eosinophilic Esophagitis ; COPD= Chronic Obstructive Pulmonary Disease ; PPMS= Primary Progressive Multiple Sclerosis ; RRMS= Relapsing-Remitting Multiple Sclerosis ; MM= Multiple Myeloma : CSCC= Cutaneous Squamous Cell Carcinoma ; NSCLC= Non-Small Cell Lung Cancer ; BCC= Basal Cell Carcinoma ; TNBC= Triple Negative Breast Cancer; MBC= Metastatic Breast Cancer ; ASMD= Acid sphingo-myelinase deficiency; ADPKD= Autosomal Dominant Polycystic Kidney Disease ; T1D= Type 1 Diabetes ; T2D= Type 2 Diabetes ; NASH= Nonalcoholic Steatohepatitis; HCM= Hypertropohic Cardiomyopathy

(1) IL33=SAR440340
(2) LAG3=REGN IO Ab
(3) Anti-CA6 TNBC=SAR566658
(4) Anti-CEACAM5 ADC=SAR408701
(5) GLP-1 dual agonist=SAR425899
(6) RSV mAb=SP0322
(7) PRN2246

* Partnered assets
** Opt-in rights product for which rights have not been exercised yet

9 Potential Submissions[1] for New Products or Additional Indications Over Next 18 Months

Planned Submissions



(1) Number of submissions determined by first submission to a regulatory authority in a country; subsequent submissions to other global regulatory authorities are not included in the count of 9 potential submissions

New Wave of Pivotal Study Starts Expected Over the Next 12 Months

dupilumab[1]
Anti-IL4Rα mAb
- COPD
- Eosinophilic Esophagitis

isatuximab
Anti-CD38 mAb
- 1L MM SCT eligible
- 1L MM SCT ineligible

venglustat[2]
Oral GCS inhibitor
- Autosomal dominant polycystic kidney disease (ADPKD)

alemtuzumab
- Primary Progressive MS

SAR425899
GLP-1/GCR dual agonist
- Obesity

cemiplimab[1]
- 1st line NSCLC

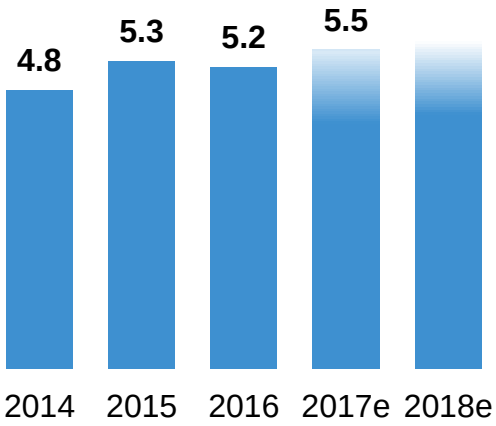
efpeglenatide[3]
Once-weekly GLP-1RA
- Type 2 Diabetes

mavacamten[4]
- Obstructive Hypertrophic Cardiomyopathy

COPD= Chronic Obstructive Pulmonary Disease; NSCLC= Non-Small Cell Lung Cancer
(1) Collaboration with Regeneron
(2) Phase 2/3 registrational study
(3) Collaboration with Hanmi
(4) Collaboration with Myokardia. Sanofi will lead ex-U.S. regulatory and commercial activities to mavacamten program where it has ex-U.S. commercialization rights

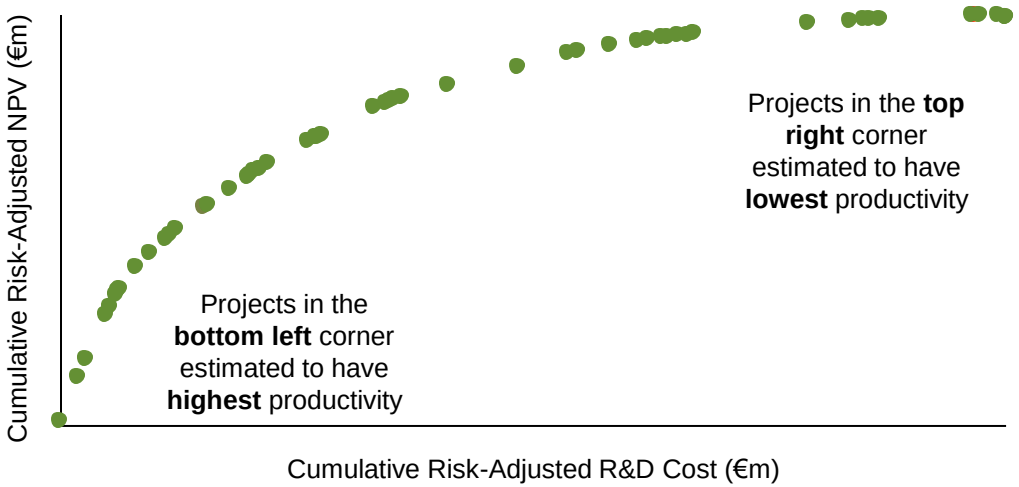
Financially Disciplined R&D Investments Based on Rigorous Prioritization Methodology

R&D Investments (in €bn)



Efficiency frontier provides a comparative view of the total value creation for a given R&D investment

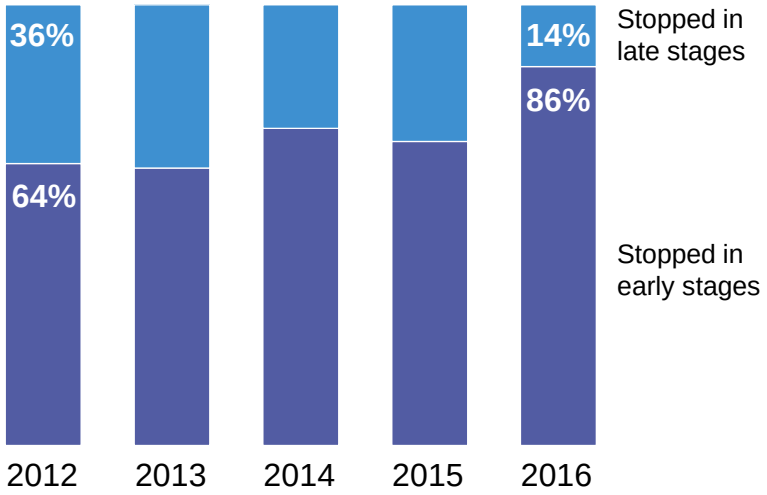
Projects ranked from left to right in descending order of productivity



Rigorous Candidate Selection Resulting in Probabilities of Success Above Industry Average in Later Stages

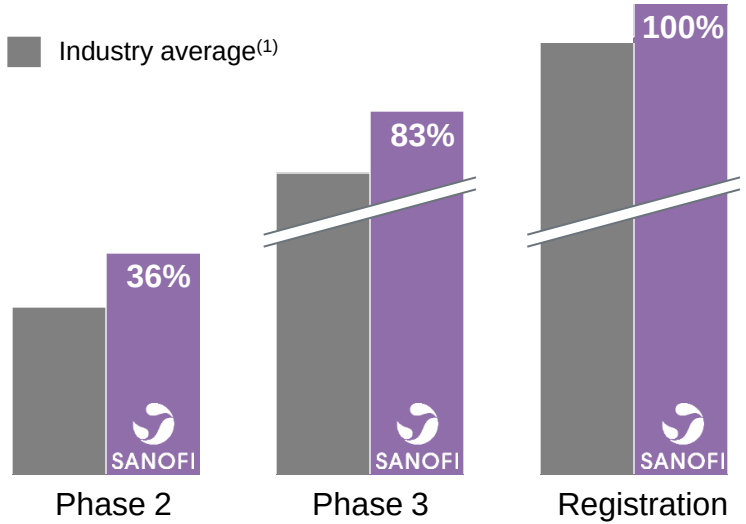
Projects discontinued at an early stage…

% projects discontinued by stage



…Higher probabilities of success in later stages

% probability of success by Phase (2014-2016)



SANOFI (1) KMR analysis

Innovative Portfolio[(1)] Brings High Value to Patients

Expected Phase in 2018
- Phase 1
- Phase 2
- Phase 3 / Pivotal

Selected Development Priorities

	Potential New Treatment Options			Potential First or Best in Class		
Post-PoC	cemiplimab NSCLC monotherapy	efpeglenatide Type 2 Diabetes	sotagliflozin Type 2 Diabetes	dupilumab Asthma	cemiplimab CSCC	sotagliflozin Type 1 Diabetes
	MenQuadTT Meningitis	isatuximab Multiple Myeloma		dupilumab Nasal Polyposis	avalglucosidase alfa	fitusiran Hemophilia
				dupilumab EoE	olipudase alfa	Praluent® CVOT
					patisiran hATTR Amyloidosis	anti-IL33 mAb[(2)] Atopic Dermatitis
Pre-PoC	alemtuzumab PPMS	anti-LAG-3 mAb Solid Tumors	isatuximab combo Solid Tumors	cemiplimab Advanced BCC	venglustat GBA-Parkinson's	anti-IL33 mAb Asthma
			anti-TGFβ mAb Solid Tumors	cemiplimab Cervical Cancer	venglustat Gaucher Type 3	anti-IL33 mAb COPD
				venglustat ADPKD	mavacamten Cardiomyopathy	SERD Breast Cancer
				GLP-1/GCG Obesity	RSV mAb	MYK-491 Dilated Cardiomyopathy
				dupilumab COPD		

(1) Products in graphic include selected R&D pipeline projects and do not reflect the entirety of Sanofi's clinical development portfolio
(2) Proof of concept based on competitor data

Partnered products: cemiplimab, dupilumab, anti-IL33 mAb, (Regeneron); anti-LAG3 (Regeneron product for which Sanofi has opt-in right); sotagliflozin (Lexicon); efpeglenatide (Hanmi); fitusiran, patisiran (Alnylam); mavacamten, MYK-491 (Myokardia) - Sanofi may have limited or shared rights on some of these products

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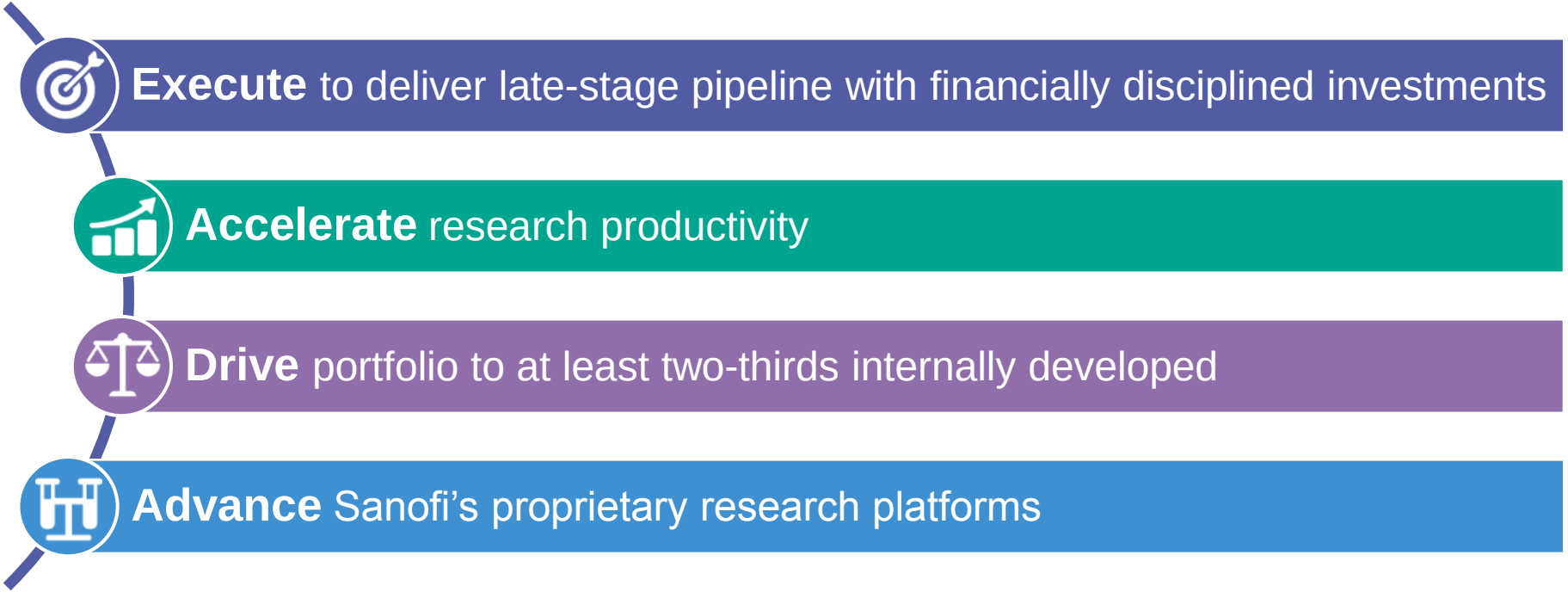
Strategic Priorities in R&D to Drive a Leading Pipeline of Innovative Molecules

R&D Priorities



Elias Zerhouni
President, Global R&D

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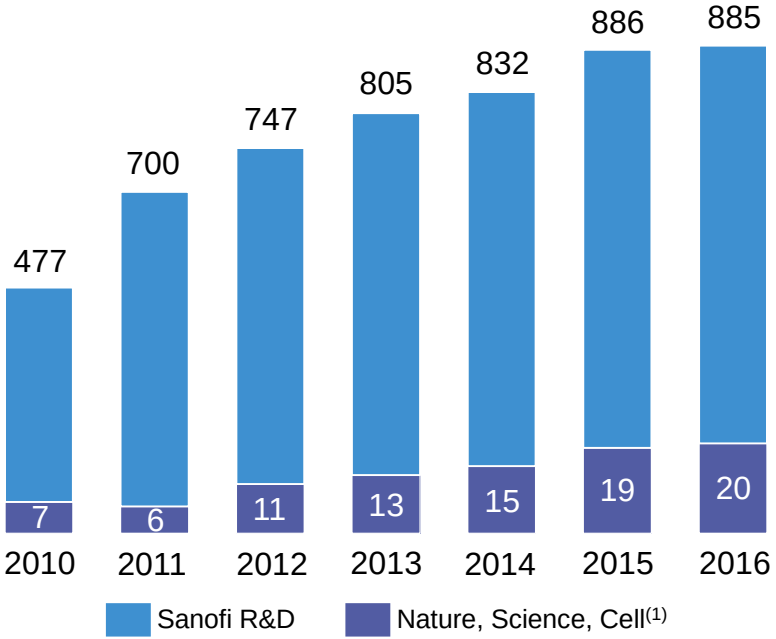
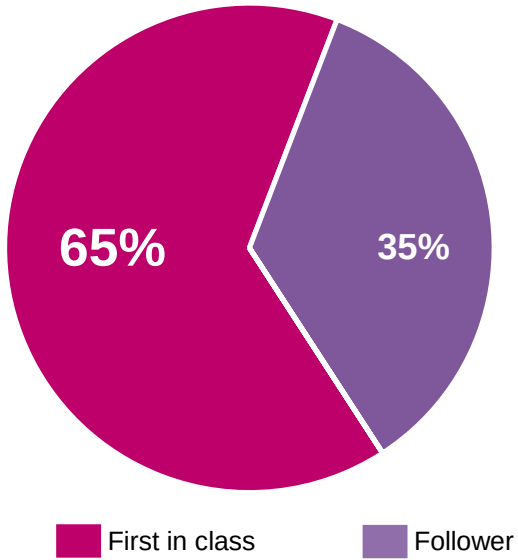
Strategic Focus of Sanofi's R&D Model 2.0

Sanofi is a Science-Driven Company

Scientific Publications



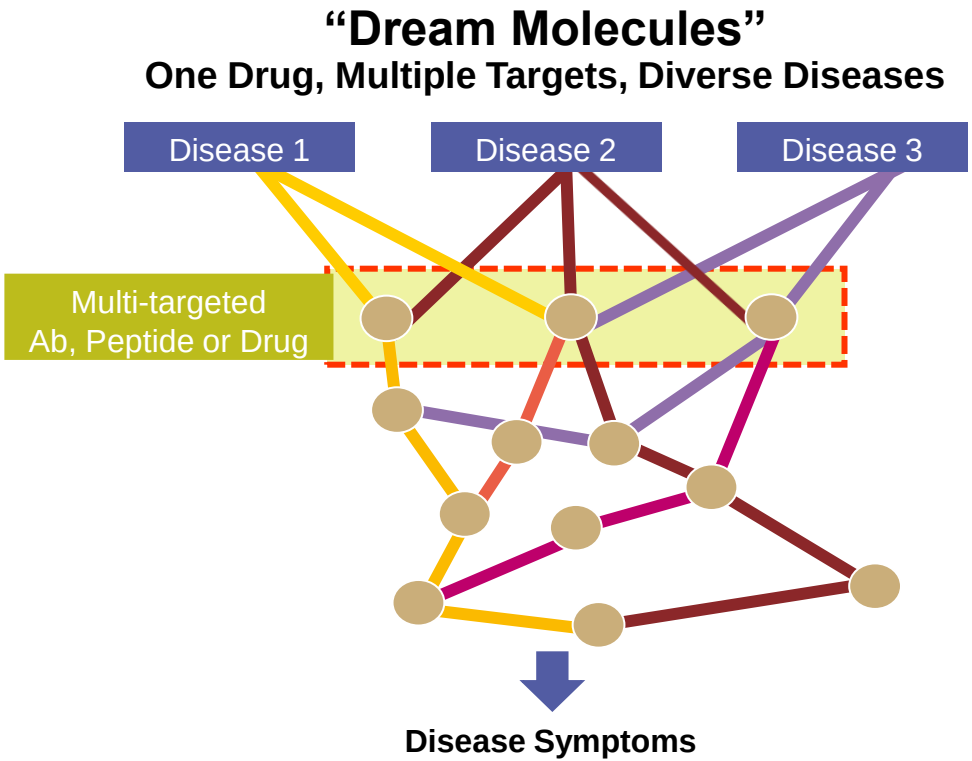
% Pipeline First in Class Projects



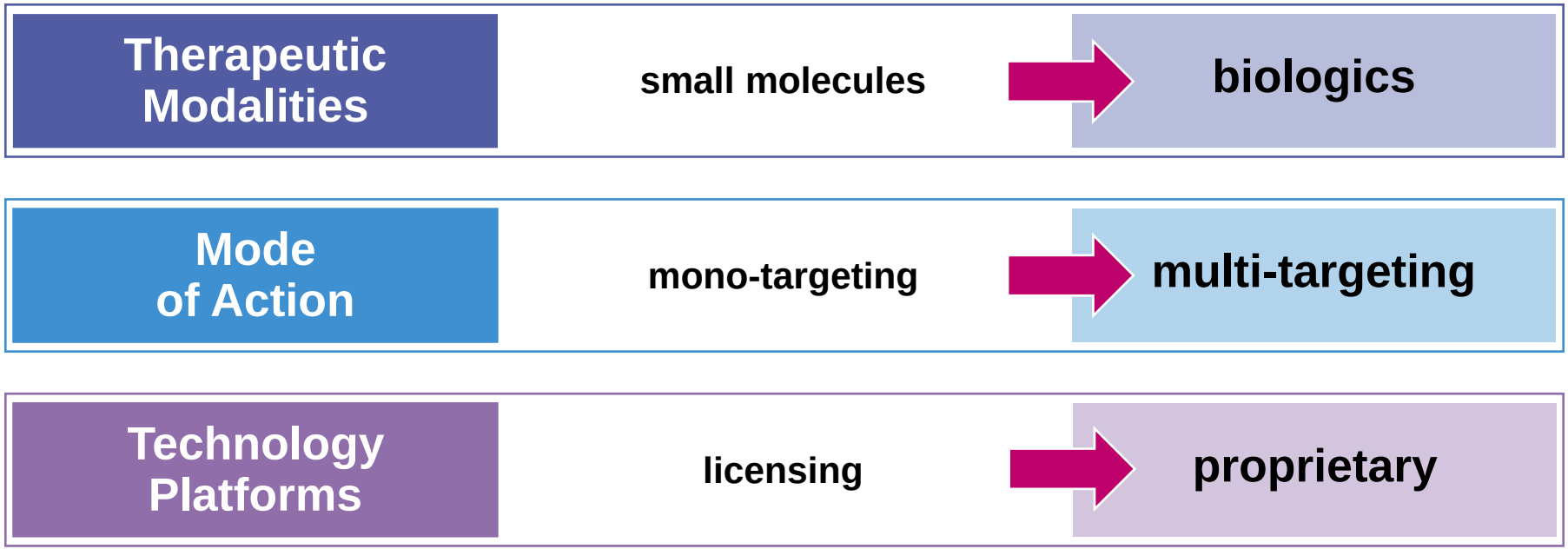
(1) Nature: including Nature Journals and Nature Review Journals; Science: including Science, Science Translational Medicine, Science Advances, Sciences Signaling
Source (Embase.com); scope (Articles, Conference Abstracts, Letters, Conference Papers, Notes, Editorials, Reviews, Chapters)

Scientific Approach to R&D: A Different Vision

- Deeper understanding of molecular networks and pathways through translational medicine
- Scientific evidence indicates most diseases will require combination of therapies to achieve success
- Molecules attacking multiple points in disease pathway may result in efficacy in several diseases or improved risk/benefit in single disease

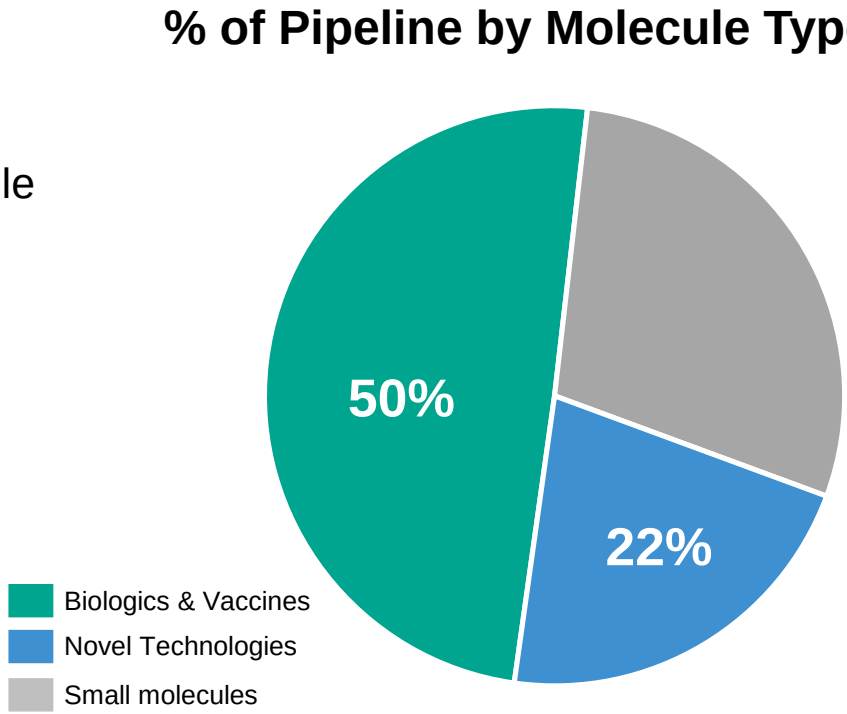


Sanofi R&D Key Strategies



Majority of Pipeline Now Biologics, Vaccines or Novel Technologies

- More specificity, less off target toxicity
- Possible multi-functionality in one molecule
- Shorter development cycle time, higher probability of success
- Opportunity for diverse modalities (e.g. mRNA)
- Challenges to entry of biosimilars



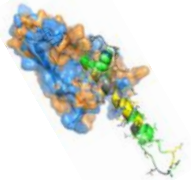
Leading Technology Platforms

Addressing Multiple Disease Targets with Single Complex Molecules

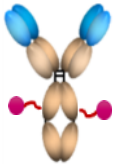
Multispecific Antibodies
(bi- & tri-specific)

siRNA Conjugates

Trigonal Peptides

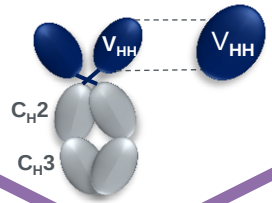


PRR Antibody Conjugates



BioNTech mRNA Mixture

Ablynx Nanobodies®

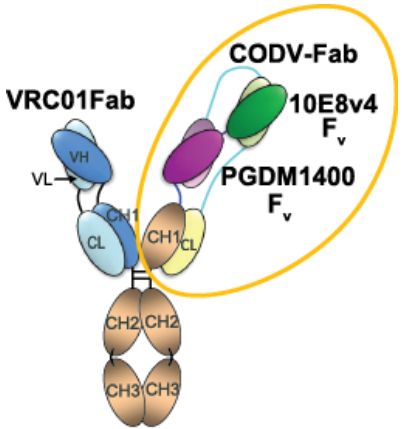


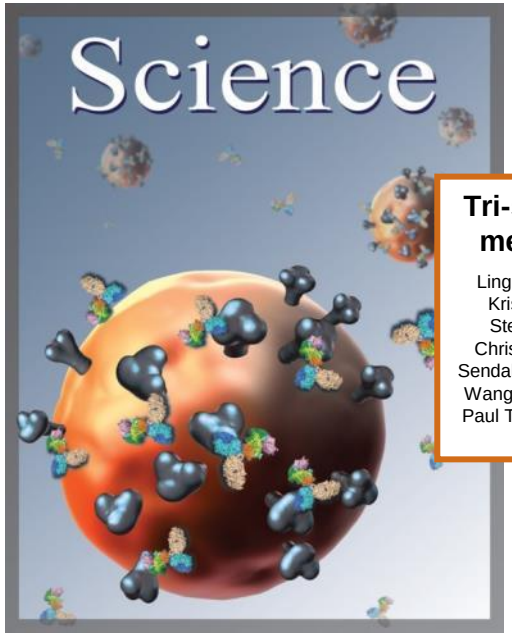
PRR= Pattern Recognition Receptor

Proprietary Tri-specific Antibody(1) Demonstrated Unprecedented Potency for HIV-1 in Pre-Clinical Study

A Breakthrough Proof of Technical Concept in Science(2)

One antibody binds to 3 different epitopes





Tri-specific broadly neutralizing HIV antibodies mediate potent SHIV protection in macaques

Ling Xu, Amarendra Pegu, Ercole Rao, Nicole Doria-Rose, Jochen Beninga, Krisha McKee, Dana M. Lord, Ronnie R. Wei, Gejing Deng, Mark Louder, Stephen D. Schmidt, Zachary Mankoff, Lan Wu, Mangaiarkarasi Asokan, Christian Beil, Christian Lange, Wulf Dirk Leuschner, Jochen Kruip, Rebecca Sendak, Young Do Kwon, Tongqing Zhou, Xuejun Chen, Robert T. Bailer, Keyun Wang, Misook Choe, Lawrence J. Tartaglia, Dan H. Barouch, Sijy O'Dell, John-Paul Todd, Dennis R. Burton, Mario Roederer, Mark Connors, Richard A. Koup, Peter D. Kwong, Zhi-yong Yang, John R. Mascola, Gary J. Nabel

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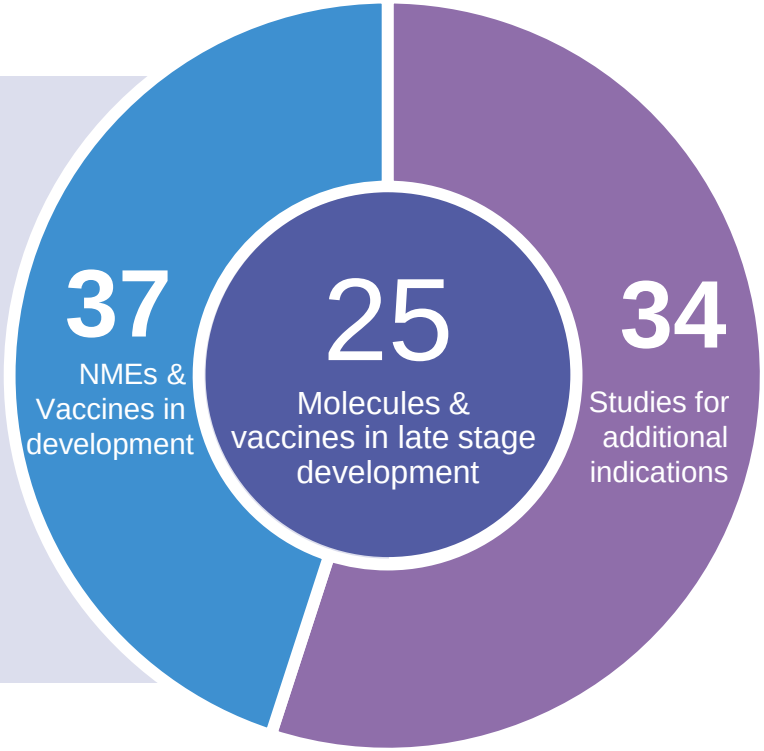
(1) Collaboration between Sanofi and NIH; expected to enter Phase 1 in Q4 2018
(2) Xu, L. et al. Science, 2017

A Robust R&D Pipeline in 6 Therapeutic Areas

- Immunology
- Multiple Sclerosis & Neurology
- Oncology
- Rare Disease
- DCV
- Vaccines and Infectious Diseases



R&D Organization Built on Strong Capabilities with Addition of New Talent

Head of R&D
E. Zerhouni

R&D Operations
J. Zhang

Regulatory Affairs
H. Malone

Research
Y.J. Liu

Development
J. Insuasty

Chief Scientific Officer
G. Nabel

Sanofi Pasteur R&D
J. Shiver

Diabetes
P. Larsen

Immunology
F. Nestle

Rare Disease
S. Cheng

Neuroscience
R. Balice-Gordon

Oncology
L. Debussche

Cardiovascular
A. Muslin

Diabetes
K. Henning Jensen

Immunology
C. Antoni

Rare Disease
R. Sutherland

Neuroscience
E. Wallstroem

Oncology
J. Lager

Cardiovascular
J. Edelberg

What We Will Cover Today (1/2)

Specialty Care	• Leading in Specialty Care	**Bill Sibold**
 **Immunology**	• Realize the potential of dupilumab	**Jorge Insuasty**
	• Next wave of Immunology	**Frank Nestle**
 **Rare Disease**	• Vision and ambition in Rare Disease • Venglustat • Patisiran and fitusiran • Avalglucosidase-alfa • Olipudase-alfa	**Rand Sutherland**
 **Oncology**	• Vision and ambition in Oncology • Immuno-Oncology: Anti PD-1 • Isatuximab Multiple Myeloma and beyond	**Jorge Insuasty**
	• Next wave in Oncology	**Yong-Jun Liu**

What We Will Cover Today (2/2)

Diabetes & Cardiovascular	• Diabetes strategy	**Stefan Oelrich**
	• GLP-1/GCG dual agonist • Sotagliflozin • Efpeglenatide	**Klaus Henning Jensen**
	• Cardiovascular	**Jay Edelberg**
Vaccines	• Vision and ambition in Vaccines	**David Loew**
	• Flu • Meningitis • RSV vaccine	**John Shiver**

Bill Sibold
Executive Vice President,
Sanofi Genzyme

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Leading in Specialty Care

Driving Growth in Specialty Care Across 4 Franchises

Sanofi Genzyme Specialty Care Franchises

Immunology

DUPIXENT (dupilumab)

KEVZARA sarilumab

Execute on launches and expand fast growing immunology franchise into disease areas with high unmet need

Multiple Sclerosis

Once-daily AUBAGIO (teriflunomide) 14mg tablets

LEMTRADA alemtuzumab 12mg IV

Continue to drive growth in a competitive market and strengthen portfolio

Oncology

JEVTANA (cabazitaxel) Injection

MOZOBIL (plerixafor injection)

Thymoglobulin Anti-thymocyte Globulin (Rabbit)

Prepare for launch opportunities with cemiplimab and isatuximab and optimize legacy brands

Rare Disease

Cerezyme imiglucerase for injection

Cerdelga (eliglustat) capsules

Myozyme (alglucosidase alfa)

Fabrazyme agalsidase beta

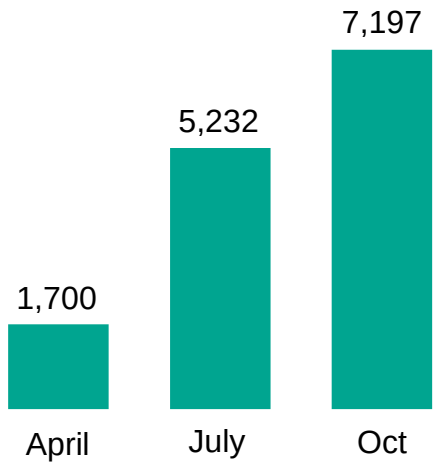
Lumizyme (alglucosidase alfa)

Sustain RD leadership through patient focus and product differentiation and prepare for launches

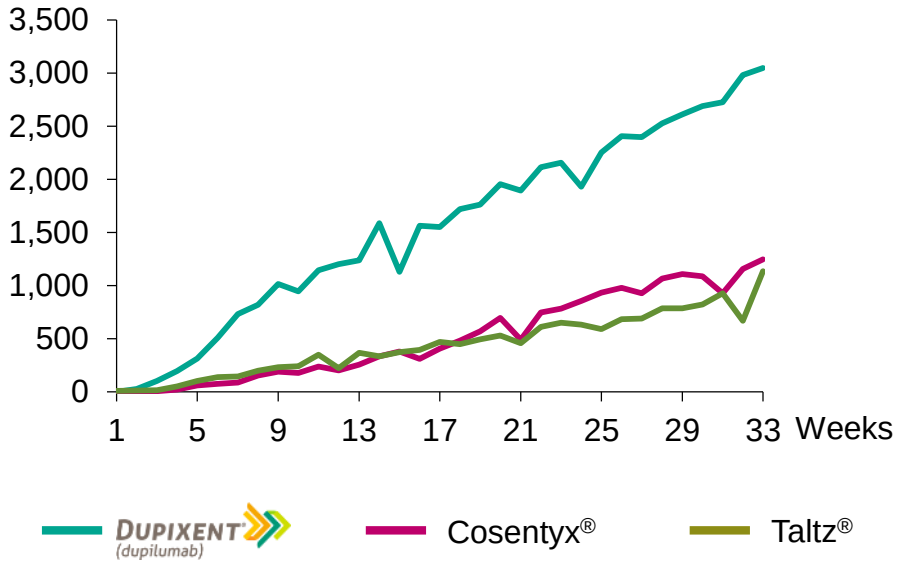
Strong U.S. Dupixent® Launch Outperforming Analogs

Total Dupixent® Prescribers

Growing prescriber breadth



Weekly TRx Since Launch

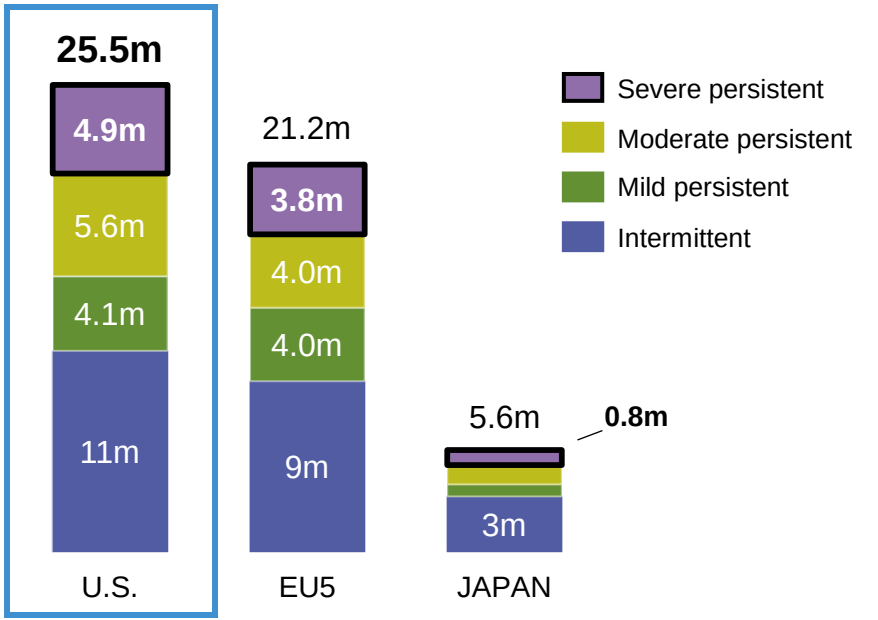


IMS NPA Weekly (through 11/10/2017 for Dupixent®)
As of Oct. 20th

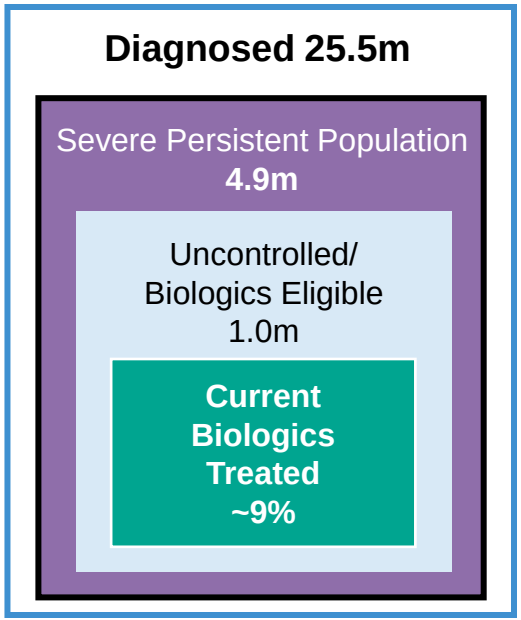
Dupilumab Clinical Program Focused on Population with Uncontrolled Persistent Asthma

Nearly 20% of diagnosed asthma patients have severe persistent disease

Asthma patients by disease severity 2016 (all ages)



U.S. Patient Population

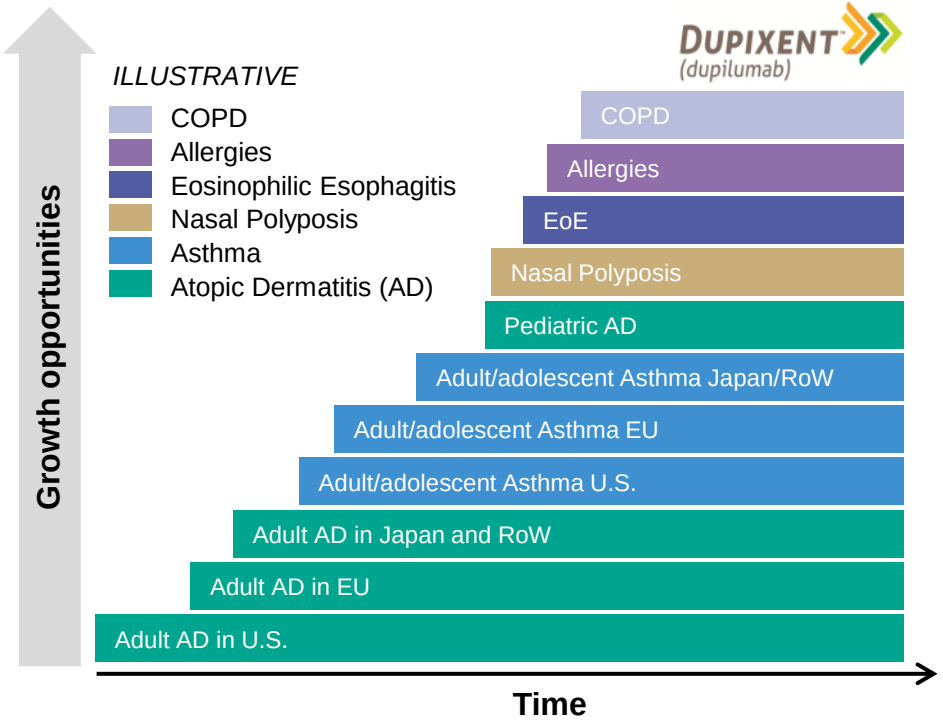


Sources: Datamonitor asthma report (Jan 2017). "Asthma Epidemiology." DMKC0142037. 23 July 2015"; Chung KF, et al. *Eur Resp J*. 2014:43(2). doi.10.1183/09031936.00202013.

Global Launch Opportunities in Multiple Diseases to Realize the Full Potential of a 'Pipeline in a Product'

- Dupilumab expected to be a key growth driver with significant commercial potential in multiple diseases
- Building a portfolio of opportunities around one compound
  - Launch of new indications over time
  - Geographic roll-out in global markets
  - Penetration into adult, adolescent and pediatric populations
  - Expansion in combination use

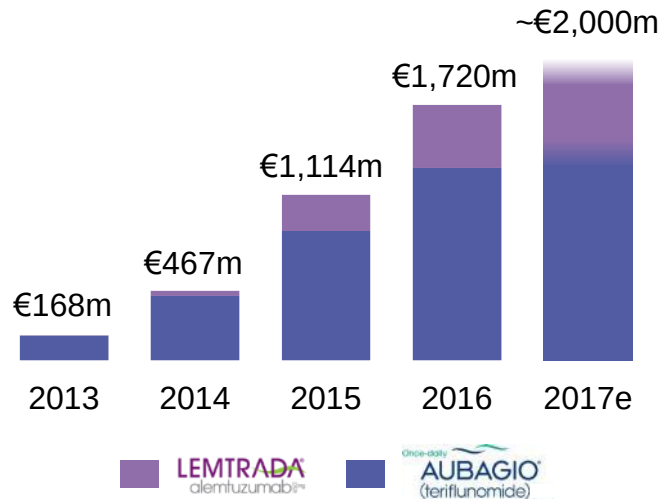
Growth Opportunities across Diseases, Geographies and Demographics(1)



(1) If approved in indications by applicable Health Authority

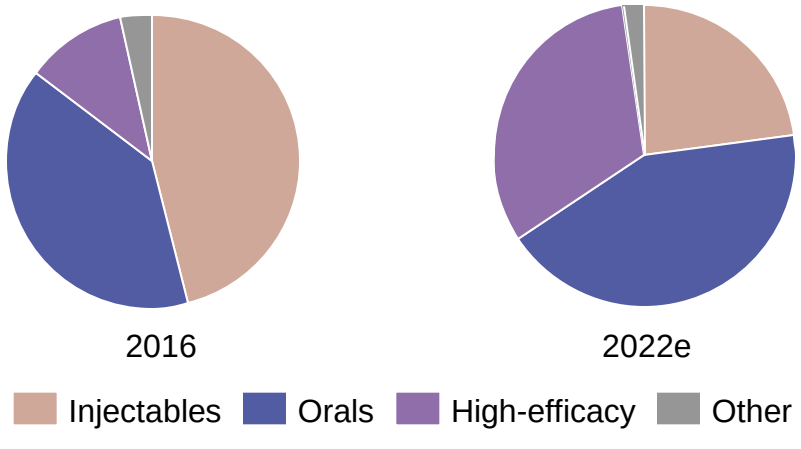
Well-Positioned in the Growing Segments of the Market

Building on a Successful MS Franchise



And Driving the Transition Towards Oral and High Efficacy Therapies(1)

Multiple Sclerosis Sales by Category of Product

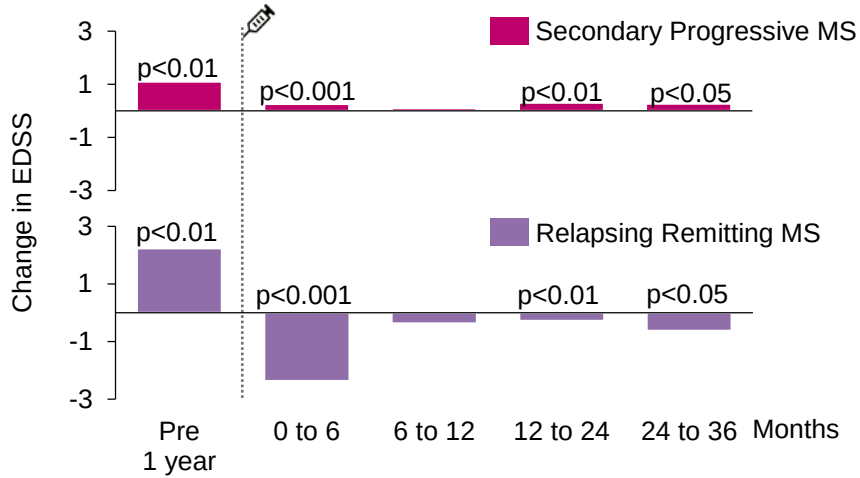


(1) Source: eValuatePharma

Leveraging our Strength in Multiple Sclerosis

- Alemtuzumab
  - High unmet need in PPMS with limited treatment options
  - Pilot studies in SPMS and RRMS demonstrated prevention of disability progression
    - 1 year post alemtuzumab treatment, 33/36 SPMS patients had maintained pre-treatment EDSS
- BTK inhibitor - PRN2246(2)
  - Recent licensing agreement signed with Principia for global rights to a potentially best-in-class brain penetrant oral BTK inhibitor

Alemtuzumab Impact on Disability in RRMS and SPMS Patients(1)



Alemtuzumab Phase 3 in PPMS targeting 1,200 patients expected to start in H1 2018

Alemtuzumab is marketed under the brand name Lemtrada® in RRMS. BTK= Bruton's Tyrosine Kinase; RRMS= Relapsed Refractory Multiple Sclerosis; PPMS= Primary Progressive Multiple Sclerosis; SPMS= Secondary Progressive Multiple Sclerosis; EDSS= Expanded Disability Status Scale

(1) The Principia transaction remains subject to customary regulatory approvals and has not yet closed. Under the terms of the agreement Sanofi will develop PRN2246 oral treatment that shows promise in multiple sclerosis (MS) and, potentially, other central nervous system (CNS) disease.

(2) The window of therapeutic opportunity in multiple sclerosis: evidence from monoclonal antibody therapy. AJ Coles et al. J Neurol 2006 Jan; 253 98-108. Data annualised to allow comparison between time epochs of different duration. "Pre 1 year" reflects the 1-year period before treatment.

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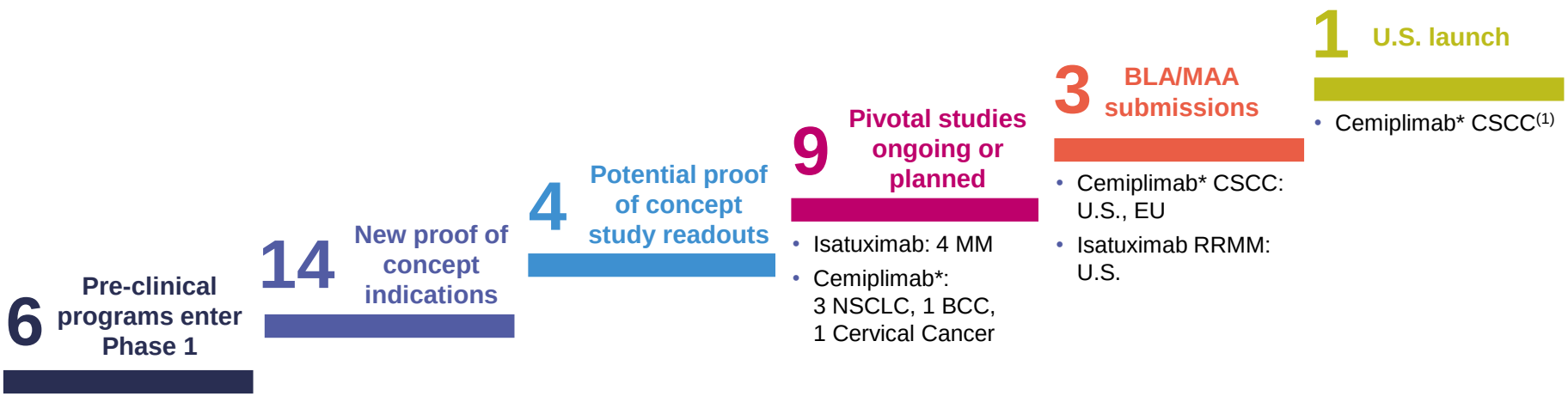
Sanofi's Strong Commitment to Oncology Expected to Begin to Deliver in 2018



NSCLC= Non-Small Cell Lung Cancer; BCC= Basal Cell Carcinoma; CSCC= Cutaneous Squamous Cell Carcinoma; RRMM= Relapsed Refractory Multiple Myeloma; MDS= Myelodysplastic Syndrome; AML= Acute Myeloid Leukemia; *cemiplimab partnered with Regeneron

(1) Subject to U.S. FDA approval

Jorge Insuasty
Senior Vice President,
Global Head of Development

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Building a Competitive Position in Immunology

Realize the potential of dupilumab

A Fast Growing Portfolio of the Innovative Pipeline Assets Across Multiple Therapeutic Areas

2018 Immunology Development Pipeline

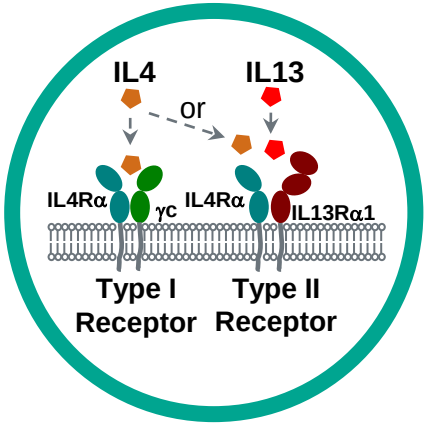
Phase 1	Phase 2		Phase 3		Registration
SAR439794 TLR4 agonist Peanut Allergy	**SAR156597** IL4/IL13 bi-specific mAb Systemic Scleroderma	**sarilumab** Anti-IL6R mAb Systemic Juvenile Arthritis	**Dupixent®** Anti-IL4Rα mAb Atopic Dermatitis 12–17y	**dupilumab** Anti-IL4Rα mAb COPD	**dupilumab** Anti-IL4Rα mAb Asthma 12y+
	GZ389988 TRKA antagonist Osteoarthritis	**SAR440340** Anti-IL33 mAb Atopic Dermatitis	**Dupixent®** Anti-IL4Rα mAb Atopic Dermatitis 6–11y	**dupilumab** Anti-IL4Rα mAb Eosinophilic Esophagitis	
	sarilumab Anti-IL6R mAb Polyarticular Juvenile Idiopathic Arthritis	**SAR440340** Anti-IL33 mAb Asthma	**Dupixent®** Anti-IL4Rα mAb Atopic Dermatitis 6m-5y	**sarilumab** Anti-IL6R mAb Polymyalgia Rheumatica	**Approved**
		SAR440340 Anti-IL33 mAb COPD	**dupilumab** Anti-IL4Rα mAb Nasal Polyposis	**sarilumab** Anti-IL6R mAb Giant Cell Arteritis	**Kevzara®** Anti-IL6R mAb Rheumatoid Arthritis
		dupilumab Anti-IL4Rα mAb Grass Allergy	**dupilumab** Anti-IL4Rα mAb Asthma 6-11y		**Dupixent®** Anti-IL4Rα mAb Atopic Dermatitis
		dupilumab Anti-IL4Rα mAb Peanut Allergy			

Ongoing

First patient scheduled in 2018

Development Program Confirms Dupilumab's Value Proposition in Multiple Immune-Mediated Diseases

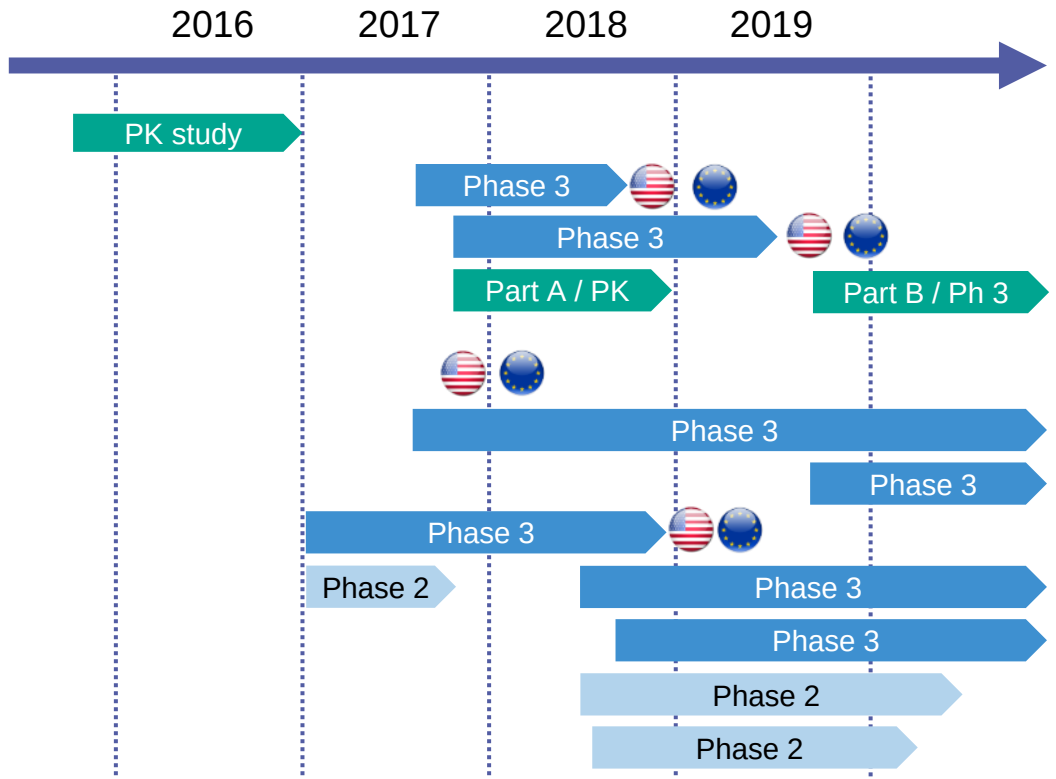
1. Comprehensive clinical program across several diseases in the Type 2 spectrum
2. First biologic to demonstrate positive clinical data in AD, Asthma, NP, EoE(1)
3. New studies to be initiated in patients with multiple co-morbidities
4. New studies to be initiated in COPD and allergic indications
5. Large safety database with established profile for continuous therapy



(1) Dupilumab is under clinical investigation for Asthma, NP and EoE and its safety or efficacy for these uses has not been evaluated by any regulatory authority

Dupilumab Clinical Trial Program Planned to Expand across 7 Indications including Pediatric Patients in Asthma and AD

Expected timeline



Dupilumab Being Evaluated as First-in-Class Dual Inhibitor of IL4/IL13 in Key Type 2 Conditions

Atopic Dermatitis

- ✓ Breakthrough therapy in moderate-to-severe AD
- ✓ First-in-class biologic treatment

Asthma

- ✓ Efficacy in 3 pivotal trials
- ✓ Largest Phase 3 program of a biologic therapy in asthma

Nasal Polyposis

- ✓ Positive Proof of Concept data
- ✓ No currently approved biologic
- ✓ Phase 3 fully enrolled

Eosinophilic Esophagitis

- ✓ Positive Proof of Concept data
- ✓ No currently approved biologic

dupilumab

Atopic Dermatitis: >2,500 Patient Development Program

Adult Patients

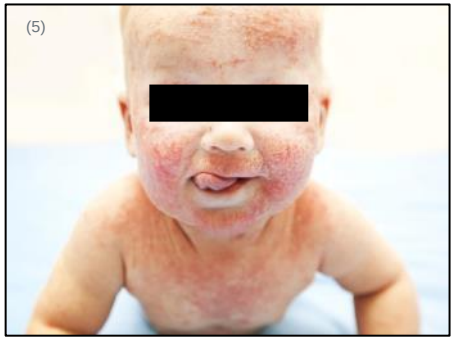
Phase 1	Phase 2	Phase 3
4-week monotherapy[1]	4-week concomitant TCS[1]	SOLO 1 & 2 16-week monotherapy[7]
Drug-drug interactions[2]	12-week monotherapy[1]	CHRONOS 52-week concomitant TCS[8]
	16-week monotherapy dose-ranging[3]	SOLO-CONTINUE 36-week monotherapy[9]
	EXPLORE: 16-week monotherapy biopsy/biomarkers[4]	CAFÉ: 16-week concomitant TCS in cyclosporine-experienced patients[6,10]
	EVALUATE: 16-week vaccine interaction (Tdap and MPSV4)[5,6]	Open-label extension[11]

(1) Beck LA *et al. N Engl J Med* 2014; 371:130–139.
(2) ClinicalTrials.gov (NCT02647086).
(3) Thaçi D *et al. Lancet* 2016;387:40–52.
(4) Guttman-Yassky E *et al. J Invest Dermatol* 2016;136:S224 abstract 373.
(5) ClinicalTrials.gov (NCT02210780).
(6) Sanofi Genzyme, Regeneron. Data on file. 2016.
(7) Simpson EL *et al. N Engl J Med* 2016;375:2335–2348.
(8) Blauvelt A *et al. The Lancet 2017; 389; 10086:2287-2303*. ClinicalTrials.gov (NCT02260986).
(9) ClinicalTrials.gov (NCT02395133).
(10) ClinicalTrials.gov (NCT02755649). Accessed February 2017
(11) ClinicalTrials.gov (NCT01949311).

Higher Disease Burden of Atopic Dermatitis in Pediatrics

- Manifestations similar to adults, pruritus remains the cardinal symptom
- 1-year prevalence ~10% of U.S. pediatric population(1)
  - 1-2% of these pediatric AD patients have severe disease(2,3,4)
- Onset of disease for majority of children is about 5 years old

Similar Disease Manifestation in Children



(1) Shaw et al., J In Derm, Eczema Prevalence in the United States; Data from the 2003 National Survey of Children's Health, 2011, 131, 67-73
(2) Charman CR, Williams HC. Epidemiology. In: Bieber T, Leung DYM, editors. Atopic Dermatitis. New York: Dekker; 2002. pp. 21–42
(3) Emerson RM, Williams HC, Allen BR. Severity distribution of atopic dermatitis in the community and its relationship to secondary referral. British Journal of Dermatology. 1998;139(1):73–6
(4) Atopic Eczema in Children: Management of Atopic Eczema in Children from Birth up to the Age of 12 Years.. NICE Clinical Guidelines, No. 57. National Collaborating Centre for Women's and Children's Health (UK). London: RCOG Press; 2007 Dec
(5) https://specialty.mims.com/topic/atopic-dermatitis-tied-to-increased-tooth-decay-risk-in-children
(6) Weinberg et al. Successful Treatment of Severe Atopic Dermatitis in a Child and an Adult With the T-Cell Modulator efalizumab; Arch Dermatol. 2006; 142(5):555-558

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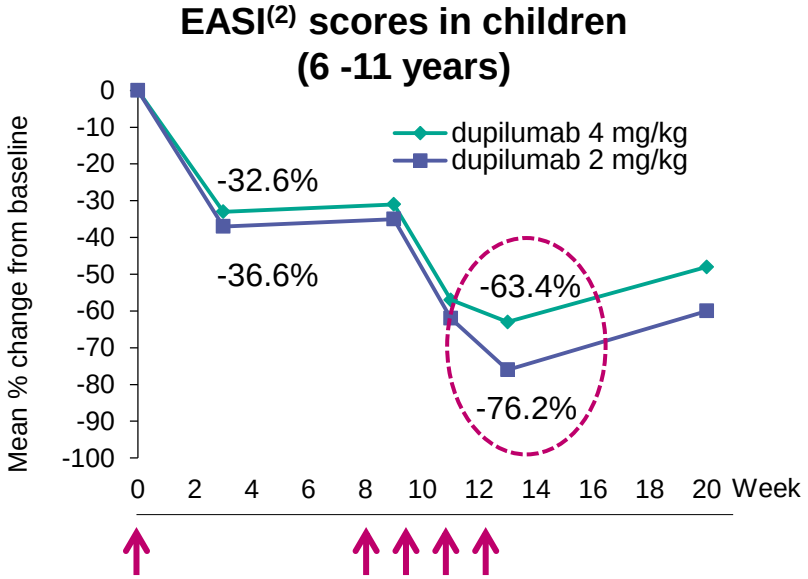
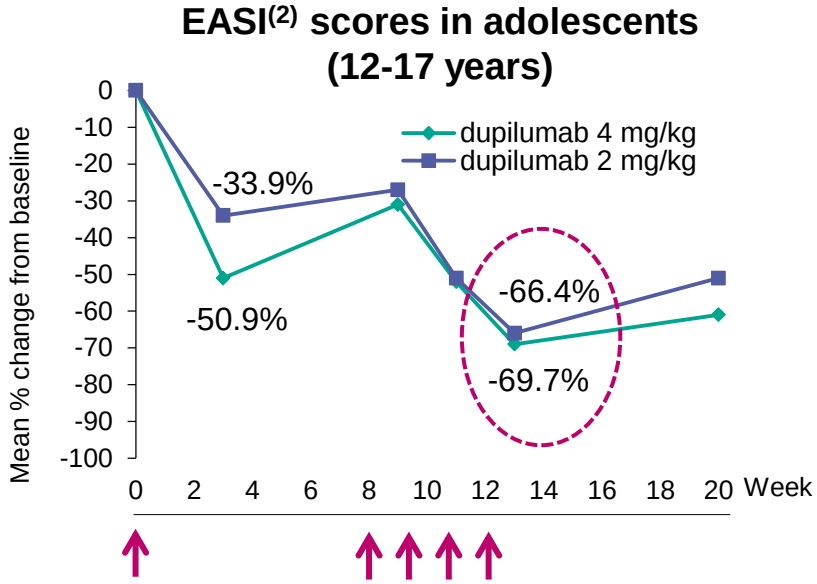
Proof of Concept Suggests Efficacy in Children and Adolescents with Atopic Dermatitis

Results Consistent with Adult Population[1]





Registrational studies initiated in age-groups ranging from 6 months to 17 years old

The safety and efficacy of dupilumab in pediatric AD patients has not been evaluated by any regulatory authority

(1) Phase 2a, open-label, ascending-dose, sequential-cohort trial among atopic dermatitis patients failing TCS

(2) EASI score is a tool used to measure the extent (area) and severity of atopic eczema (Eczema Area and Severity Index)

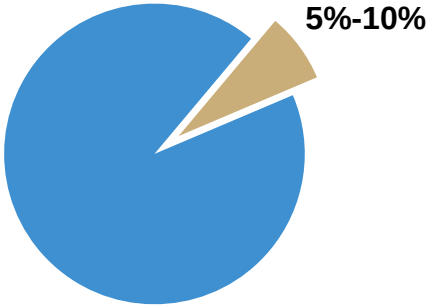
Inadequately Controlled Asthma Represents a Significant Unmet Medical Need and Economic Burden

Asthma

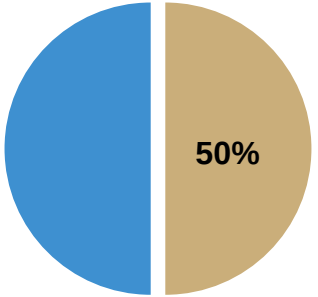
- Asthma is a common chronic disease that leads to significant health and economic burden for patients and their families
- Despite existing therapies 5% to 10% of patients suffer from severe[1] forms
- Estimated direct and indirect economic burden of asthma
  - $56bn in the U.S.[4]
  - €34bn in the EU[5]

5%-10% of U.S. asthma population with severe disease[1] accounts for 50% of all asthma costs[2,3]

U.S. asthma severe patient population



U.S. asthma related costs



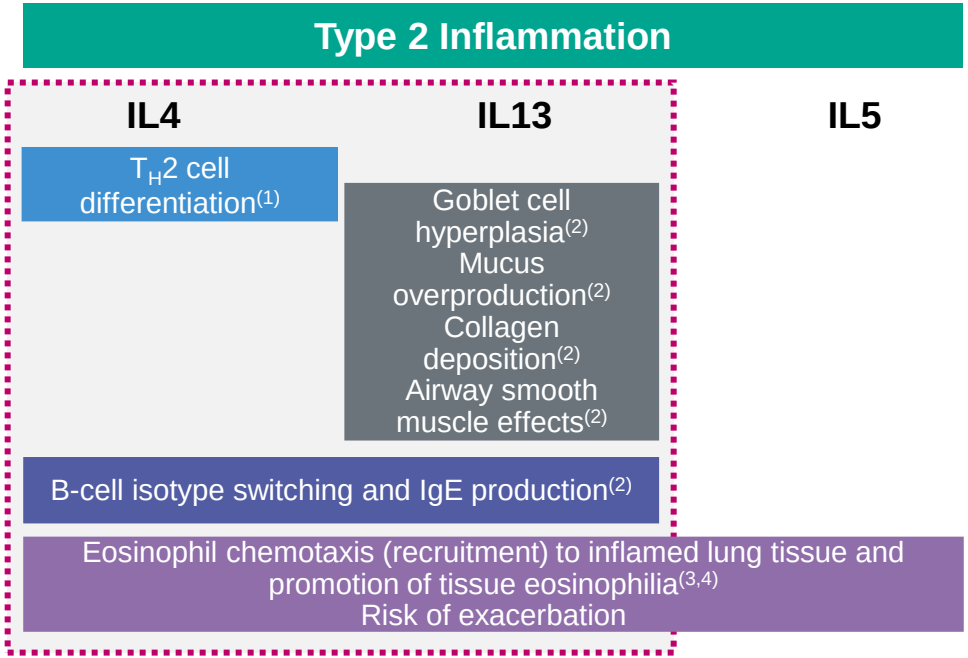
Estimated annual per-patient direct costs for this population are $16,154 to $32,308[3]

(1) Defined by hospitalization, ER visits, and/or requirement for systemic corticosteroids
(2) Chung K et al. International ERS/ATS guidelines on definition, evaluation and treatment of severe asthma. European Respiratory Journal. 2013;43(2):343-373.
(3) Hankin CS et al. J Allergy Clin Immunol. 2013;131(2);AB126.
(4) AAAAI; www.aaaai.org/about-aaaai/newsroom/asthma-statistics
(5) ERS White Book; www.erswhitebook.org/chapters/the-economic-burden-of-lung-disease

Dupilumab in Asthma - IL4/IL13 as Key Type 2 Cytokines that May Have Broad Effects on Type 2 Inflammation

- Type 2 inflammation in asthma involves a range of cytokines and mediators
- IL4/IL13 with unique roles as key drivers of Type 2 mediated asthma
- Type 2 asthma encompasses much more than eosinophilic changes alone
- IL13 mAbs have not been successful in Phase 3 development in asthma

IL4 and IL13 Play Key Roles in Type 2 Inflammation



(1) Gandhi NA et al. *Nat Rev Drug Discov*. 2015;15(1):35-50.
(2) Vatrella A et al. *J Asthma Allergy*. 2014;7:123-130.
(3) Steinke J et al. *Respir Res*. 2001;2:66-70.
(4) Corren J. *Curr Allergy Asthma Rep*. 2013;13(5):415-420.

A Comprehensive Asthma Clinical Development Program Conducted in a Broad Patient Population

Adult & Adolescent Patients

Phase 2

Pivotal

DRI12544[1]

Adults, Dose ranging – Pivotal

24 weeks, N=776

EXPEDITION[2]

Adults, Exploratory (airway inflammation)

12 weeks, N=42

Phase 3

Pivotal

QUEST[3]

Adults and adolescents (12+ years)

52 weeks, N=1,902

Pivotal

VENTURE[4]

Adults and adolescents (12+ years) with severe steroid dependent asthma

24 weeks, N=210

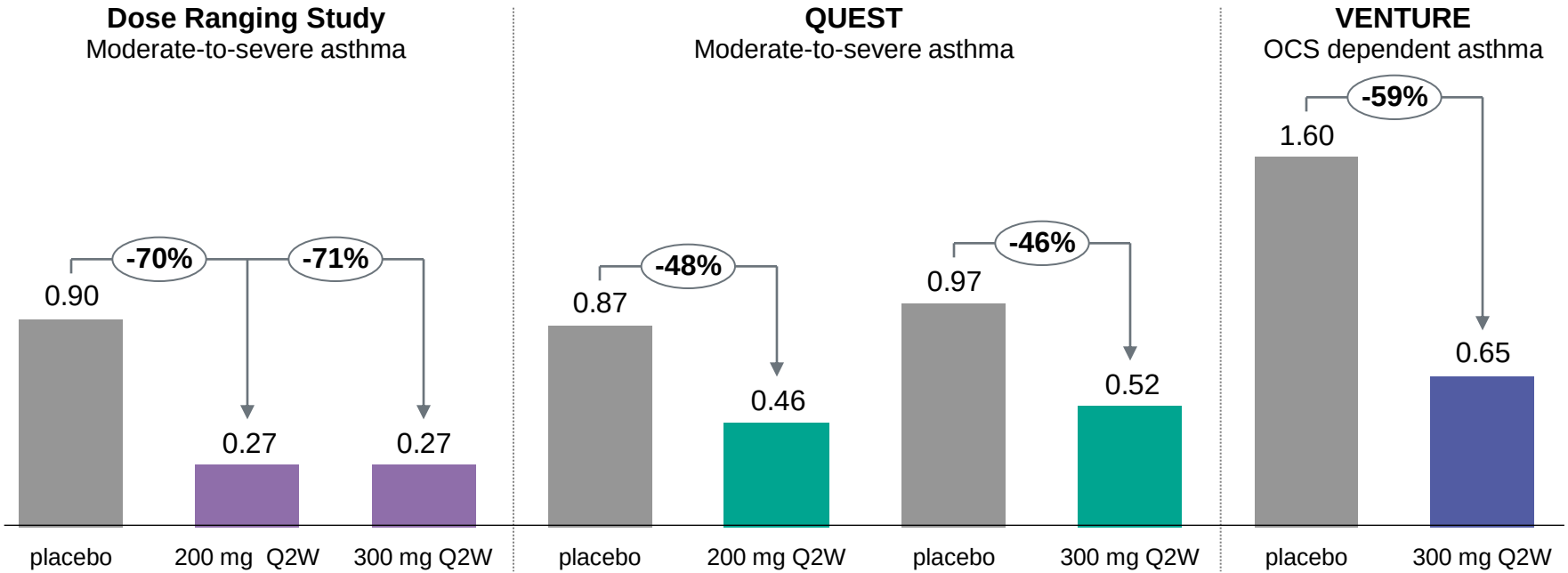
TRAVERSE[5]

Open-label extension study

up to 108 weeks, N=2,287

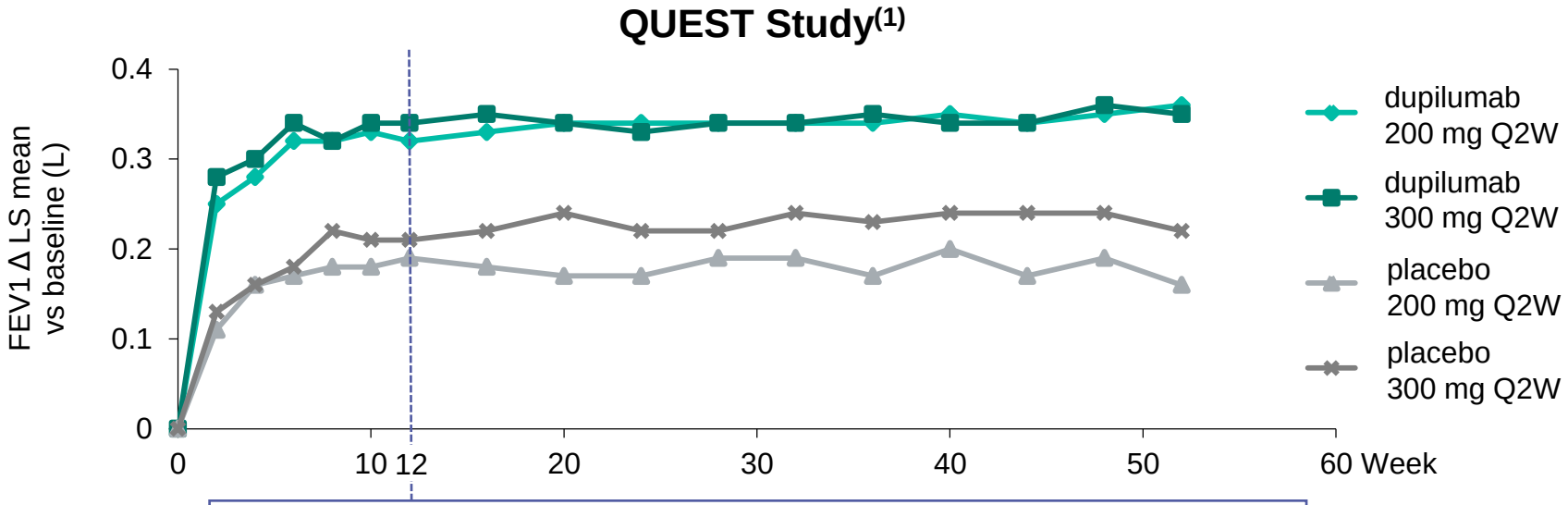
(1) Wenzel S et al. Lancet 2016; Phase 2b dose-ranging trial
(2) clinicaltrials.gov (NCT02573233) accessed Nov 1st 2017
(3) clinicaltrials.gov (NCT02573233) accessed Nov 1st 2017
(4) clinicaltrials.gov (NCT02528214) accessed Nov 1st 2017
(5) clinicaltrials.gov (NCT02573233) accessed Nov 1st 2017

Dupilumab in Asthma Pivotal Trial Program: Reduced Exacerbations in Overall Population



The safety and efficacy of dupilumab in asthma patients have not been evaluated by any regulatory authority
Most common adverse event was injection site reaction, which was more frequent in the dupilumab dose groups than placebo. Other common adverse events more common with dupilumab than placebo were upper respiratory tract infection, headache, nasopharyngitis and bronchitis. Incidence of Infections and of serious adverse events was balanced across treatment groups

Dupilumab Demonstrated Rapid and Sustained Improvement of Lung Function



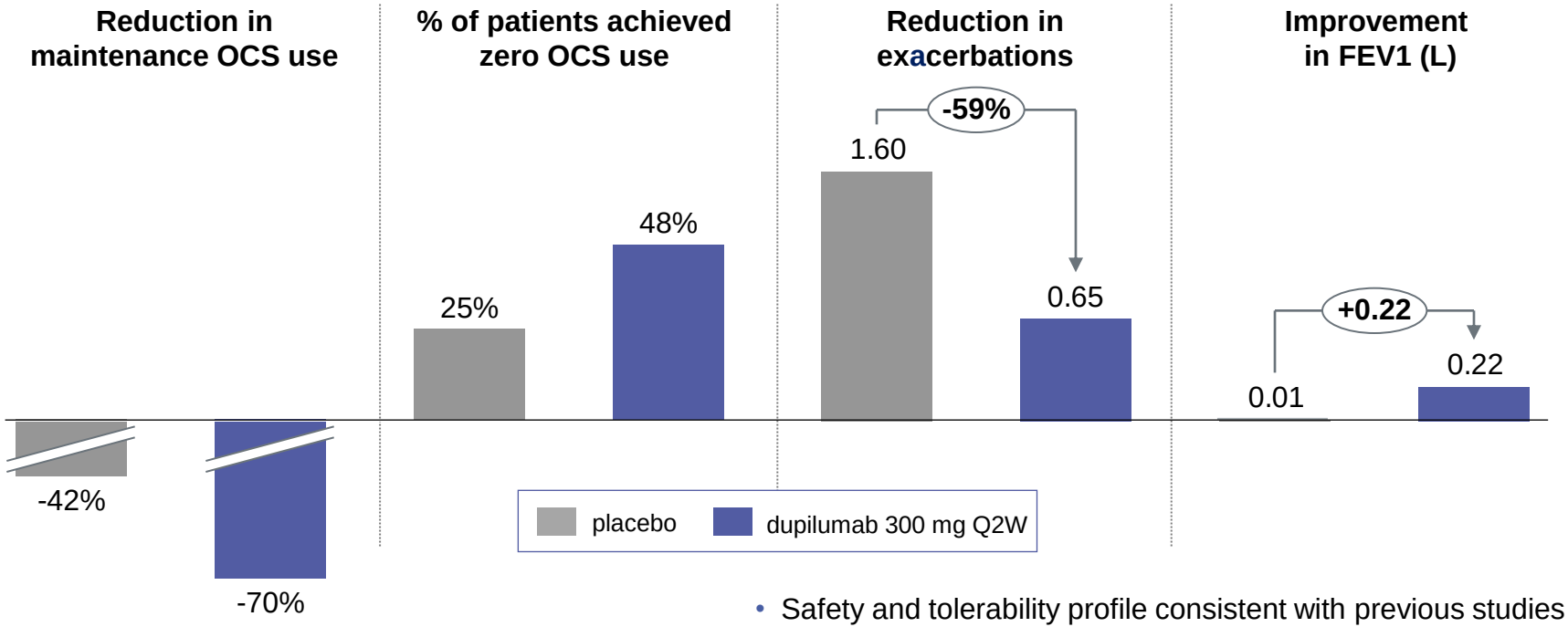
FEV1 Δ LS mean vs placebo (L)	200 mg Q2W	300 mg Q2W
QUEST - week 12	0.14	0.13
Dose Ranging Study - week 12	0.20	0.16
VENTURE - week 24	n/a	0.22

The safety and efficacy of dupilumab in asthma patients have not been evaluated by any regulatory authority

(1) The overall rates of adverse events, deaths, infections, conjunctivitis, herpes and discontinuations were comparable between the dupilumab and placebo groups. Injection site reactions were more common in the dupilumab groups (17% of dupilumab patients vs 8% for placebo patients).

Dupilumab Reduced OCS, Exacerbations and Improved Lung Function in Severe Steroid-Dependent Asthma Population

VENTURE Study: Overall Patient Population at Week 24



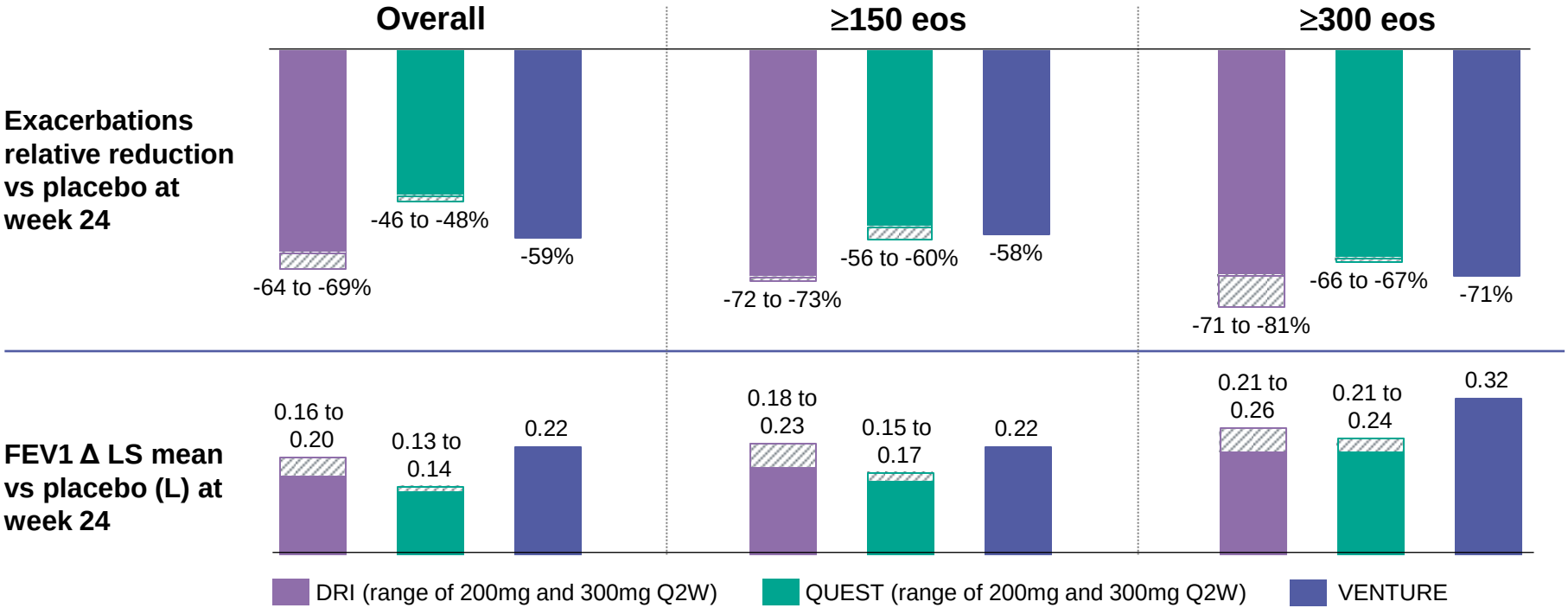
- Safety and tolerability profile consistent with previous studies

OCS= Oral Corticosteroids; FEV1= Forced expiratory volume

The safety and efficacy of dupilumab in asthma patients have not been evaluated by any regulatory authority

Dupilumab Demonstrated Efficacy Across Broad Population and Independent of Eosinophilic Phenotype

Consistent Reduction in Risk of Exacerbation and Improvement in Lung Function



Dupilumab's Profile Demonstrated in Pivotal Asthma Program Suggests Key Differentiation in Competitive Class

Biologics in asthma	dupilumab	benrazilumab	mepolizumab	reslizumab	omalizumab	tezepelumab
Mechanism of action	✓ Dual inhibitor IL4/IL13	Anti-IL5R	Anti-IL5	Anti-IL5	Anti-IgE	Anti-TSLP
Population studied	✓ All comers/ biomarkers unrestricted	Eosinophilic phenotype	Eosinophilic phenotype	Eosinophilic phenotype	High IgE	All comers/ biomarkers unrestricted
Efficacy in Type 2 co-morbidities	✓ Atopic Dermatitis ✓ PoC in EoE, NP	n/a	n/a	n/a	n/a	n/a(1)
Dosing & Administration	✓ At-home administration, Q2W	In office by HCP, Q4W first 3 doses, then Q8W	In office by HCP, Q4W	In office by HCP, Q4W	In office by HCP, Q2W or Q4W	TBD

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The safety and efficacy of dupilumab in asthma patients has not been evaluated by any regulatory authority

(1) As per Amgen Q3 2017 earnings call, tezepelumab Phase 2a study in atopic dermatitis failed to report statistical significance on its primary endpoint

Safety Database Supports Profile for Continuous Therapy

6,500+
patients
on dupilumab in development program

23
clinical trials
completed in clinical program

~4,000
patients
with exposure to dupilumab for **>1 year**

12
clinical trials
initiated and currently ongoing

- No imbalance in serious infection or malignancy(1)
- Update from asthma indication ongoing

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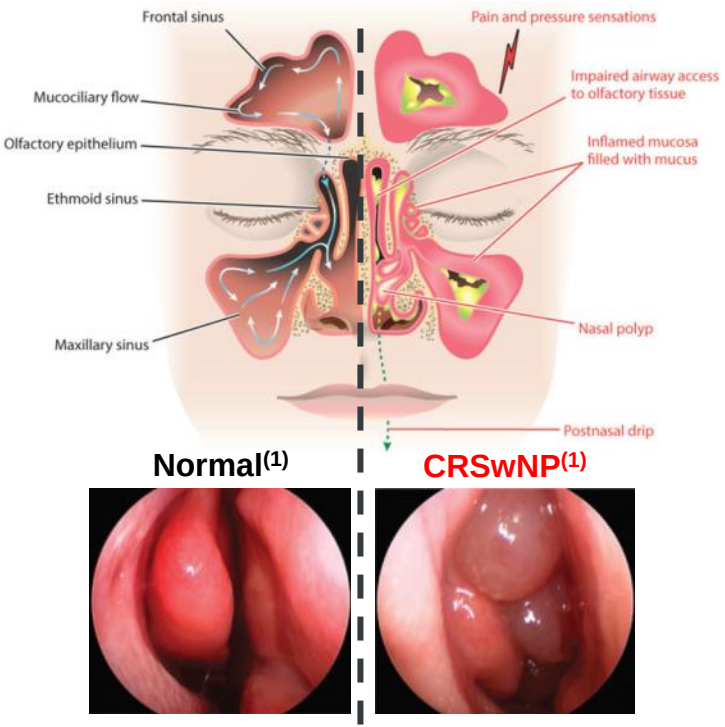
(1) Most common adverse reactions (incidence ≥1%): injection site reactions, conjunctivitis, blepharitis, oral herpes, keratitis, eye pruritus, other herpes simplex virus infection, dry eye

High Unmet Medical Need in Patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP)

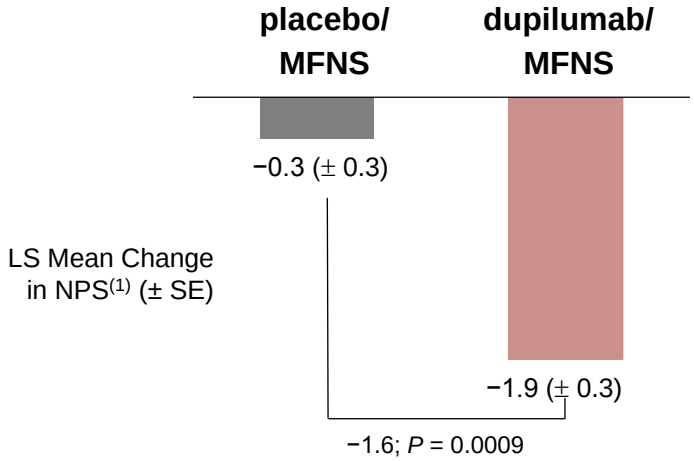
- CRSwNP a prevalent and persistent disease
- CRSwNP affects 2-4% of adults[2]
  - 30-70% overlap rate with asthma[3]
- Symptoms (nasal blockage and congestion, loss of smell, facial pressure and pain) lead to reduced productivity, sleep and quality of life
- Standard of care: Intranasal steroid use, followed by functional endoscopic sinus surgery
  - Annual number of functional endoscopic sinus surgery procedures ~250K in U.S. and EU5
  - Recurrence post surgery in >50% of patients



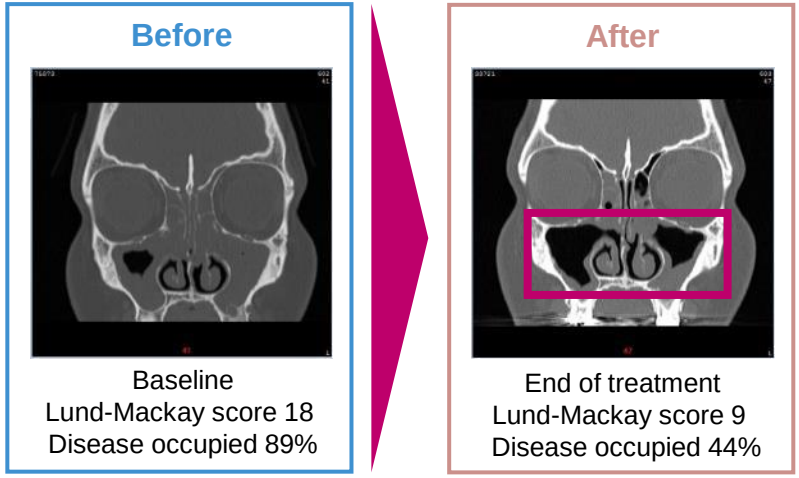
(1) Endoscopic images from a healthy person and patient with severe CRSwNP. Source: Schleimer RP. Annu Rev Pathol 2017;12:331–357
(2) Incidence across U.S., EU and Japan - Settipane 1977; Klossek 2005; Hedman 1999
(3) Ref: Alobid 2011b; Dietz de Loos 2013; Bachert 2010; Promsopa 2016; Hakansson 2015

Dupilumab Improved Endoscopic, Radiographic and Patient Reported Measures in PoC study

Improvement in Nasal Endoscopy NPS[1]



Treatment with dupilumab (CT scan)[2]



~50% improvement in sinus patency

Phase 3 fully enrolled with read-out expected in H2 2018

The safety and efficacy of dupilumab in patients with NP has not been evaluated by any regulatory authority. Safety profile consistent with previous studies. Most common AEs were injection site reactions, nasopharyngitis, oropharyngeal pain, epistaxis, headache and dizziness. MFNS= Mometasone Furoate Nasal spray; LS= Least Squares; SE= Standard Error

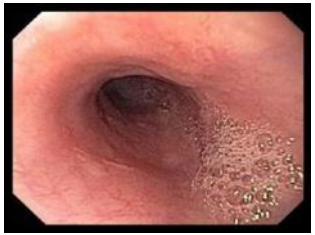
(1) NPS= Nasal Polyps Score; Bilateral score range 0–8 (0 = no polyps, 4 = large polyps causing complete obstruction of the inferior nasal cavity)
Bachert and al,; Effect of Subcutaneous dupilumab on NP Burden in Patients With Chronic Sinusitis and NP; JAMA 2016;315:469-479

(2) Individual results did vary

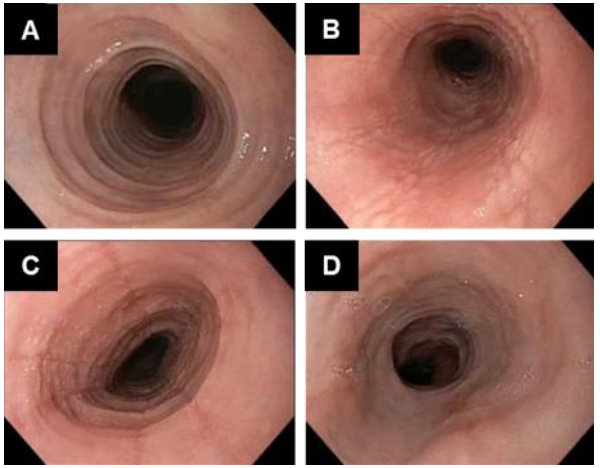
Eosinophilic Esophagitis (EoE): A Type 2 Inflammation of the Esophagus with Limited Treatment Options

- Chronic allergic inflammatory disease localized to the esophagus
- Symptoms of esophageal dysfunction and histology resulting from eosinophilic inflammation
- Treatment options limited to diet changes, proton-pump inhibitors, corticosteroids and surgery (dilation)
- ~150K patients in the U.S.(1)
  - Rising incidence
  - Approximately 60% with co-morbidities
  - >40% with family history of atopy or allergies(2)

Normal esophagus



Structural changes to esophagus(3)



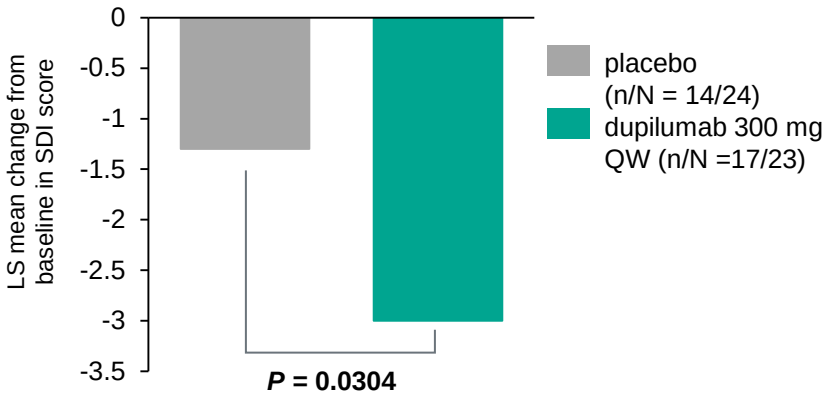
A: Fixed esophageal rings; B: Linear furrows
C: A more focal structure in the distal esophagus
D: Combination of multiple findings including rings, furrows, plaques, narrowing, decreased vascularity

(1) Dellon, et al., Prevalence of Eosinophilic Esophaghitis in the United States Clinical Gastroenterology and Hepatology. Volume 12, Issue 4, 2014
(2) Mohammad AA et al., Journal of the American Academy of Dermatology, 2017; 76(3);559-560
(3) Reprinted from Gastroenterology, 147(6), Dellon ES, Liacouras CA, Advances in clinical management of eosinophilic esophagitis, 1238–1254, Copyright (2014), with permission from Elsevier

Dupilumab Improved Symptoms, Endoscopy and Histology Measurements in Moderate-to-Severe EoE in PoC study

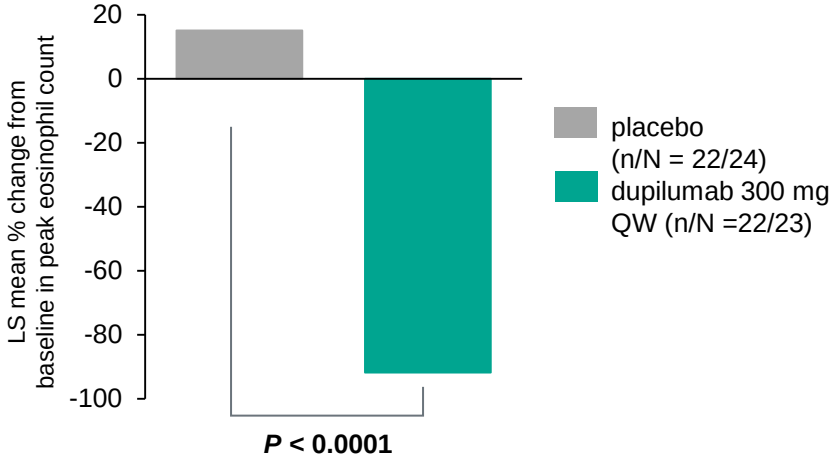
Primary Endpoint (Subjective)

Dupilumab significantly reduced Straumann Dysphagia Instrument SDI PRO score at week 10



Secondary Endpoint (Objective)

Significant reduction in overall peak esophageal intraepithelial eosinophils at week 12



- There were no new significant safety concerns in this trial. Higher rates of injection site reactions were observed on dupilumab versus placebo

Start of Phase 3 expected in H2 2018

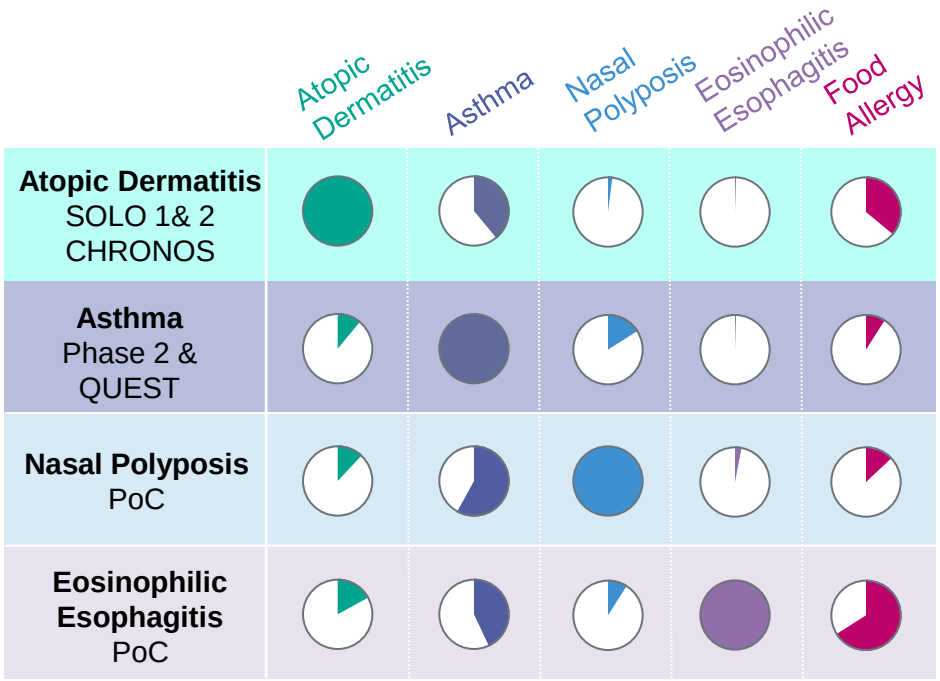
Dupilumab, by Blocking the IL4/IL13 Pathway, Potentially Addresses the Burden of Co-Morbidities Effectively

Co-morbidities represent large burden for patients suffering from immune-mediated diseases

Addressing co-morbidities in dupilumab development program is a key differentiator

Start of clinical program evaluating co-morbidities planned for 2018

Co-Morbid History of Patients in dupilumab Studies

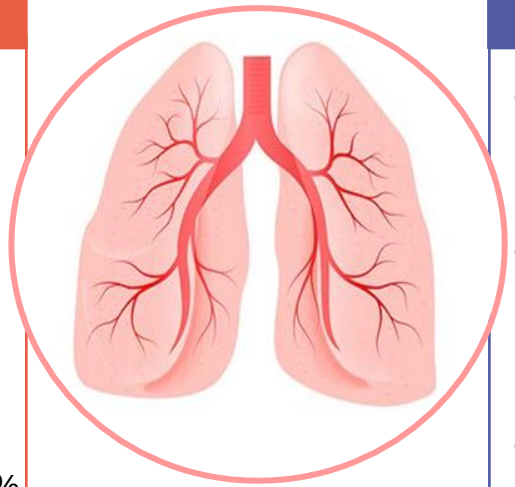


Dupilumab is under clinical investigation for Asthma, NP and EoE and its safety or efficacy for use in co-morbidities has not been evaluated by any regulatory authority

Dupilumab to Start Phase 3 Program in COPD in 2018

Large unmet need for new treatment options in COPD

- Estimated market of ~€16bn in 2025(1)
- Despite existing therapies a large subset of patients still experience severe exacerbations
- Significant need for a new MoA
  - Approximately 2m patients in the U.S. at risk despite inhaled triple therapy(2)
  - Penetration of biologics by 2025 ~10-15%



Compelling rationale for dupilumab development program in COPD

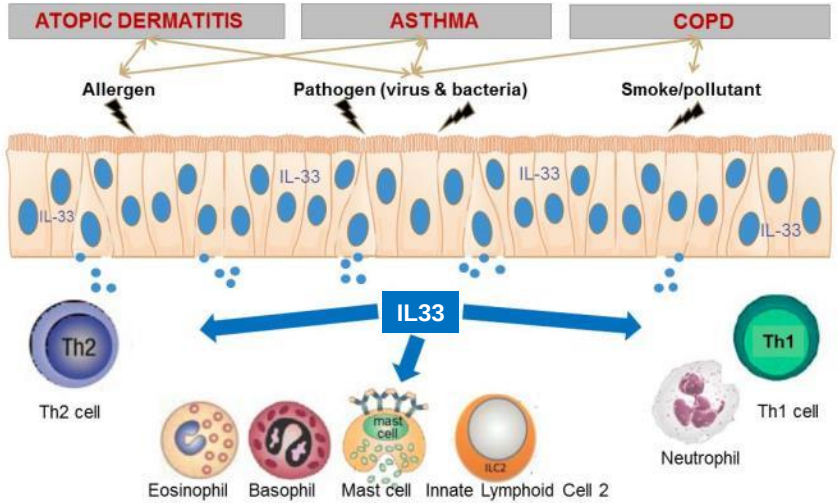
- Unmet need to prevent exacerbation and to improve pulmonary function
  - No approved biologics to date
- Type 2 inflammation plays a key role in a group of COPD patients and is associated with decreased lung function(3)
- Leverage robust efficacy and safety data to build COPD development program for dupilumab

SANOFI

(1) Estimated global sales of advanced therapies (biologics and orals)
(2) Adelphi COPD DSP

(3) Asthma–COPD Overlap. Clinical Relevance of Genomic Signatures of Type 2 Inflammation in Chronic Obstructive Pulmonary Disease Am J Respir Crit Care Med. 2015 Apr 1; 191(7): 758–766

IL33 mAb(1): Potential for Broader Spectrum of Immune Modulation in Atopic Dermatitis, Asthma and COPD



- IL33 is a proinflammatory cytokine released by damaged epithelial cells in response to insults such as allergens, pathogens and smoke(2)
- IL33 signaling initiates and amplifies downstream inflammatory pathways characteristic of both Type 1 and Type 2 inflammation(2)

- Target identified and validated by human genetics(3)
- Major opportunity in monotherapy and in combination
  - Building on the benefit of dupilumab in AD, as well as potentially asthma and COPD

(1) Collaboration with Regeneron
(2) Cayrol and Girard, 2014
(3) Regeneron Genetics Center validated that LOF mutations in IL33 decrease the risk of asthma by greater than 50%

IL33 mAb(1) as Monotherapy and in Combination with Dupilumab: Clinical Development Program

Phase 1 Program

Phase 1 in Healthy Adults IL33 administered intravenously or subcutaneously	**Completed** ✓
Phase 1b in Adult Patients with Moderate Asthma Studies safety, tolerability, pharmacokinetics of multiple ascending doses of IL33	**Started Q1 2017** ✓
Phase 1b in Mild Allergic Asthma Patients (BAC) Studies effects of IL33, dupilumab and combined IL33/dupilumab on inflammatory signature after bronchial allergen challenge (BAC)	**Started Q3 2017** ✓

Phase 2 Program

Phase 2b in Atopic Dermatitis	**Planned to start H1 2018**
Proof of Concept in COPD	**Planned to start H2 2018**
Proof of Concept in Asthma	**Planned to start H1 2018**

(1) Collaboration with Regeneron

LCM Opportunity in Overlapping Conditions with a Strong IL6 Signature

KEVZARA™ sarilumab

Giant Cell Arteritis[1]	• Chronic vasculitis of medium and large vessels • Occurs in the elderly, mostly women • Symptoms: jaw claudication, visual symptoms including blindness, arm claudication • IL6 level correlate with severity • 50% have PMR-type symptoms	**Prevalence**: >228K patients in the U.S.[2]; Prevalence varies across ex-U.S. markets[3]	**Objective**: Offering IL6 efficacy with less frequent dosing
Polymyalgia Rheumatica[1]	• Inflammatory syndrome in the elderly, mostly women • Characterized by symmetrical proximal (shoulder & hip girdle) aching and stiffness • IL6 levels correlate with severity • 10 to 30% develop GCA within 1 year • Corticosteroid are current preferred treatment option	**Prevalence**: At least 711K patients in the U.S.[2]; Prevalence varies across ex-U.S. markets[3]	**Objective:** To become 1st biologic therapy indicated for PMR

(1) Potential area for further study
(2) Lawrence RC, Felson DT, Helmick CG, et al; National Arthritis Data Workgroup. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States: part II. Arthritis Rheum. 2008;58(1):26-35
(3) Gonzalez-Gay MA, et al, Arthritis Care & Research. Vol. 61, No. 10, October 15, 2009, pp 1454–1461

SANOFI

Frank Nestle
Global Head of Immunology &
Inflammation Research Therapeutic Area

SANOFI

Building a Competitive Position in Immunology

Next wave in Immunology

Sanofi's Vision to Discover Breakthrough Medicines in Immunology

Sanofi is developing precision immune therapies

Precision Immunology

Multi-pathway targeting

Accelerating discovery of impactful patient treatments

Patients with immunological disease

Atopic Dermatitis

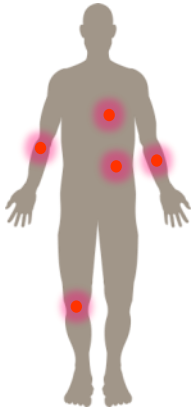
Asthma

Systemic Lupus Erythematosus

Rheumatoid Arthritis

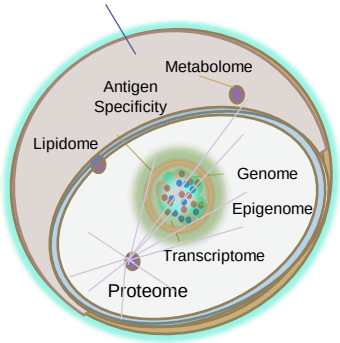
Type 1 Diabetes

Multiple Sclerosis



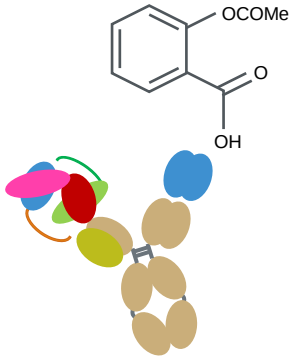
Interrogate at single cell level

Surface Immunophenotype



Develop breakthrough precision immune therapies

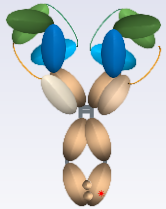
Medicine



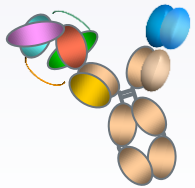
Discovering Transformative Immunology Medicines

Going beyond the current paradigm of single cytokine blockade

Multi-pathway modulation



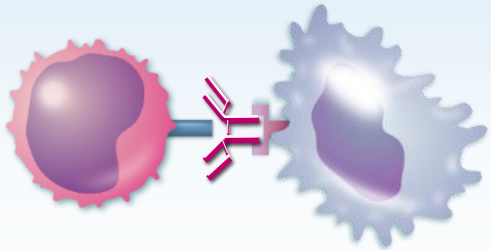
Bi-specific antibodies



Tri-specific antibodies

Targeted cell depletion and modulation

aCXCR3

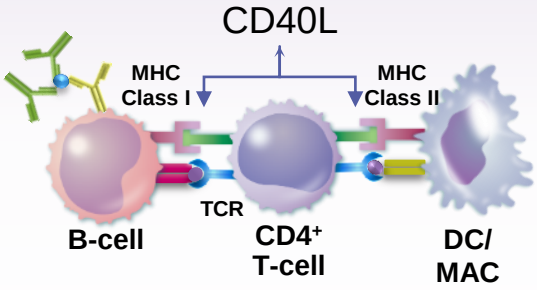


CXCR3+ cell

NK cell, Macrophage

Master Regulators

Autoantibody

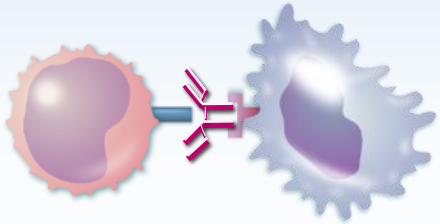


Targeted Cell Depletion in Dermatology and Type 1 Diabetes

SAR440241 - Anti-CXCR3 Targeted T-cell Depletion

Clinical Candidate

aCXCR3

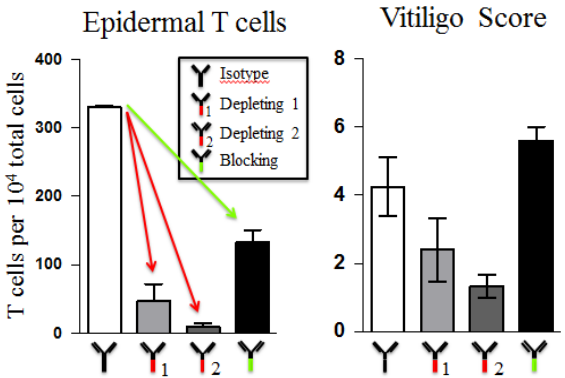


Autoimmune Lymphocyte

NK cell, Macrophage

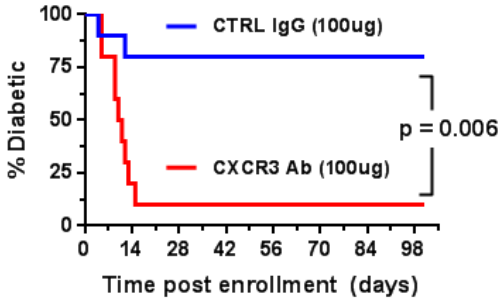
Depletion of Epidermal T-cells by anti-CXCR3 in Vitiligo Model

Reduction in Vitiligo Score[1]



Durable Reversal of Hyperglycemia in NOD Diabetes Model

Diabetes Reversal



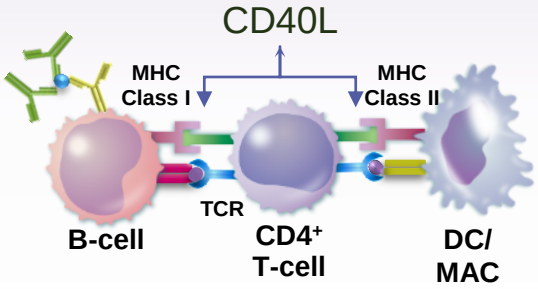
Potential clinical indications:
T1D, Vitiligo, Psoriasis

(1) Richmond et al. J Invest Dermatol 2017 Apr; 137(4): 982-985.

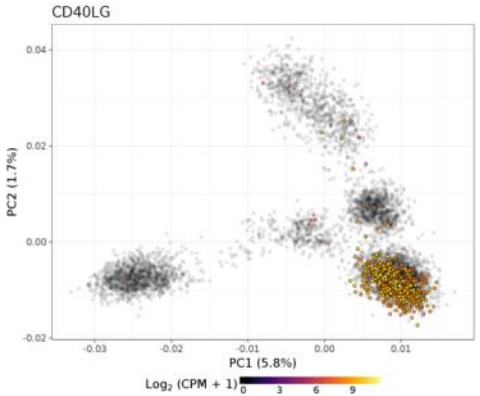
Next Key Master Regulator in Immunology: CD40L

α-CD40L mAb

Autoantibody

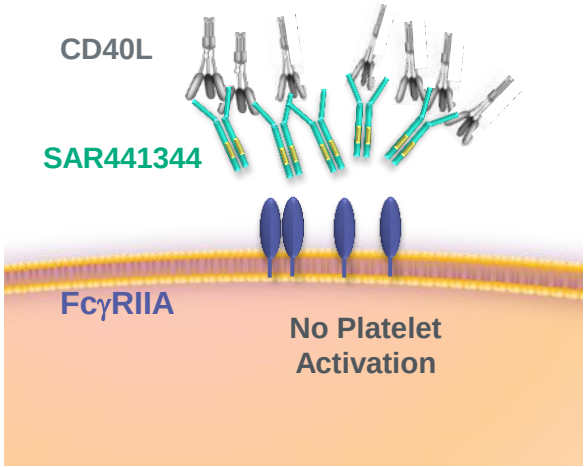


CD40L Expression on Single Immune Cells



AMP Consortium
Phase 1 Data -single cell RNA seq

SAR441344 α-CD40L Inactivated Fc Region

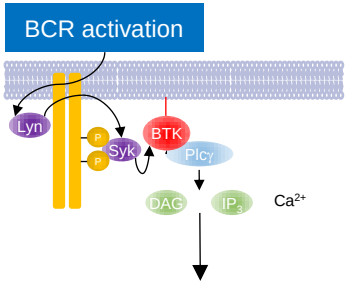


Potential clinical Indications:
MS, SLE

Global License Agreement with Principia for Brain-Penetrant BTK Inhibitor

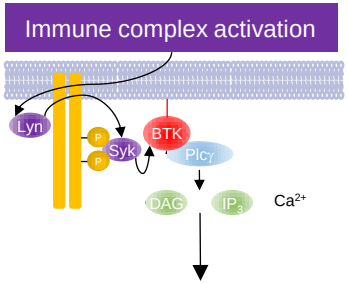
Rationale of BTK Inhibition in MS(1)

B-Cells



- B-Cell maturation
- Proliferation (NF-κB)
- Autoantibody production
- Cytokine Secretion

CNS Microglia



- Microglial activation
- Pro-inflammatory cytokine secretion (e.g., TNFα, IL1β, IL6)

Differentiation of PRN2246 vs Other BTKi and Current High-Efficacy Treatments

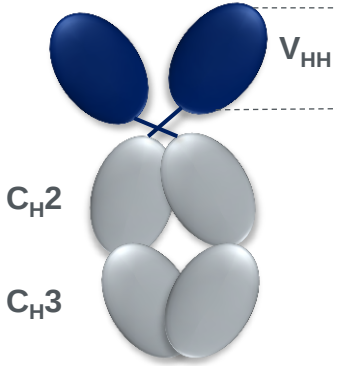
	Current high-efficacy DMTs	Other BTKi	PRN2246
B-Cell modulation (not depletion)	✗	✓	✓
Oral	✗	✓	✓
Significant drug levels in the brain	✗	✗	✓
Potential to modulate CNS innate immunity	✗	✗	✓

The Principia transaction remains subject to customary regulatory approvals and has not yet closed. Under the terms of the agreement Sanofi will develop PRN2246 oral treatment that shows promise in multiple sclerosis (MS) and, potentially, other central nervous system (CNS) disease.
BTK= Bruton's Tyrosine Kinase; BCR= B-Cell Receptor
(1) Adapted from Hendriks (2011) Nat. Chem. Biol. 7:4-5.

Multi-Pathway Modulation: Collaboration with Ablynx

Ablynx: A Leading Biologics Platform

- Up to **8 programs focused on immune-mediated inflammatory diseases**
- Multiple drug targets in a single molecule
- Proven success:
  - >45 programs
  - >2,000 patients and volunteers treated with Nanobodies®



Heavy-chain only Antibodies

Ablynx **Nanobody®**

- Nano to pico-molar affinities
- Able to bind and block challenging targets
- Multiple administration routes
- Simple to manufacture

Deal signed with Ablynx:
July 2017

Potential Indications:
Asthma/COPD, RA, AD, Psoriasis

AD= Atopic Dermatitis; COPD= Chronic Obstructive Pulmonary Disease; RA= Rheumatoid Arthritis;

Rand Sutherland
Therapeutic Area Head,
Rare Disease Development

SANOFI

Sustaining Leadership in Rare Disease

SANOFI GENZYME Over 30 Years of Innovation in Rare Disease

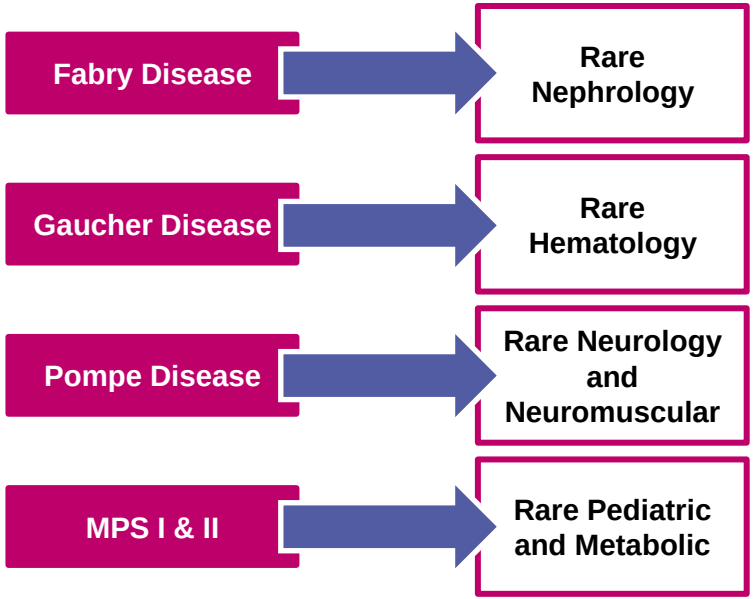
Mission

Discover and develop transformative therapies for rare diseases with well-defined mechanisms and high unmet need

Ambition

Expand leadership by:

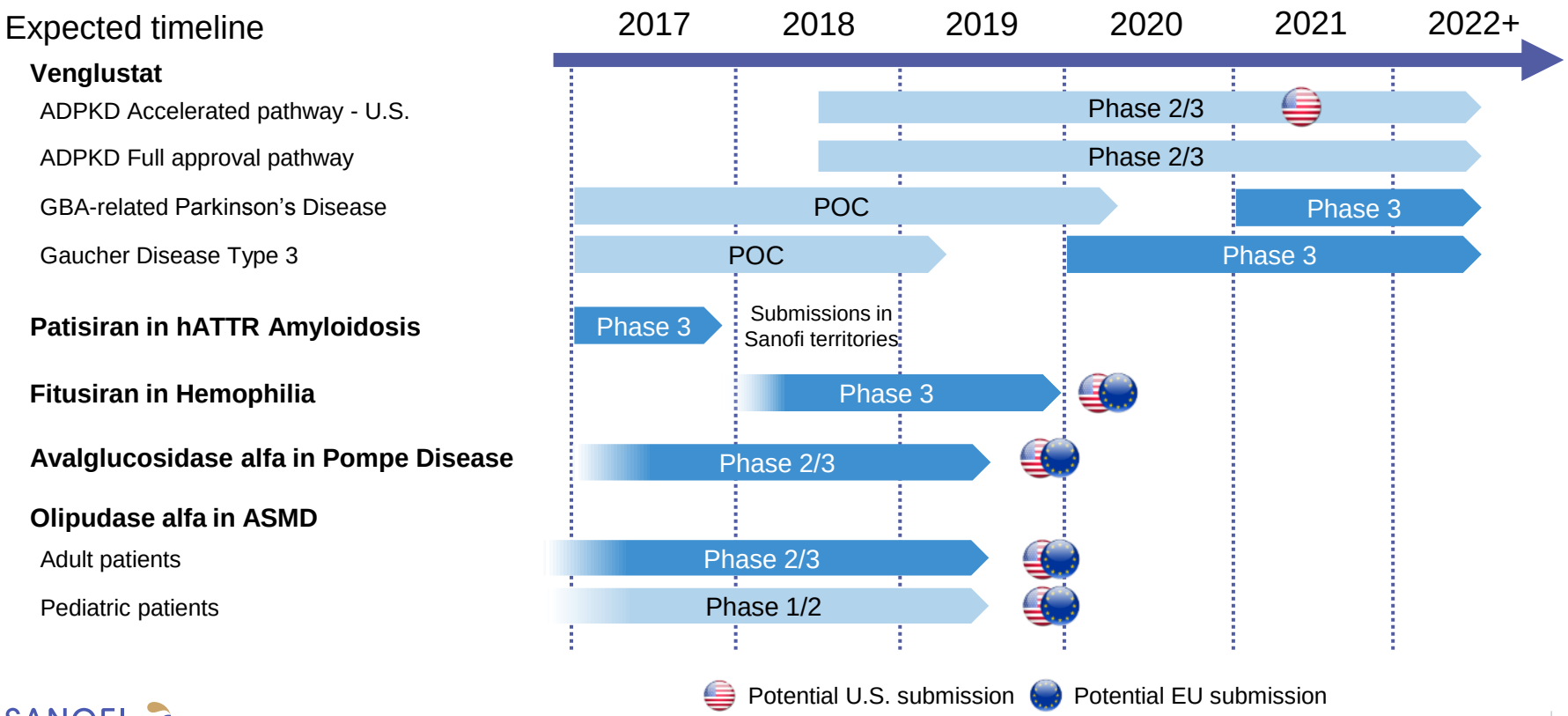
- Sustaining innovation in LSD treatments
- Strategically expanding into related conditions through Rare Disease Therapeutic Areas



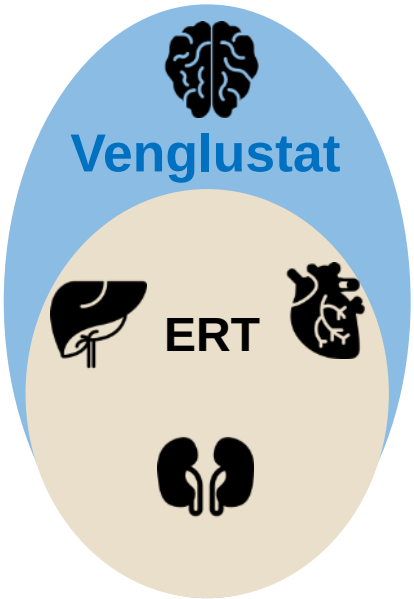
Cerezyme® imiglucerase for injection | Cerdelga® eliglustat | Fabrazyme® agalsidase beta | Myozyme® (alglucosidase alfa) | ALDURAZYME® (LARONIDASE) | elaprase® (idursulfase)

LSD= Lysosomal Storage Disorder; MPS= Mucopolysaccharidoses
Sanofi Genzyme markets Elaprase® in JaPac (including Japan, South Korea, Taiwan and Australia)

Rare Disease Planned Development and Regulatory Timelines

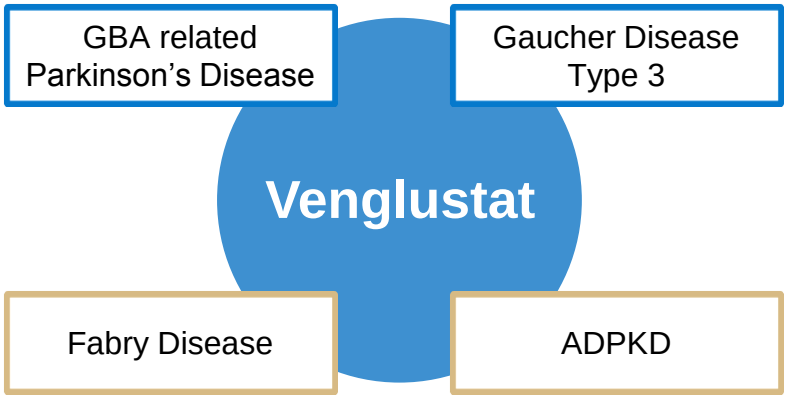


Venglustat[(1)]: Oral, Once Daily Inhibitor of GCS with Potential Across Multiple Rare Diseases



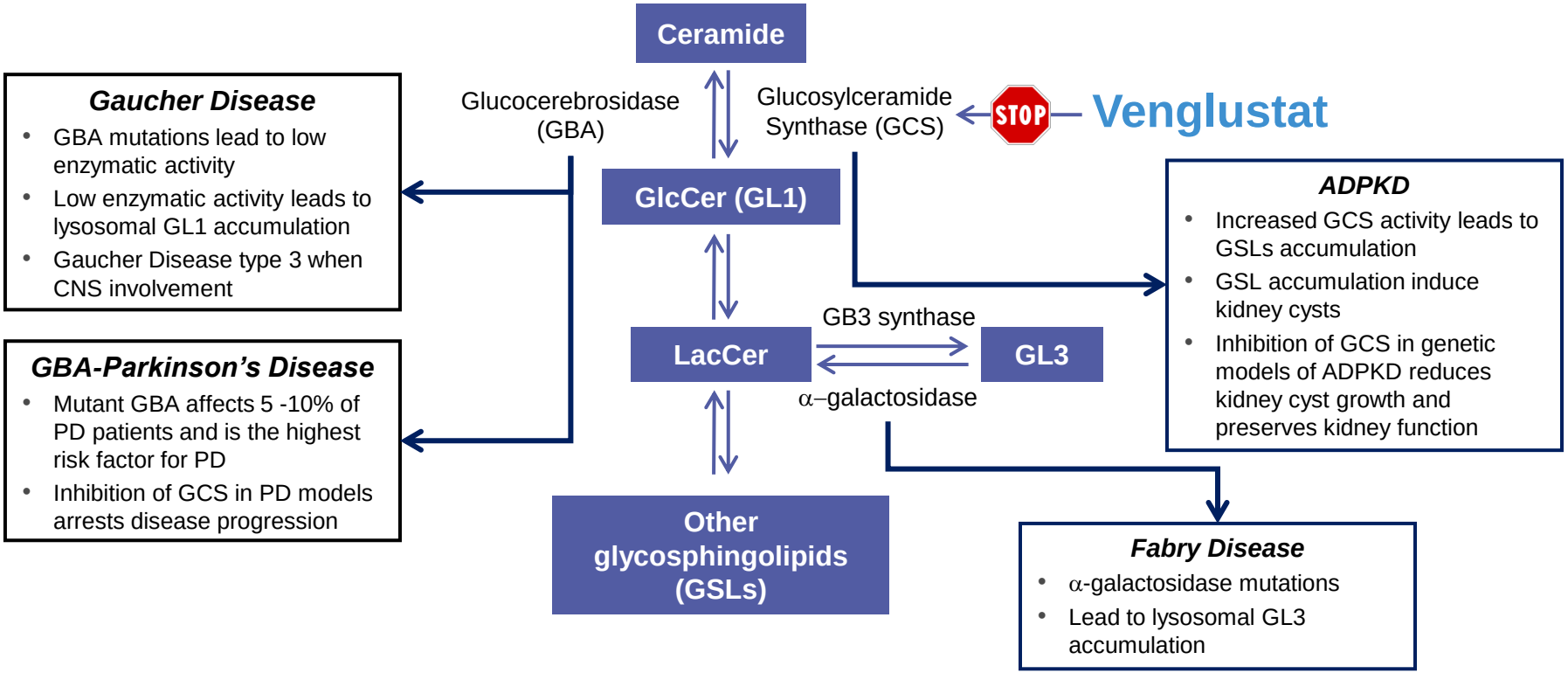
Expected to address CNS manifestations of LSDs and related disorders

Venglustat Clinical Development



Venglustat is an investigational agent and has not been evaluated by any regulatory authority
In preclinical studies, venglustat penetrates the blood-brain barrier
ERT= Enzyme Replacement Therapies; ADPKD= Autosomal Dominant Polycystic Kidney Disease
(1) Also known as SAR402671

The Glycosphingolipid Pathway is at the Heart of Multiple Rare Diseases

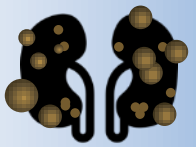


Venglustat is an investigational agent and has not been evaluated by any regulatory authority
GlcCer= Glucosylceramide; GL3= Glycolipid; GSL= Glycosphingolipids; ADPKD= Autosomal Dominant Polycystic Kidney Disease

Venglustat: Autosomal Dominant Polycystic Kidney Disease (ADPKD)

Increased GSL concentrations in kidney

Normal Kidney



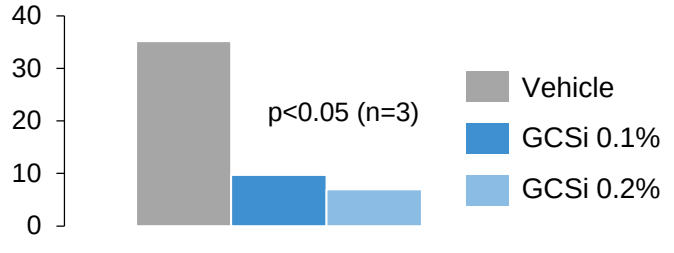
Polycystic Kidney Disease

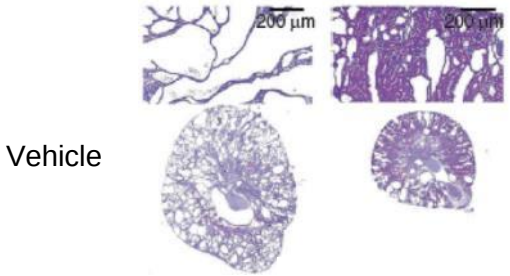
End Stage Kidney Disease

120,000 patients

170,000 patients

GM3 (AU) in male *jck* mice





Registrational Phase 2/3 expected to start in 2018, FDA submission targeted for 2021

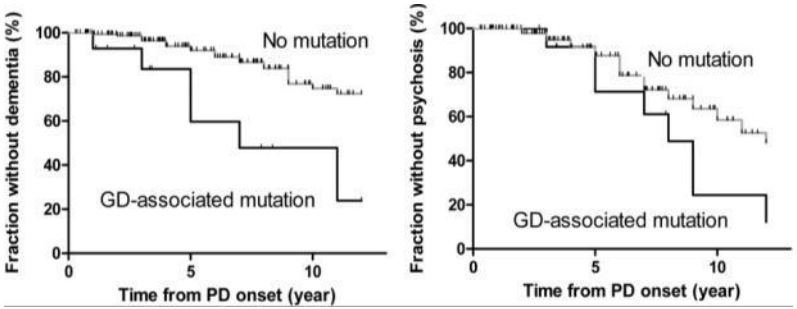
Venglustat is an investigational agent and has not been evaluated by any regulatory authority
GSL= Glycosphingolipids; GM3= GM3 ganglioside; BUN= Blood Urea Nitrogen; Kidney/BW= Kidney size to body weight ratio
All data from Natoli TA, et al. Nat Med. 2010 Jul;16(7):788-92.
(1) p<0.05, in male mice

Venglustat: Glucocerebrosidase-Related Parkinson's Disease

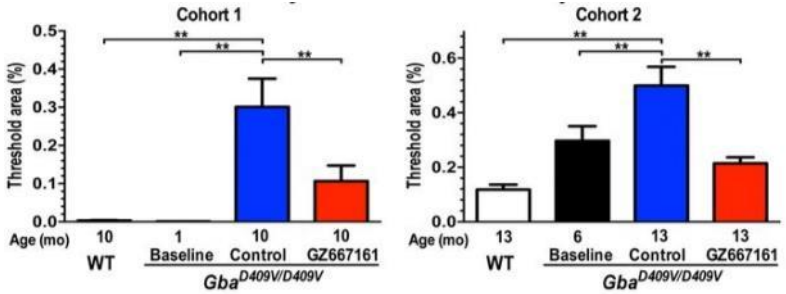
GBA-related Parkinson's Disease

- GBA gene mutations, causative in Gaucher, also associated with Parkinson's Disease
  - Associated with accelerated clinical progression
  - Estimated prevalence of ~50k-100k patients in the U.S.
- GCS inhibition in relevant mouse models(1):
  - Reduced GL-1
  - Reduced membrane-associated α-synuclein in CNS
  - Improved behavioral and cognitive deficits
- Phase 2 ongoing in ~250 patients

Clinical Impact of GBA Mutation



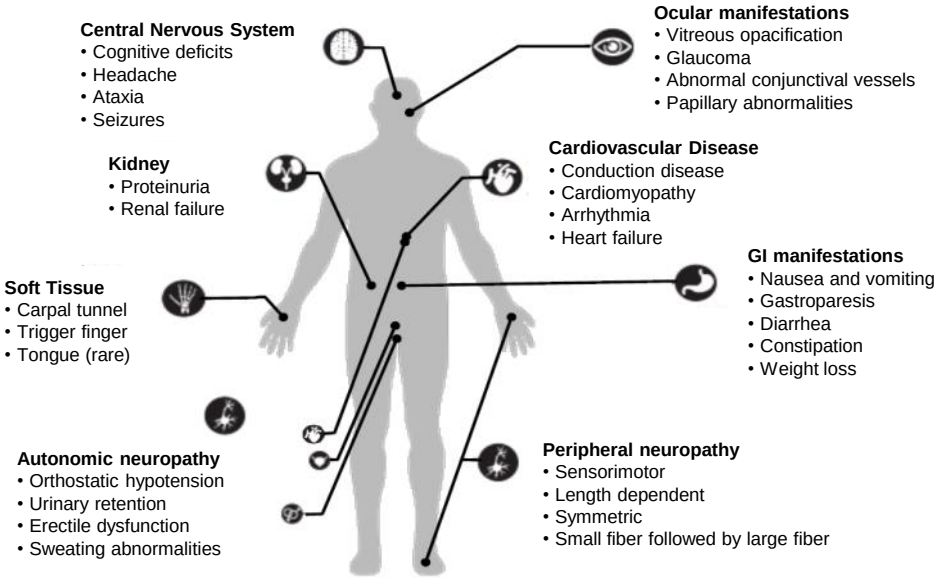
Proteinase K-resistant α-synuclein immunoreactivity



In mouse models; Sardi et al., 2011 & 2013, Rocha et al., 2015; Rockenstein et al
Oeda T et al. Neurobiol Aging 2015;36:3306-13 - Sardi SP et al. PNAS 2017;114:2699-704

Patisiran(1): RNAi Therapeutic for hATTR Amyloidosis

The Multiple Aspects of hATTR Amyloidosis



Patisiran APOLLO Phase 3 Study

Primary endpoint change in mNIS+7 from baseline

Estimated 5,000 to 7,000 hATTR patients with polyneuropathy in Sanofi territories

Patisiran is an investigational agent and has not been evaluated by any regulatory authority

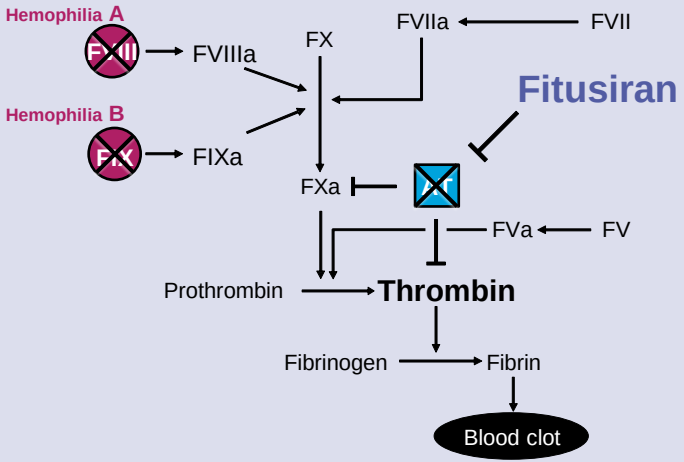
Improvements in exploratory cardiac endpoints also observed

The most commonly reported adverse events (AEs) with patisiran were generally mild to moderate and included peripheral edema and infusion-related reactions (IRRs). The frequency of deaths and serious adverse events (SAEs) was similar in the patisiran and placebo groups.

(1) In collaboration with Alnylam; Sanofi has development and commercialization rights in all territories outside the U.S., Canada and Western Europe.

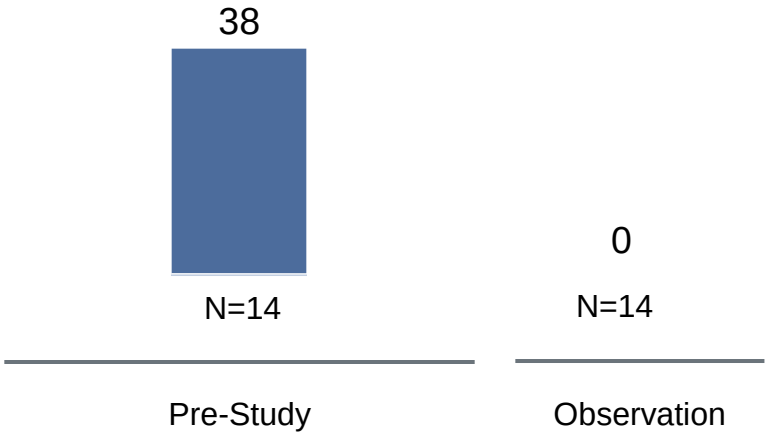
Fitusiran[(1)]: RNAi Therapeutic for Hemophilia Demonstrated Encouraging Efficacy in Phase 1/2 Study

Fitusiran Mechanism of Action



Fitusiran Phase 1/2 Study in Patients with Inhibitors

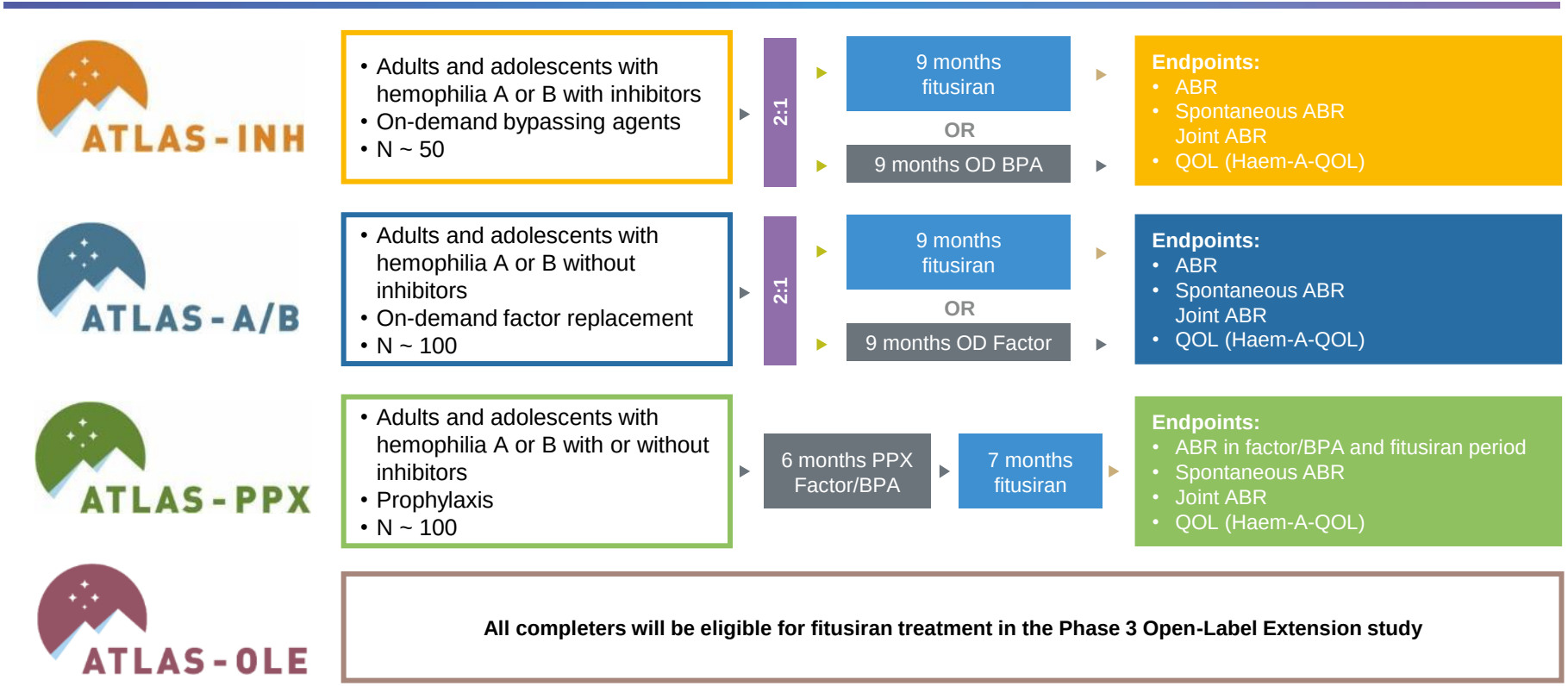
Primary endpoint Annualized Bleeding Rate (ABR)



Estimated ~140,000 treated moderate/severe hemophilia patients in Sanofi territories

Fitusiran is an investigational agent and has not been evaluated by any regulatory authority
Safety/tolerability profile includes increased AST/ALT in HCV Ab positive patients and one case of thrombosis, possibly drug-related
In collaboration with Alnylam; Sanofi has co-development and co-commercialization rights in the U.S., Canada and Western Europe. Sanofi also has rights for territories outside the U.S., Canada and Western Europe.
(1) Currently on clinical hold pending outcome of FDA discussion – Expected to resume around year-end

Fitusiran[(1)]: ATLAS Phase 3 Development Program

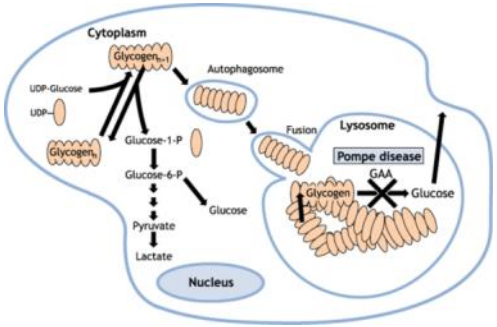


Fitusiran is an investigational agent and has not been evaluated by any regulatory authority

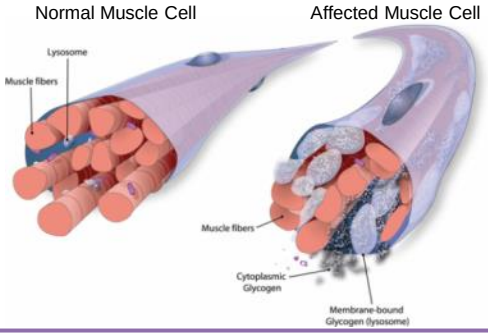
(1) Preliminary plans subject to further diligence and health authority feedback. Following the completion of the Type A meeting, the FDA will consider removal of the clinical hold upon final review of the amended protocols and other trial materials

Avalglucosidase alfa: Developing a Potentially Superior Drug for Pompe Disease

Pompe Disease – A progressive, often fatal myopathy



- Caused by mutations in the GAA gene
- Results in accumulation of glycogen within muscle cells



- rhGAA conjugated with bisM6p residues
  - Engineered to increase cellular uptake
- ~5x more effective than Myozyme® at clearing glycogen(1) from heart, diaphragm, skeletal muscle
- POC data suggest potential for superior efficacy vs. Myozyme®

Avalglucosidase alfa

- In development for LOPD and IOPD
  - Late Onset (LOPD) ~1/37,000
    Progressive damage to skeletal & respiratory muscle, significant disability, premature death
  - Infantile Onset (IOPD) ~1/138,000
    Rapidly progressive myopathy, respiratory failure, often fatal in first year of life

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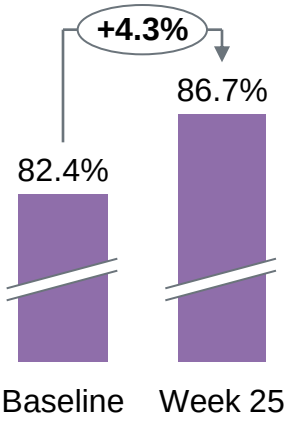
Avalglucosidase alfa is an investigational agent and has not been evaluated by any regulatory authority
Pompe Disease also known as acid α-glucosidase deficiency
M6P= mannose-6-phosphate; rhGAA= recombinant human acid α-glucosidase

LOPD= Late Onset Pompe Disease; IOPD= Infantile Onset Pompe Disease
(1) based on preclinical data
(2) based on preclinical toxicology studies

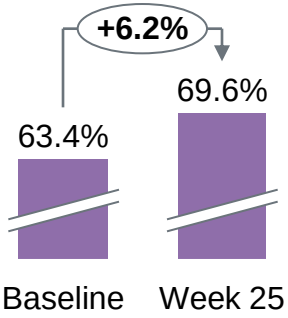
Avalglucosidase alfa: U.S. and EU Regulatory Submissions Targeted for Q4 2019

Phase 1/2 Clinical Data

NEO1 study[1]
10mg/Kg / n=3 naive
% predicted FVC, mean change



NEO1 study[1]
20mg/Kg / n=3 naive
% predicted FVC, mean change



Late-onset Pompe[2]

- Phase 3 randomized, double-blind efficacy and safety trial, vs. Myozyme®, in treatment-naïve adults
  - Primary endpoint: Change in FVC%
  - n=96

Infantile-onset Pompe[3]

- Phase 2, open-label, ascending dose, safety/PK/exploratory efficacy trial in patients <18 years of age who progress despite rhGAA treatment
  - n=20

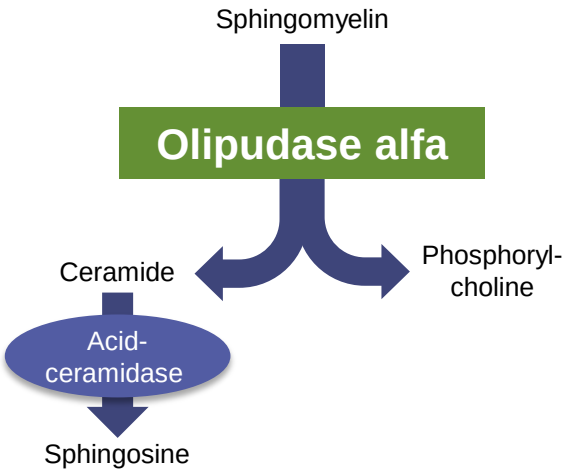
Avalglucosidase alfa is an investigational agent and has not been evaluated by any regulatory authority
Avalglucodisase alfa was well-tolerated, with safety profile similar to Myozyme®

(1) 1 exploratory efficacy of the novel enzyme replacement therapy neoGAA in treatment-naïve and avalglucosidase alfa-treated late-onset Pompe disease patients; Molecular Genetics and Metabolism 117 (2016) S14–S124
(2) COMET Phase 3
(3) Mini-COMET Phase 2

Olipudase alfa: Proof of Concept in ASMD Achieved

Therapeutic Approach

Target the underlying metabolic defect by supplementing the deficient enzyme



Positive Phase 1b Clinical Response(1)

- 24% pulmonary function
- 23% spleen volume
- 17% liver volume

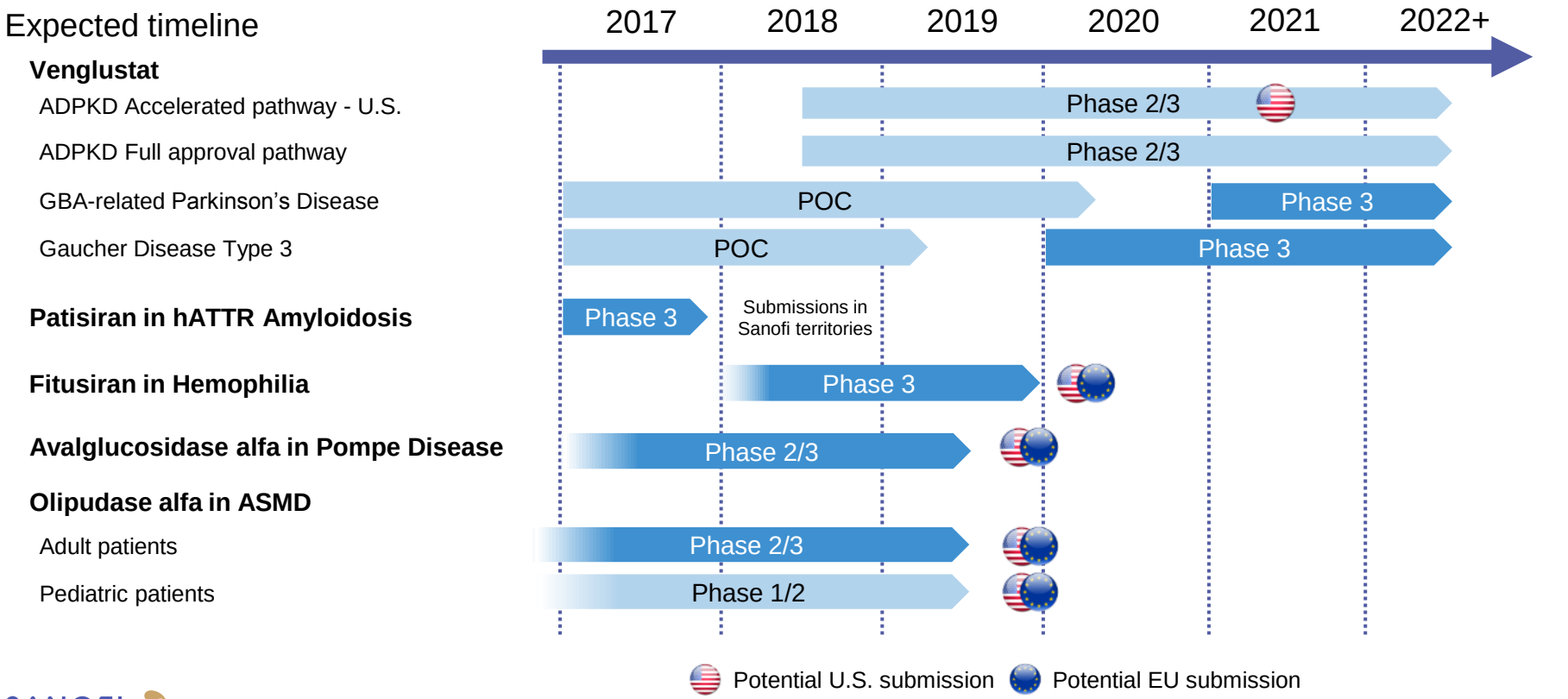
Well tolerated with no death or adverse events leading to discontinuation over 30 months

Ongoing ASCEND Clinical Program

- Phase 1/2 in pediatric patients
  - Read-out expected in H2 2019
- Phase 2/3 in adult patients
  - Read-out expected in H2 2019
- Designations received to date:
  - Orphan Drug Designation
    Fast Track
    Breakthrough Therapy
  - PRIME
  - Sakigake

ASMD= Acid Sphingomyelinase Deficiency, also known as Niemann-Pick Disease Type B
Olipudase alfa is an investigational agent and has not been evaluated by any regulatory authority
(1) Phase 1b clinical trial in 5 adults patients with chronic visceral ASMD. Dose escalation study (NCT01722526)

Rare Disease Planned Development and Regulatory Timelines



Jorge Insuasty
Senior Vice President,
Global Head of Development

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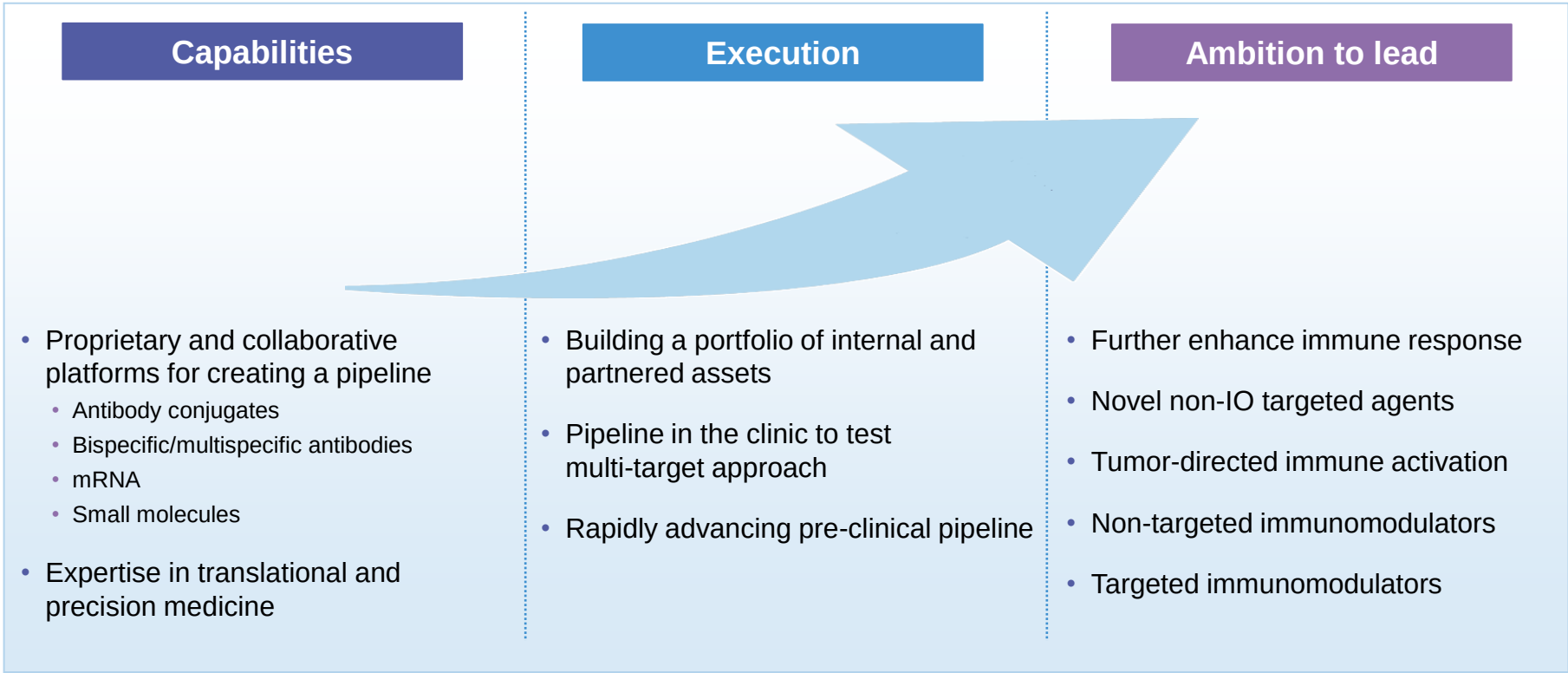
Building a Competitive Position in Oncology

Leverage Proprietary and Collaborative Platforms to Establish Strong Presence in Oncology



Dynamic and Growing Portfolio of Internally Developed and Partnered Assets

2018 Oncology Development Pipeline

Phase 1		Phase 2		Pivotal	
SAR439859 SERD Metastatic Breast Cancer	**SAR440234** T-Cell Engager AML/MDS	**SAR566658** Maytansin-loaded anti-CA6 mAb TNBC	**isatuximab** Anti-CD38 + cemiplimab MM	**cemiplimab*** Anti-PD-1 mAb Advanced CSCC	**isatuximab** Anti-CD38 RRMM (ICARIA)
SAR439859 SERD + palbociclib Metastatic Breast Cancer	**SAR441000** Immuno mRNA**	**SAR408701** Anti-CEACAM5 ADC Solid Tumors	**isatuximab** Anti-CD38 + cemiplimab Solid Tumors	**cemiplimab*** Anti-PD-1 mAb 1st line NSCLC	**isatuximab** Anti-CD38 RRMM (IKEMA)
SAR439459 Anti-TGFβ mAb Advanced Solid Tumors	**REGN IO mAB** T-Cell Engager Ovarian Cancer	**REGN3767***** Anti-LAG3 Advanced Cancers		**cemiplimab*** Anti-PD-1 mAb 2nd line Cervical Cancer	**isatuximab** Anti-CD38 1st line Ti (IMROZ)
SAR439459 Anti-TGFβ + cemiplimab* Solid Tumors	**REGN IO mAB** Checkpoint Inhibitor Solid Tumors			**cemiplimab*** Anti-PD-1 mAb Advanced BCC	**isatuximab** Anti-CD38 1st line Te
REGN3767*+ cemiplimab** Anti-LAG3 and anti-PD-1 Malignancies	**cemiplimab* + DNA vaccine** Anti-PD-1 mAb 1st L GBM*				
	cemiplimab* + oncolytic virus Anti-PD-1 mAb / Advanced RCC*				

Ongoing

New entries

* Partnered with Regeneron ** Partnered with BioNTech *** Opt-in rights products for which rights have not been exercised yet,
ADC= Antibody Drug Conjugate; AML= Acute Myeloid Leukemia; BCC= Basal Cell Carcinoma; CSCC= Cutaneous Squamous Cell Carcinoma; GBM= glioblastoma multiforme; MDS= Myelodysplastic Syndrome; MM= Multiple Myeloma; NSCLC= Non-Small Cell Lung Cancer; RCC= Renal Cell Carcinoma; RRMM= Relapsed Refractory Multiple Myeloma; SERD= Selective Estrogen Receptor Degrader; TNBC= Triple Negative Breast Cancer; Te= Transplant eligible; Ti= Transplant ineligible,

Sanofi's Strong Commitment to Oncology Expected to Begin to Deliver in 2018

6 Pre-clinical programs enter Phase 1

- T-cell engager in AML/MDS (Sanofi)
- Immunostimulatory mRNA (BioNTech)
- T-cell engager(2) in Ovarian Cancer (Regeneron)
- Checkpoint inhibitor (Regeneron)
- cemiplimab + DNA vaccine(2)
- cemiplimab + oncolytic(2)

14 New proof of concept indications

- Isatuximab + Check-point inhibitor (9)
- Anti-TGFβ monotherapy
- Anti-TGFβ + cemiplimab (2)
- SERD monotherapy
- SERD + palbociclib

4 Potential proof of concept study readouts

- Anti-LAG3 monotherapy and combination with other checkpoint inhibitors in solid tumors/lymphoma (Regeneron)
- SERD in metastatic Breast Cancer
- CEACAM5 ADC in Solid Tumors
- CA6 ADC in metastatic Breast Cancer

9 Pivotal studies ongoing or planned

- Isatuximab: 4 MM
- Cemiplimab*: 3 NSCLC, 1 BCC, 1 Cervical Cancer

3 BLA/MAA submissions

- Cemiplimab* CSCC: U.S., EU
- Isatuximab RRMM: U.S.

1 U.S. launch

- Cemiplimab* CSCC(1)

SERD= Selective Estrogen Receptor Degrader; NSCLC= Non-Small Cell Lung Cancer; BCC= Basal Cell Carcinoma; CSCC= Cutaneous Squamous Cell Carcinoma; RRMM= Relapsed Refractory Multiple Myeloma; MDS= Myelodysplastic Syndrome; AML= Acute Myeloid Leukemia

*cemiplimab partnered with Regeneron

(1) Subject to U.S. FDA approval

(2) Collaboration with REGN

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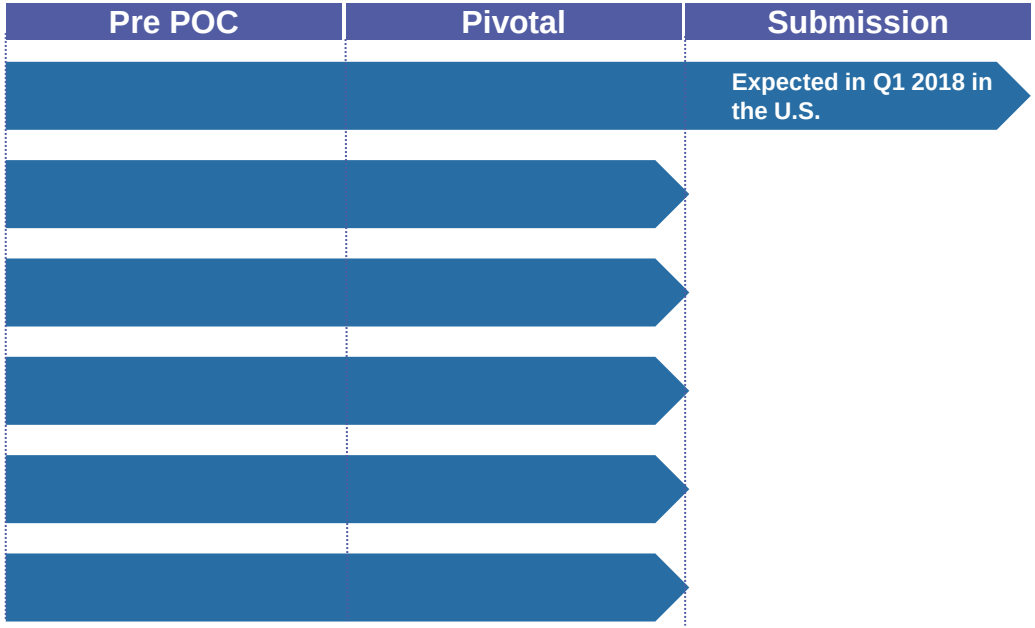
Expected First Submission for Cemiplimab(1) in CSCC, Followed by Other Large or Untapped Opportunities

	Indication
CSCC (EMPOWER CSCC 1)	Locally advanced or metastatic CSCC
BCC (EMPOWER BCC 1)	2nd line advanced metastatic BCC
Cervical Cancer (EMPOWER Cervical 1)	Platinum-refractory cervical cancer
NSCLC (EMPOWER Lung 1)	1st line NSCLC PD-L1 ≥ 50% monotherapy
NSCLC (EMPOWER Lung 2)	1st line NSCLC PD-L1 ≥ 50% combinations
NSCLC (EMPOWER Lung 3)	1st line NSCLC PD-L1 < 50% combinations



CSCC= Cutaneous Squamous Cell Carcinoma; BCC= Basal Cell Carcinoma; NSCLC= Non-Small Cell Lung Cancer
Cemiplimab is an investigational agent and has not been evaluated by any regulatory authority
(1) In collaboration with REGN

Cutaneous Squamous Cell Carcinoma (CSCC) is a Disease with Significant Unmet Medical Need

- High patient burden in resectable and unresectable locally advanced and metastatic disease
- Rate of metastasis is 1% to 6%(1)
- Presence of distal metastasis associated with poor prognosis
  - Median survival <2 years
- Primary management is surgical

2nd
most common skin cancer in U.S.(1)

200K to 400K
new cases/year in the U.S.

5,000 to 13,000
metastatic or locally advanced(1)

3,900 to 8,800
deaths/year in U.S.(1)
compared to 9,700 deaths from melanoma(2)

SANOFI

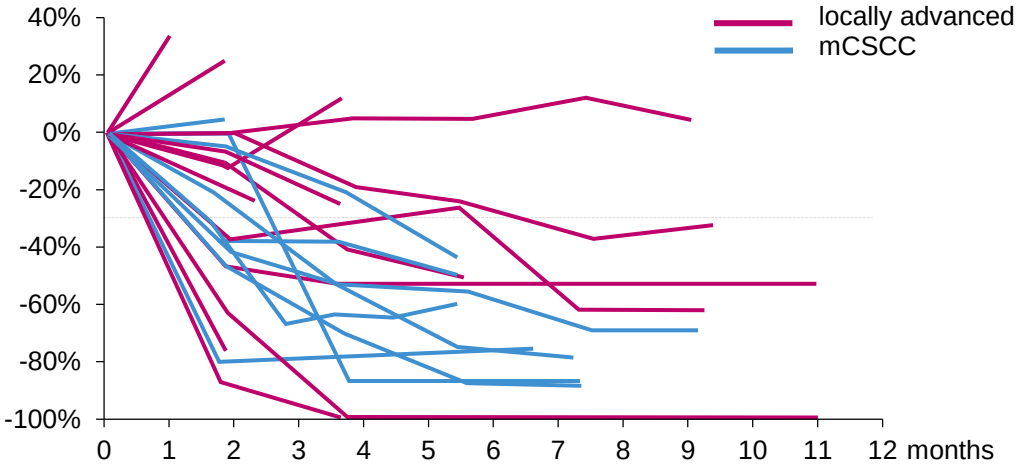
(1) Karia PS et al. *J Am Acad Dermatol*. 2013;68:957–66
(2) National Cancer Institute

Cemiplimab(1) Phase 1 Expansion Cohort Results Confirm PD-1 as an Important Therapeutic Target in CSCC

- Positive results from the CSCC expansion cohort of first in human study at ASCO 2017
  - 46.2% ORR and 69.2% DCR
  - Generally well tolerated(2)
- Deep and durable tumor reductions in target lesions observed
- Breakthrough Therapy Designation granted from the U.S. FDA

Cemiplimab ORR in Phase 1 CSCC(3)

% change in target lesions from baseline



Cemiplimab is an investigational agent and has not been evaluated by any regulatory authority

(1) In collaboration with REGN

CSCC= Cutaneous Squamous Cell Carcinoma; DCR= Disease Control Rate ; ORR= Objective Response Rate

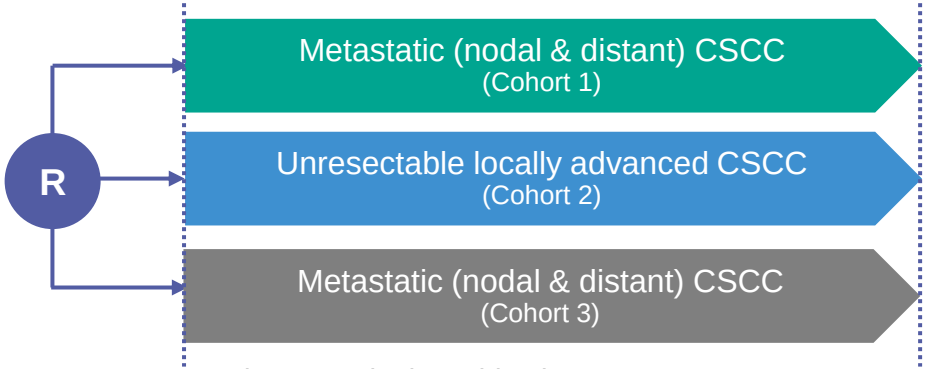
(2) The most common treatment-related adverse event of any grade was fatigue (23.1%). All grade 3 or higher adverse events occurred once and included arthralgia (3.8%), maculopapular rash (3.8%), asthenia (3.8%), aspartate aminotransferase (AST) elevation (3.8%) and alanine aminotransferase (ALT) elevation (3.8%).

(3) Data presented at ASCO 2017

Pivotal Results for Cemiplimab(1) in Advanced CSCC Confirm High Response Rate and Durable Responses

- If approved cemiplimab expected to be the first anti-PD-1 indicated for advanced CSCC
- Results from 82 patients in the pivotal Phase 2 trial
  - 46.3% ORR by independent review
  - 33 of 38 responses ongoing (with at least 6 months of follow up)
  - Safety profile generally consistent with approved anti-PD1 drugs
- FDA and EMA submissions planned in Q1 2018

Pivotal Phase 2 Trial



Primary Endpoint: Objective Response Rate

Regimen: Cohort 1&2: 3mg/kg cemiplimab every 14 days

Cohort 3: 350mg flat dose cemiplimab every 3 weeks

CSCC= Cutaneous Squamous Cell Carcinoma

(1) In collaboration with Regeneron

Cemiplimab is an investigational agent and has not been evaluated by any regulatory authority

Cemiplimab(1) First-in-Class Opportunity in CSCC, Expansion into Other Untapped Opportunities in IO

2nd Line Advanced Metastatic Basal Cell Carcinoma(2)

- 28,000 patients diagnosed in U.S. with metastatic BCC
- 3,000 estimated deaths in the U.S. annually

Study expected to complete H2 2018

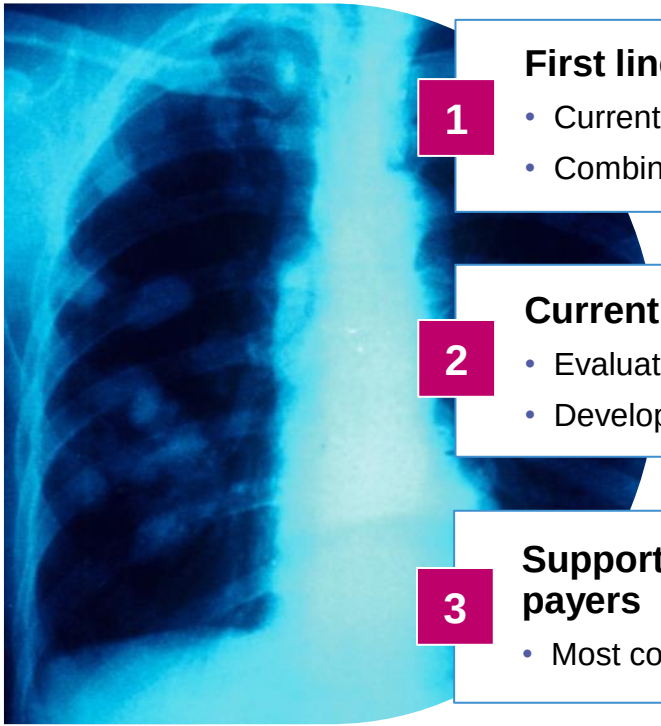
Platinum-Refractory Cervical Cancer(3)

- 25,000 patients diagnosed in U.S. and Western EU
- 35% of patients are Stage IV at diagnosis

Study expected to complete H1 2020

(1) In collaboration with Regeneron
(2) Epidemiological data from Mohan et al Curr Derm Rep 2014;3:40-45
(3) Epidemiological data from National Cancer Institute
Cemiplimab is an investigational agent and has not been evaluated by any regulatory authority

Strong Rationale to Establish Presence in Non-Small Cell Lung Cancer with Anti-PD-1



1 First line NSCLC landscape is evolving

- Current standard of care unlikely to remain over the next 5-10 years
- Combination regimens likely to dominate and optimal combinations not clearly identified

2 Current trials provide foundation for testing new combinations

- Evaluation of monotherapy, IO/IO, and IO/chemo in Phase 3 trials
- Developing multiple novel next generation combinations in preclinical through Phase 2

3 Supports engagement with healthcare practitioners, investigators and payers

- Most common use for anti-PD-1 antibodies is in NSCLC

NSCLC= Non-Small Cell Lung Cancer; OS= Overall Survival

Cemiplimab(1) Strategic Development Program in Non-Small Cell Lung Cancer (NSCLC)

- Large lung cancer indication continues to be an area of major unmet need
- Phase 3 study in front line NSCLC underway
- Phase 3 studies in first line NSCLC using combinations with chemo and ipilimumab in high and low expressers of PD-L1 are planned
- Second line NSCLC study planned

EMPOWER Lung 1	EMPOWER Lung 2	EMPOWER Lung 3
1L Monotherapy PD-L1 ≥ 50%	1L Combinations PD-L1 ≥ 50%	1L Combinations PD-L1 < 50%
cemiplimab vs. platinum doublet	**cemiplimab combinations vs. pembrolizumab**	**cemiplimab combinations vs. platinum doublet**
Ongoing P3 N=300	Planned	Initiated

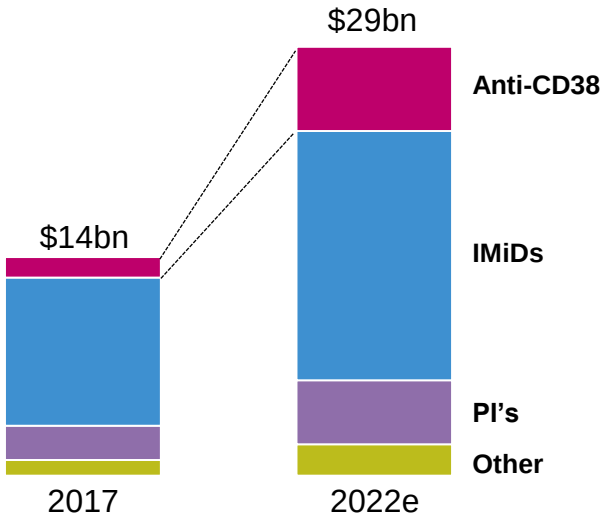
Primary endpoint PFS
Secondary endpoints include OS

(1) In collaboration with Regeneron
Cemiplimab is an investigational agent and has not been evaluated by any regulatory authority

Significant Opportunity for Isatuximab in Large and Growing Multiple Myeloma Market

- Worldwide Multiple Myeloma market expected to reach $29bn in 2022 driven by:
  - Double/triple branded combination use
  - New options with prolonged PFS benefit
  - Globally ~114k new cases diagnosed annually
- Anti-CD38 class rapidly becoming standard of care
  - Combinability without increased toxicity
  - Unprecedented PFS prolongation

Estimated Worldwide Multiple Myeloma Market(1)

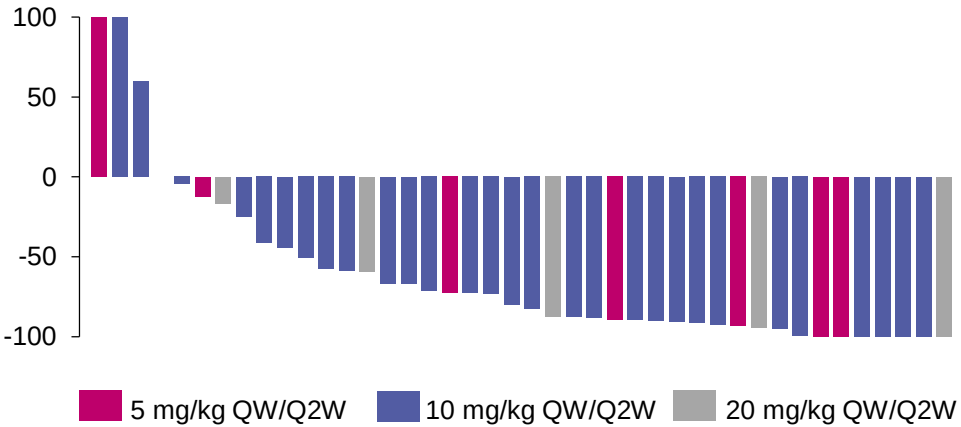


Isatuximab is an investigational agent and has not been evaluated by any regulatory authority
IMiD= immunomodulatory agent; PI= proteasome inhibitor; PFS= progression free survival
(1) EvaluatePharma® October 2017

Isatuximab Demonstrated Competitive Profile in Phase 1b

- Targets unique epitope with distinct combination MoA[1]
- Competitive administration profile
  - ~3h for initial infusion
  - 2.5h for subsequent infusions
- Broad development program in Multiple Myeloma with >12 clinical trials ongoing
- Potential benefit in solid tumors being explored

Isatuximab combination with PomDex
Relapse Refractory Multiple Myeloma[2]



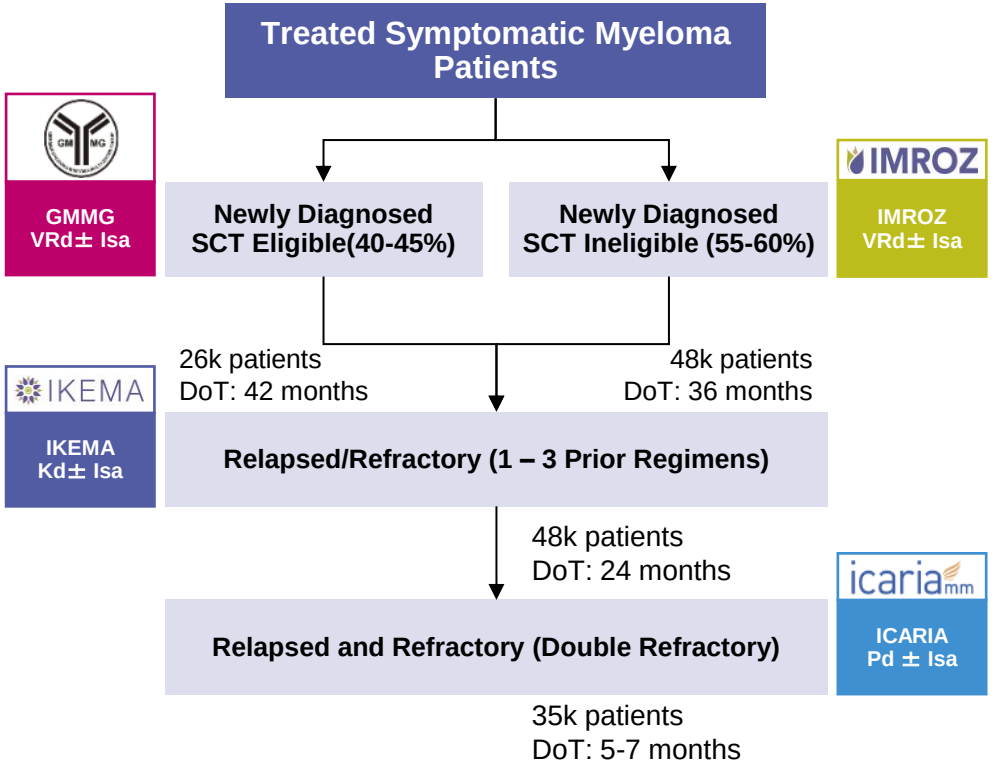
Isatuximab combination with PomDex ORR 61%
versus 31% PomDex alone

ASCT= Autologous Stem Cell Transplant; CyBorD= cyclophosphamide, bortezomib, and dexamethasone; PomDex= pomalidomide and dexamethasone; ORR= Objective Response Rate
Isatuximab is an investigational agent and has not been evaluated by any regulatory authority

(1) HDeckert, et al. Clin Cancer Res 2014;20:4574–83
(2) Richardson PG, et al. Poster presented at American Society of Hematology; 2017 Dec 9-12th

Four Large Phase 3 Trials with Isatuximab Address Multiple Myeloma Along the Treatment Continuum

- Two trials in first line setting with “Gold Standard” backbone therapy, VRd
  - GMMG: transplant eligible patients
  - IMROZ: transplant ineligible patients
- IKEMA trial in RRMM patients previously treated with 1-3 lines of therapy
- ICARIA pivotal data to potentially provide entry to market RRMM
- Minimal residual disease (MRD) assessments linked to PFS endpoint
- IMROZ, IKEMA, and ICARIA in progress

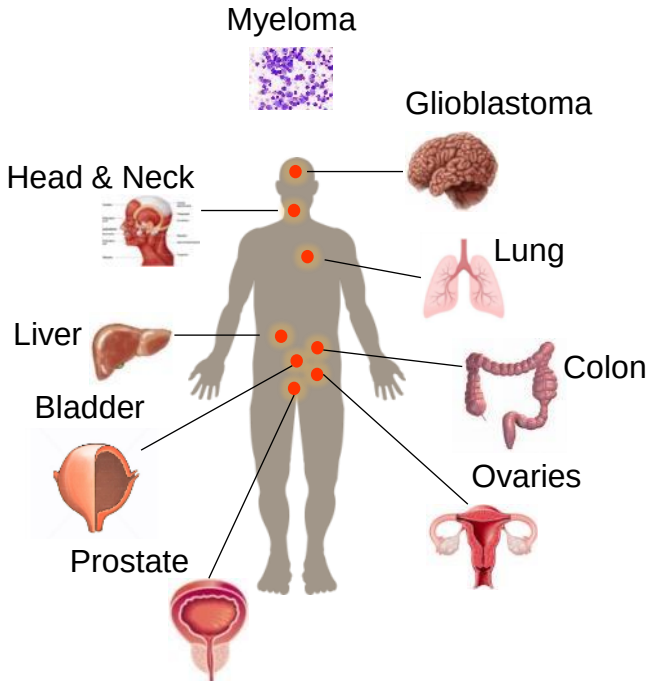


PFS= Progression Free Survival; DoT= duration of treatment; SCT= Stem Cell Transplant; MM= Multiple Myeloma; RR= Relapsed Refractory; ND= Newly Diagnosed; VRd= Velcade, Revlimid, dexamethasone; Te= Transplant eligible, GMMG= German Multiple Myeloma Group
Isatuximab is an investigational agent and has not been evaluated by any regulatory authority

Initiating PoC Trials with Isatuximab and Checkpoint Inhibitors in Combinations for 9 Indications

Combination indications

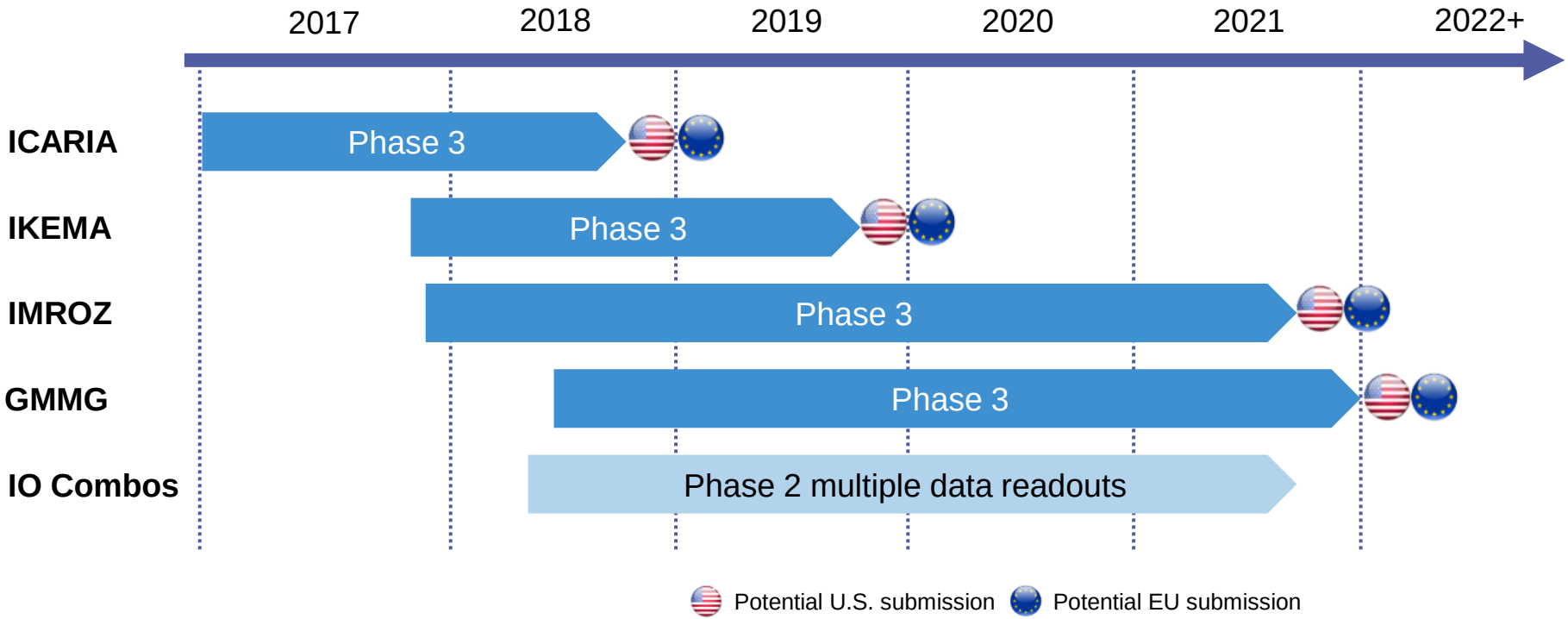
- Glioblastoma
- Hepatocellular Cancer
- Ovarian Cancer
- Head & Neck Cancer
- Urothelial Cancer
- Colorectal Cancer
- Multiple Myeloma
- NSCLC
- Prostate Cancer



NSCLC= Non-Small Cell Lung Cancer
Isatuximab is an investigational agent and has not been evaluated by any regulatory authority

First Expected FDA Submission for Isatuximab Based on ICARIA Data in 2018, Ahead of Data Readouts in 2L and 1L

Expected timeline



1L= first line; Te= transplant eligible; GMMG= German Multiple Myeloma Group
Isatuximab is an investigational agent and has not been evaluated by any regulatory authority

Leverage Entry in RRMM to Expand Use of Isatuximab in Earlier Lines of Therapy and Other Cancer Types

Gain Market Entry

Initial submission planned in Relapsed Refractory Multiple Myeloma

Expand in Multiple Myeloma

Utilization in 1L and 2L along treatment continuum of Multiple Myeloma

Combination Use in Solid Tumors

Further enhance response to immuno-oncology agents

Building Hematology Portfolio

3 pre-clinical assets

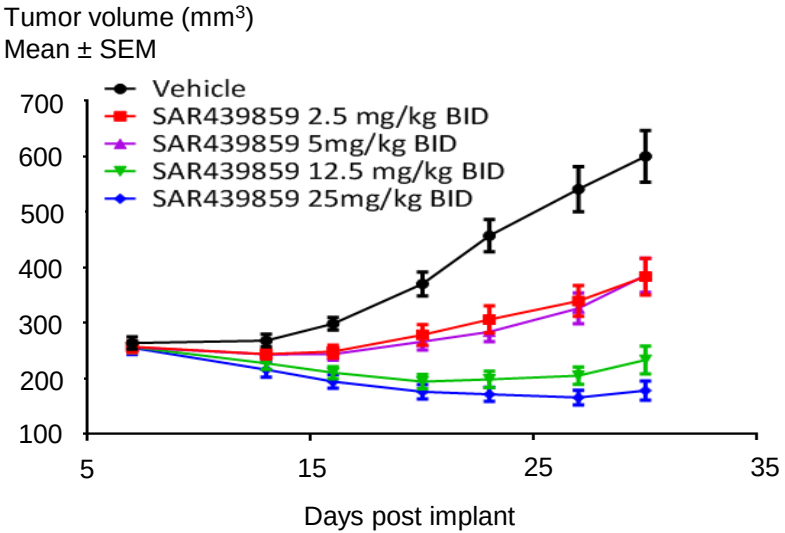
- Next generation CD38 mAB
- REGN bispecific
- Multispecific T-cell engager

Isatuximab is an investigational agent and has not been evaluated by any regulatory authority

Selective Estrogen Receptor Degrader Demonstrates Strong Tumor Response in Preclinical Models

- Key differentiating factors vs. current treatment option
  - Highly potent against mutant and wild-type ER
  - Activity across all BC cell lines
  - No estrogenic activity on uterine tissue in-vivo
  - Strong anti-tumor activity (regression) in BC models
  - Oral dosing vs infusion
- Trial in ER+ mBC began enrollment November 2017
  - Using FES-PET imaging to demonstrate target engagement
  - Evaluating as monotherapy and in combination with palbociclib

Pre-Clinical Efficacy in MCF7 Model of Breast Cancer



Potential Proof of Concept Study Readout in 2018

BC= Breast Cancer; ER= Estrogen Receptor; MCF7=Michigan Cancer Foundation-7
FES= Fluoroestradiol; PET= Positron Emission Tomography; BID= twice daily

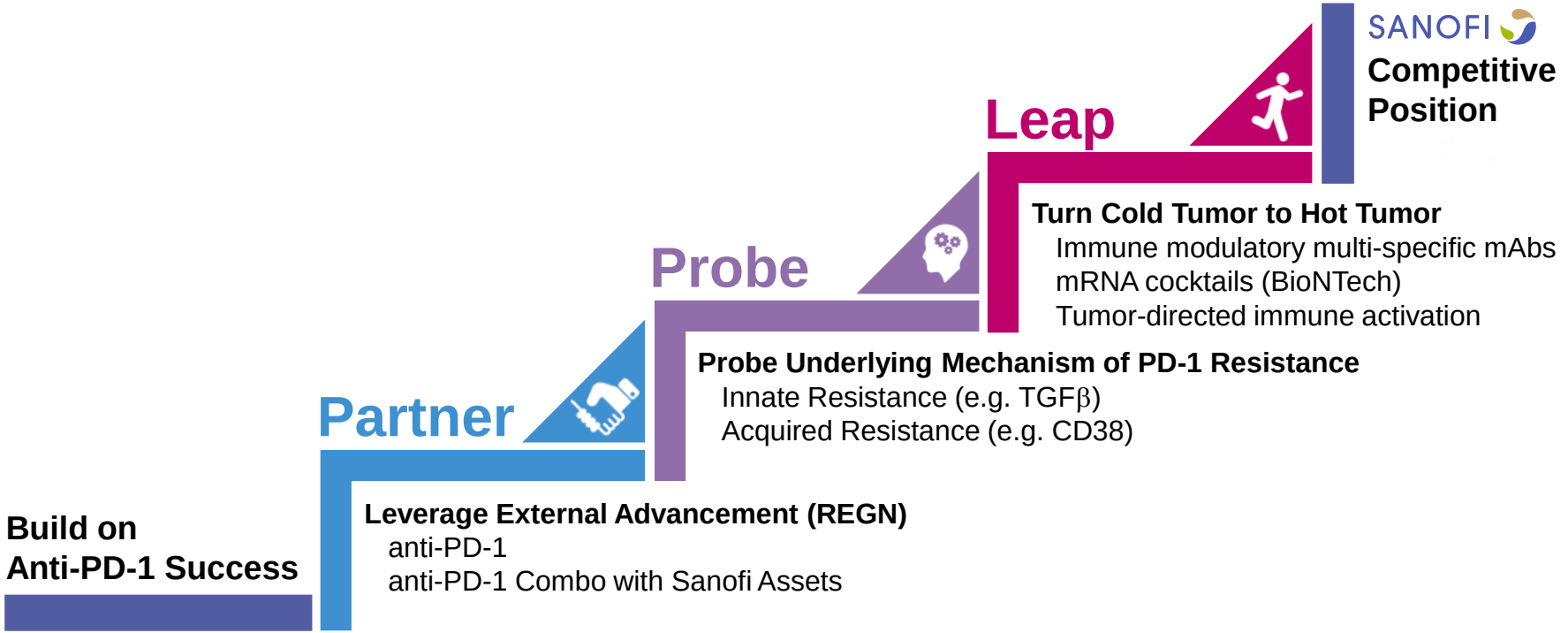
Yong-Jun Liu
Senior Vice President
Global Head of Research

SANOFI

Building a Competitive Position in Oncology

Next wave in Oncology

Our Immuno-Oncology Competitive Strategy



Global Immuno-Oncology Collaboration with Regeneron to Develop and Commercialize Antibody Cancer Treatments

Checkpoint-centric approach with an extension to bispecific antibodies

		Phase 1	Phase 2	Phase 3
Checkpoint inhibitors	• PD-1 (clinic) • LAG3 (clinic) • Several in pre-clinical development	**REGN IO Ab** Checkpoint inhibitor Solid Tumors(2)	**REGN3767*** Anti-LAG3 Advanced Cancers	R **cemiplimab** PD-1 inhibitor Advanced CSCC	**cemiplimab** PD-1 inhibitor 1st line NSCLC
				R **cemiplimab** PD-1 inhibitor Advanced BCC	**cemiplimab** PD-1 inhibitor 2nd line Cervical Cancer
Combination with checkpoint inhibitors	• PD-1 + LAG-3 (clinic) • PD-1 + CD38(1) (clinic) • PD-1 + TGFβ(1) (clinic)	**cemiplimab + DNA vaccine** Anti-PD-1 mAb 1 L GBM(2)	**cemiplimab + REGN3767*** anti PD-1 + LAG3 Advanced Cancers	**isatuximab + cemiplimab** CD38 and PD-1 inhibitors Solid Tumors(3)	
		cemiplimab + oncolytic virus Anti-PD-1 mAb Advanced RCC(2)	**isatuximab + cemiplimab** CD38 and PD-1 inhibitors RRMM		
		cemiplimab + SAR439459 anti- PD-1 + anti-TGFβ Advanced Solid Tumors			
Bispecific antibodies	• Several in pre-clinical development	**REGN IO Ab** T-Cell Engager Ovarian Cancer(2)			

Current Status as of Dec ember 13 2017. IO Discovery and Development Agreement with Regeneron signed in July 2015; agreement duration 5 years, subject to Tail Period Option

(1) Sanofi only molecule

(2) Entering Phase 1 expected in Q1 2018; R- Registration Study

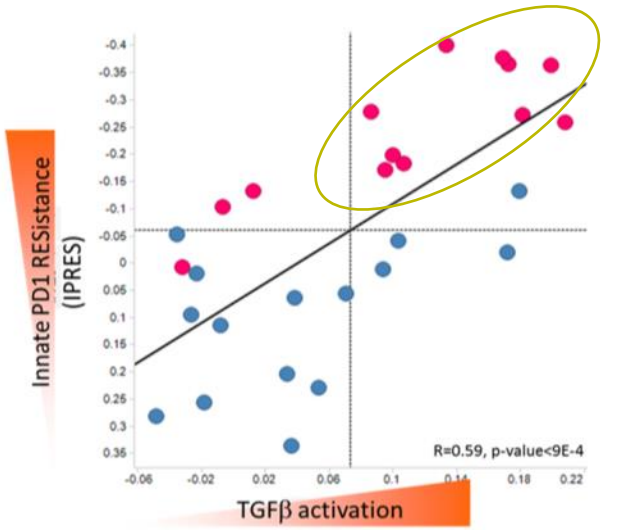
(3) Entering Phase 2 expected in 2018

* Opt-in rights products for which rights have not been exercised yet

Overcoming anti-PD-1 Resistance by Blocking TGF-β

Genomic Analysis
(Patient Samples)[1]

Responders vs. Non-responders



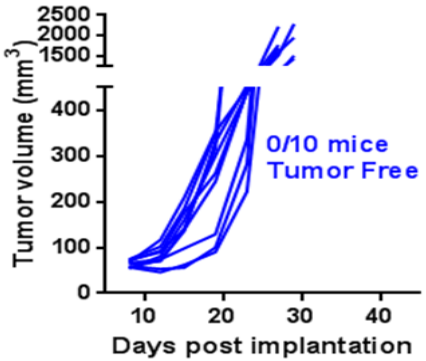
Sanofi Internal Results

- TGFß activation correlates with anti-PD-1 resistance
- TGFß-mediated immune suppression in melanoma may contribute to anti-PD-1 resistance
- Gateway indication: combination of anti-TGFß and anti-PD-1 to overcome innate resistance

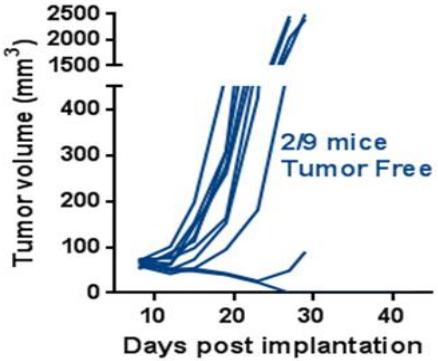
(1) Sanofi Hypothesis Analysis

Overcoming anti-PD-1 Resistance by Blocking TGF-β: *in vivo* Proof of Concept

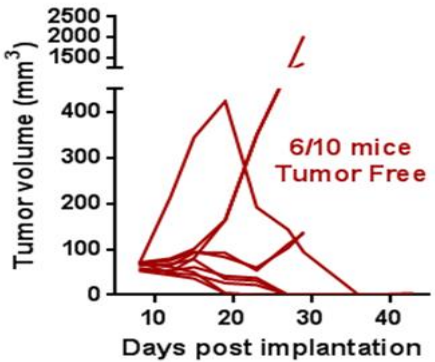
Single Agent Control
SAR439459



Combination Control
SAR439459 Isotype Ctrl + anti-mPD-1



Combination
SAR439459 + anti-mPD-1



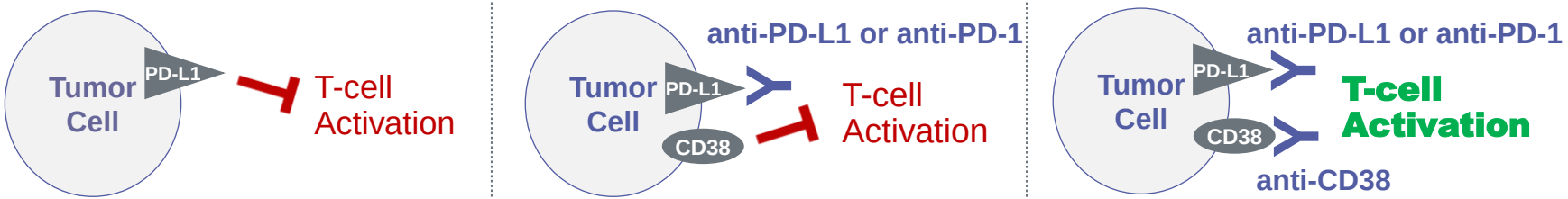
Status: Phase 1 Anti-TGF-β + cemiplimab

Indication: Advanced Solid Tumors

MC38 syngeneic colon s.c. model in C57BL/6 mice; 8 administrations IP every 3 days beginning <100mm3
Anti-TGF–B, SAR439459 (25 mg/kg), RMP1-14 anti-PD-1 (5 mg/kg)

Isatuximab Targets CD38: A Second Checkpoint Inhibitor

Anti-PD-1 *in vivo* resistance via CD38 upregulation on tumor cells is reversed by anti-CD38/anti-PD-1 combination(1)



PD-L1/PD-1 inhibits T-cell activation

PD-L1 or PD-1 blockade induces CD38 expression(1), preventing T-cell activation by anti-PD-L1 or anti-PD-1

Combination of anti-PD-1 and anti-CD38 restores T-cell activation *in vitro* (1,2) and *in vivo* (1)

Status: Phase 1 expected to start in Solid Tumors in Q1 2018

(1) Limo Chen, et al. ASCO-SITC, 2017, MD Anderson Cancer Center (anti-mouse-PD-L1 and CD38 antibodies)
(2) Sanofi internal data (isatuximab + nivolumab)

Future Pipeline: Turning Cold Tumor to Hot Tumor

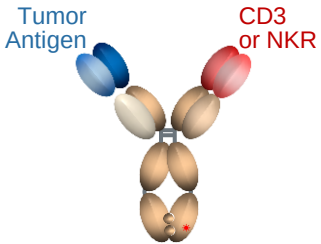
mRNA

mRNA
Mixture

First Development Candidate
in vivo Proof of Concept
FIH expected in 2018

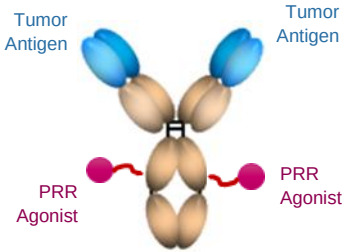
Antibodies

NK- and T-Cell
Engagers

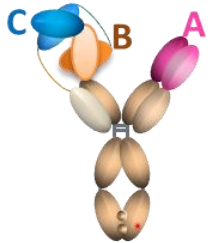


Development Candidate
in vivo Proof of Concept
FIH expected in 2018

Antibody-PRR
Conjugates



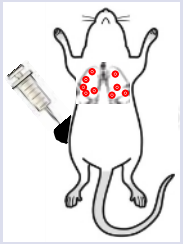
Immune Modulatory
Multispecific Antibodies



PRR= Pattern Recognition Receptor; NK= Natural Killer; M0= Target validation; FIH= First in Human
"Cold" to "Hot": Anti-PD-1/PD-L1 agents are believed to primarily work on T-cell inflamed tumors. In most patients, their tumors have a non T-cell inflamed microenvironment. In order to drive responsiveness to immune therapy based agents, there is a need to identify and develop agents that can bring T-cells to tumors.

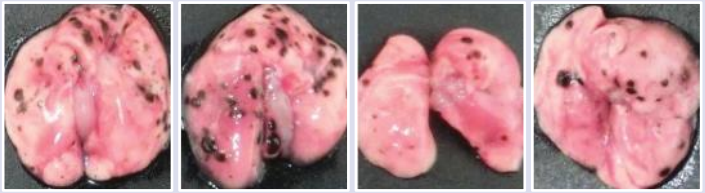
Systemic Anti-Tumor Immunity After mRNA Treatment

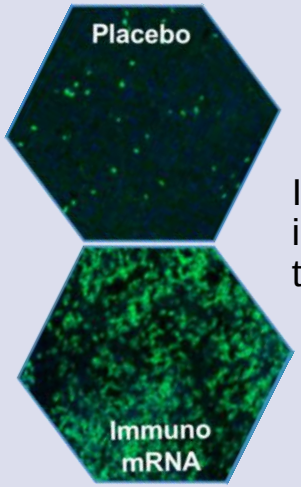
Intratumoral injection of immuno mRNA reduces tumors at distant non-injected sites



Placebo

Immuno mRNA





Immune cells (green) infiltrate melanoma tumors after treatment

Status: Phase 1 entry expected in 2018

Sanofi is Building a Robust IO Discovery Pipeline

- Building a portfolio of internal and partnered assets
- Supported by a talented team with expertise in translational and precision medicine
- **6** pre-clinical programs expected to enter the clinic in 2018

Expected FIH Projection	2018	2019	2020
mRNA (BioNTech)	**Immuno mRNA Mix 1**	**Up to 4 additional Immuno mRNAs**	
CD38	**1-2 CD38 mAb 2nd generation**		
Immune-cell Engagers	**T-Cell Engager**(1) Ovarian Cancer **T-Cell Engager** AML/MDS	**REGN Bispecific**(1) Multiple Myeloma **NK Cell Engager**	
Multi-specific Ab	**1-2 Multi-Targeting Abs**(1)		
ADC	**1 mAb Toxin**		
CheckPoint Inhibitors	**REGN IO Ab**(1) Solid Tumors **cemiplimab**(1) **+ DNA vaccine**(1) 1L GBM **cemiplimab**(1) **+ oncolytic virus**(1) Advanced RCC		

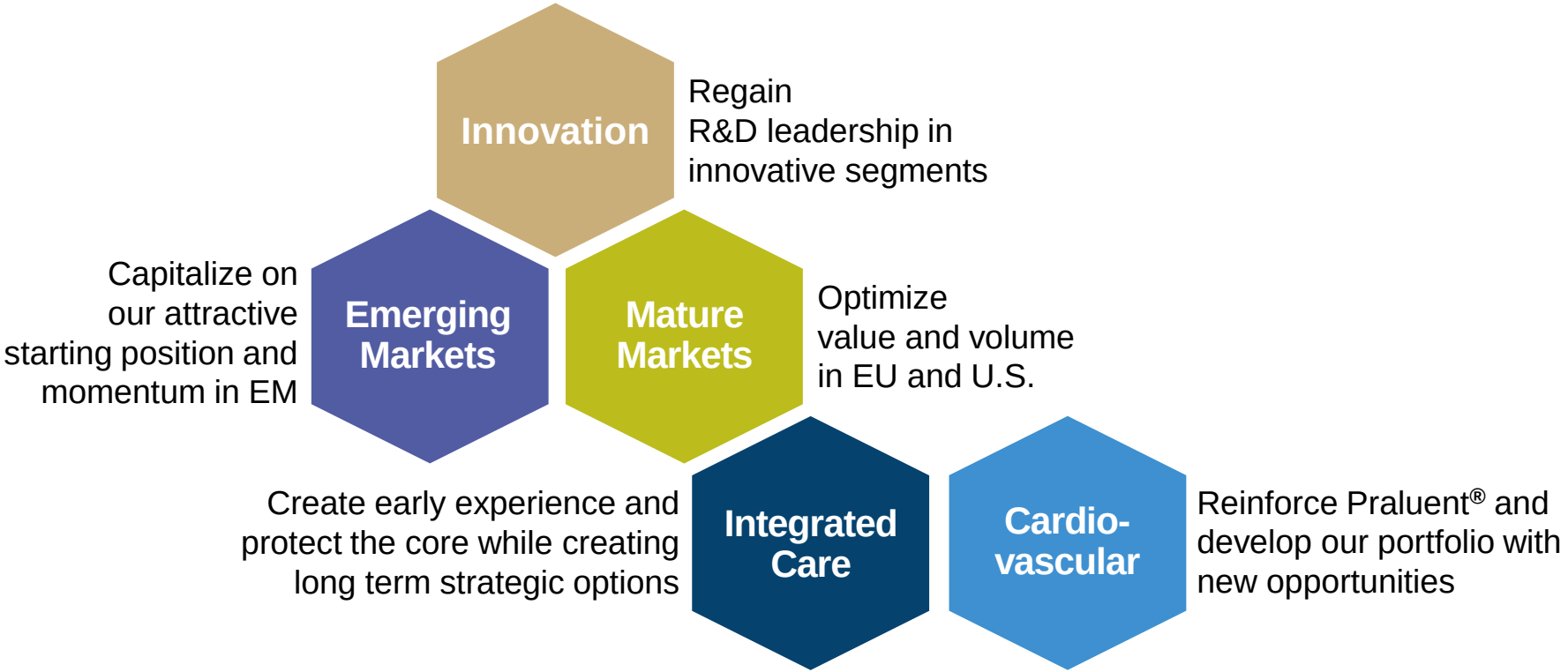
FIH= First in Human
(1) Collaboration with REGN

Stefan Oelrich
Executive Vice President
Diabetes & Cardiovascular

SANOFI

Sustaining Leadership in DCV

DCV Strategy Will Focus on Innovation While Protecting our Core Business



Klaus Henning Jensen
Therapeutic Area Head,
Diabetes Development

SANOFI

Sustaining Leadership in DCV

Diabetes

Broadening our Innovative DCV Portfolio

2018 DCV Development Pipeline

Preclinical	Phase 1	Phase 2	Phase 3	Registration
SAR441255 GLP-1/GCG/GIP agonist Type 2 Diabetes & Obesity	**SAR438335** GLP-1/GIP agonist Type 2 Diabetes	**SAR425899**(5) GLP-1/GCG agonist NASH	**efpeglenatide**(2) Long acting GLP-1 agonist Type 2 Diabetes	**Praluent**®(4) Anti-PCSK9 mAb CV events reduction
	SAR440181(3) Myosin activation Dilated Cardiomyopathy	**SAR407899** rho kinase Microvascular Angina	**sotagliflozin**(1) Oral SGLT-1&2 inhibitor Type 2 Diabetes	**sotagliflozin**(1) Oral SGLT-1&2 inhibitor Type 1 Diabetes
	SAR247799 S1P1 agonist Cardiovascular indication	**sotagliflozin**(1) Oral SGLT-1 & 2 inhibitor Worsening HF in Diabetes pts	**SAR341402** Rapid acting insulin Type 1/2 Diabetes	
			SAR425899(5) GLP-1/GCG agonist Obesity	
			mavacamten(3,5) Myosin inhibitor Obst. Hypertrophic Cardiomyopathy	

Cardiovascular

Diabetes & metabolism

HF= Heart Failure; NASH= Nonalcoholic steatohepatitis

(1) Collaboration with Lexicon

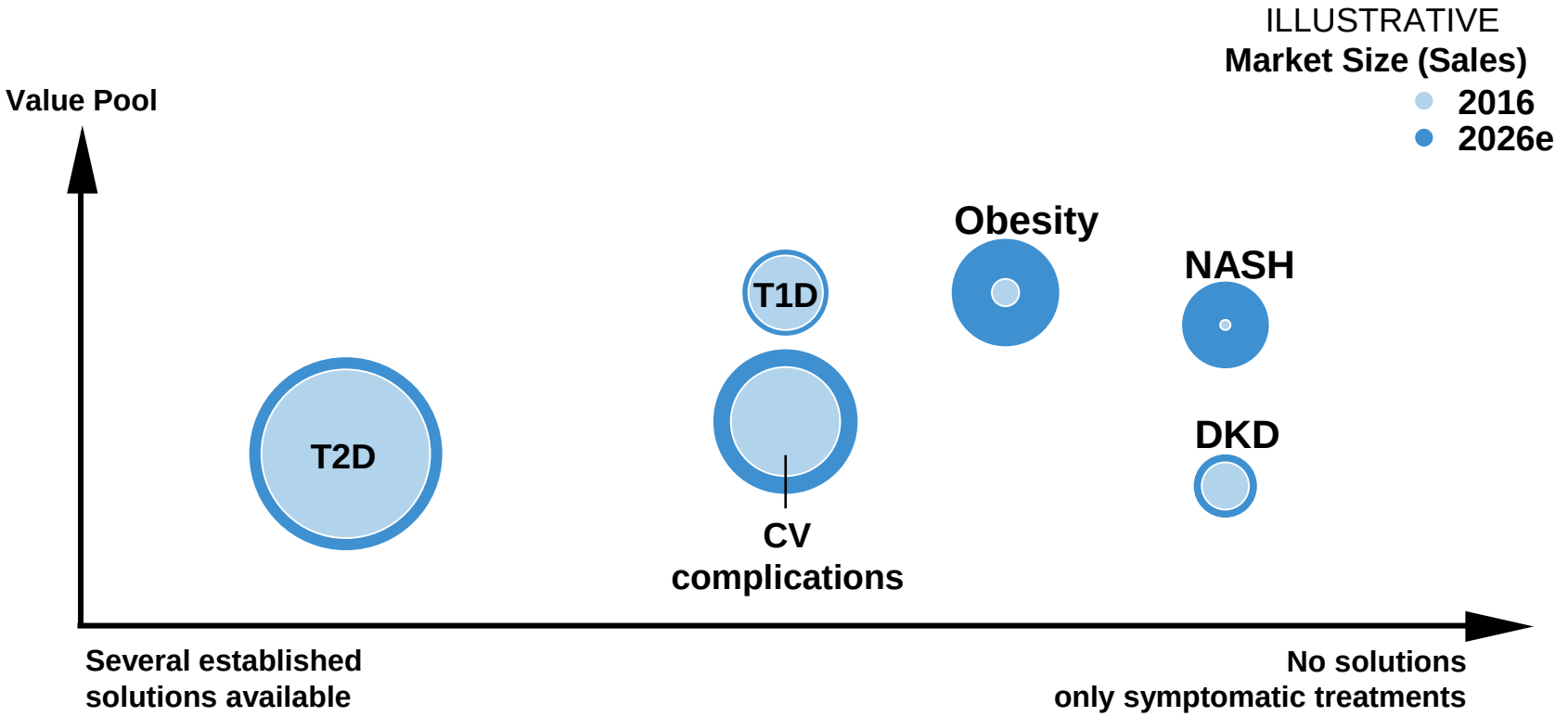
(2) Collaboration with Hamni

(3) Collaboration with MyoKardia

(4) Collaboration with Regeneron

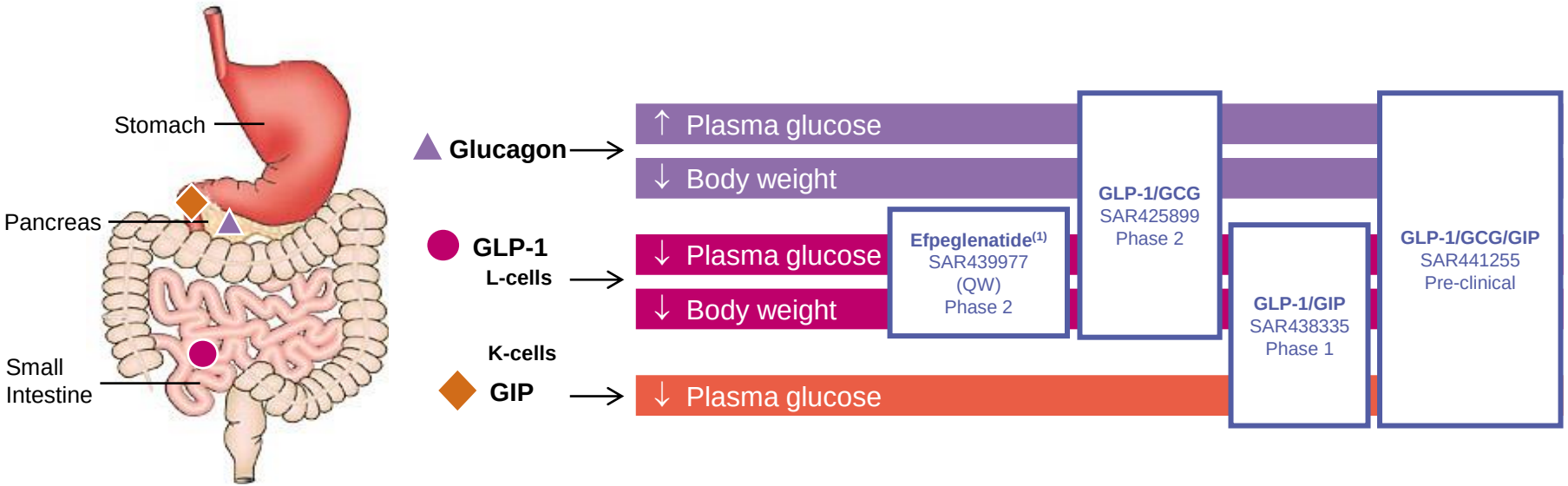
(5) 2018 new entries

Sanofi Diabetes R&D Strategy Focuses on Type 1 & 2 Diabetes, Obesity and NASH



CV= Cardiovascular; DKD= Diabetic Kidney Disease; NASH= Nonalcoholic Steatohepatitis; T1D= Type 1 Diabetes; T2D= Type 2 Diabetes

Novel Peptide Platform to Potentially Result in Innovative Diabetes, Obesity and NASH Therapies



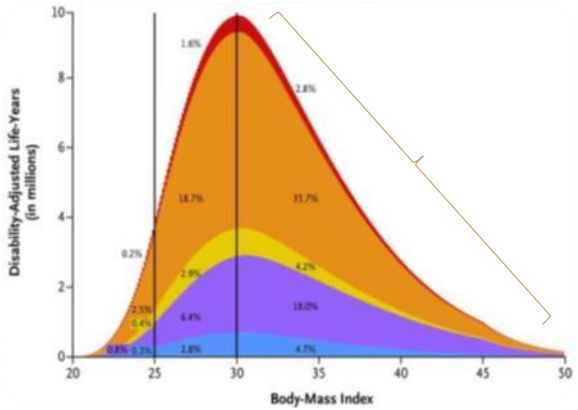
Dual and Triple Agonist adding Pharmacology of GIP and/or Glucagon

Holst J.J. et al., Trends Mol Med, 2008; Murphy K.G. & Bloom S.R., Nature, 2006; Sadry S.A. & Drucker D., Nat. Rev. Endocrinol, 2013
GLP-1= Glucagon-Like Peptide-1; GIP= Gastric inhibitory polypeptide; GCG= Glucagon
(1) Collaboration with Hanmi

Obesity Is a Medical Challenge and the Source of Substantial Morbidity and Mortality

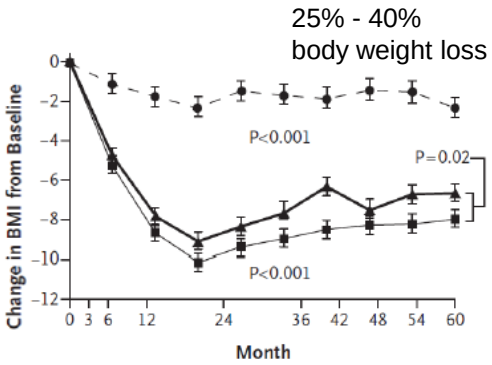
Obesity: a major driver of subsequent disease

120 million quality adjusted life-years lost to disability/year(1)



Gastric bypass: very effective, but only small fraction of eligible patients do it

Mean BMI Change in T2D from baseline to 5 years(2)



Our development options might bring advantages closer with bypass by inducing 10-15% weight loss

	Relative risk reduction(3)
Death	40%
Diabetes	92%
CV disease	49%
CAD	59%
Stroke	57%
Heart failure	41%
Cancer	60%

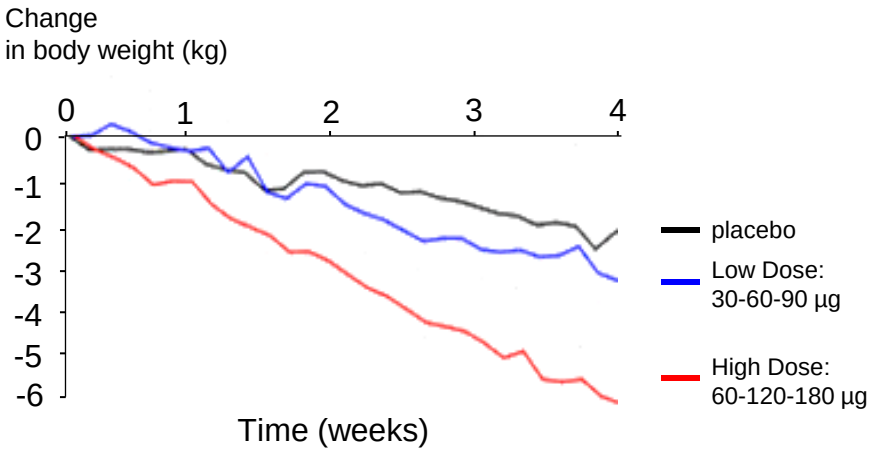
Relative risk reduction of common obesity-related diseases 7 years after bariatric surgery(3)

(1) GBD 2015 Obesity Collaborators; NEJM2017; 377:13–27
(2) Schauer et al. NEJM 376:641-51, 2017
(3) Adams et al., 2007 NEJM 357:753-761; Mingrone et al. NEJM 2012; 366:1577-85

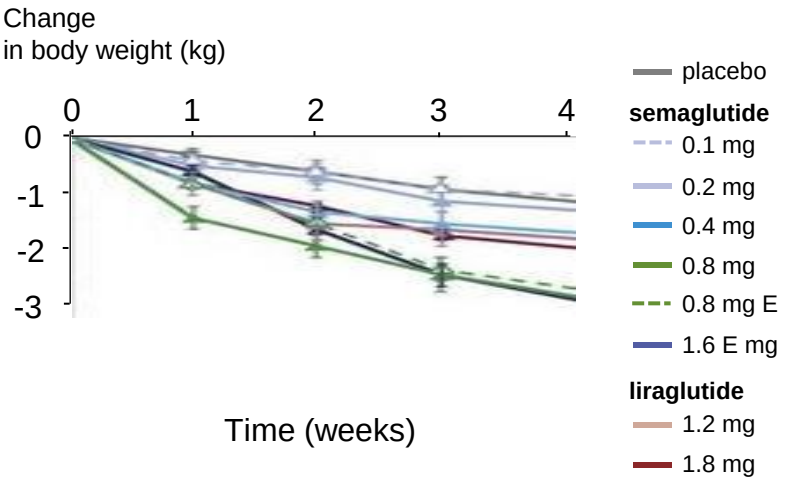
Dual Agonist(1) Shows Significant Body Weight Reduction in Overweight/Obese Diabetic Patients

Change in Body Weight from Baseline

GLP-1/GCG agonist(1,2)

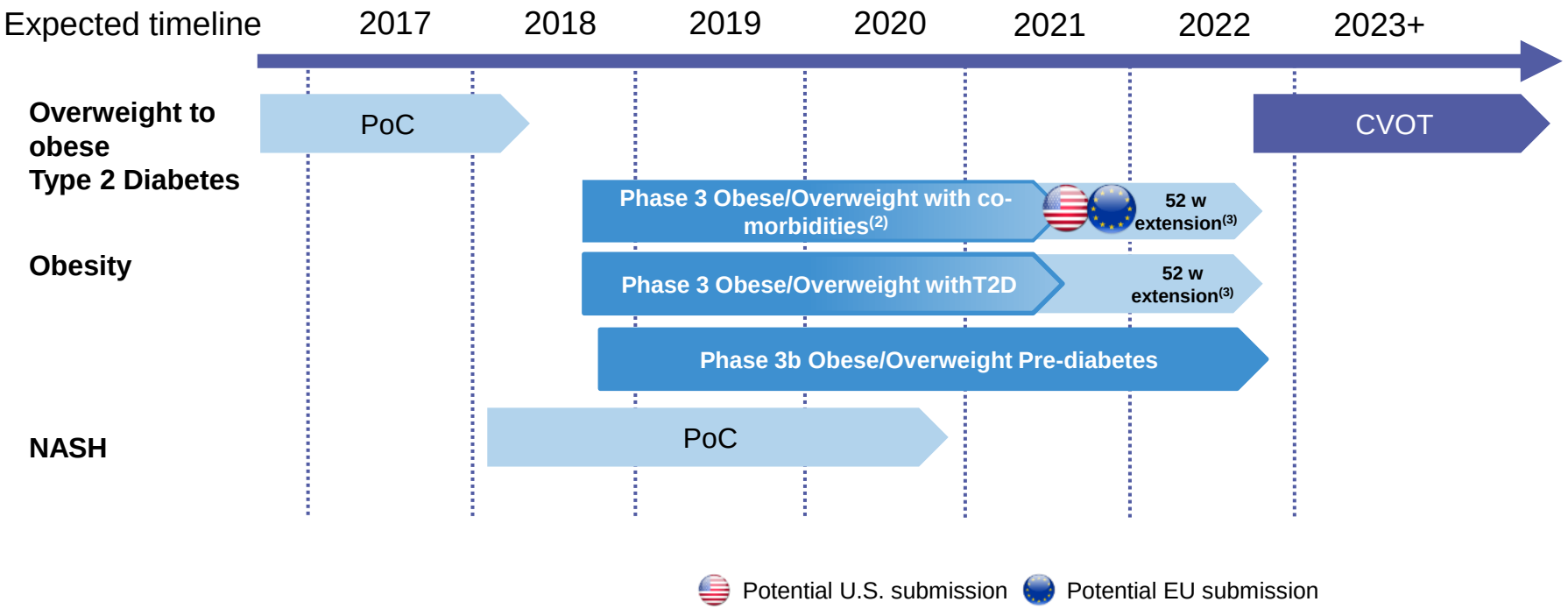


semaglutide and liraglutide(3)



(1) SAR425899 is an investigational agent and has not been evaluated by any regulatory authority. Adverse events observed most frequently were related to GI disorders
(2) Phase 1 Results; 4-week study in overweight to obese T2DM, 2-step up-titration after 7 days - Lindauer K et al, Oral presentation #109, European Association for the Study of Diabetes (EASD) 52nd Annual Meeting, September 14, 2016, Munich, Germany; BMI at baseline: 32 kg/m3
(3) Nauck et al. Diabetes Care 2016; BMI at baseline: ~31 kg/m^3

Dual Agonist(1) Large Development Program in Obesity and NASH Expected to Start in 2018



PoC= Proof of Concept; CVOT= Cardiovascular Outcome Trial

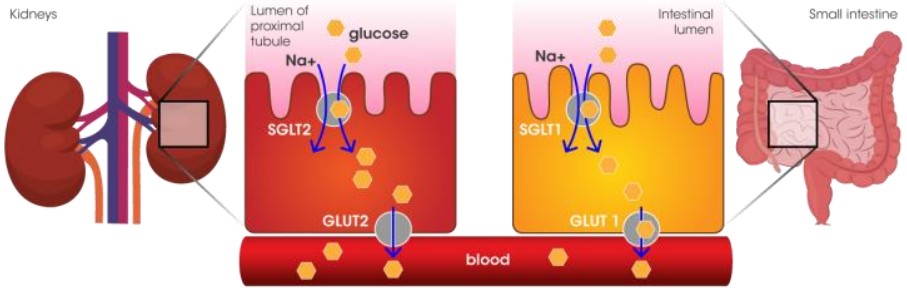
(1) SAR425899 is an investigational agent and has not been evaluated by any regulatory authority. Adverse events observed most frequently were related to GI disorders

(2) Excluding T2DM

(3) 52 weeks safety extension

Sotagliflozin[1]: First Investigational Dual SGLT-1 and SGLT-2 Inhibitor in T1D and T2D[2,3]

Inhibition of SGLT-1 and SGLT-2 Pathways



SGLT-2 inhibition in the kidney[4] increases glucose excretion in the urine

- Reduced levels of blood glucose
- Mechanism is independent of insulin but diminishes in effect with declining renal function

SGLT-1 inhibition in the GI tract[5] reduces post-prandial glucose and elevates GI hormones[65])

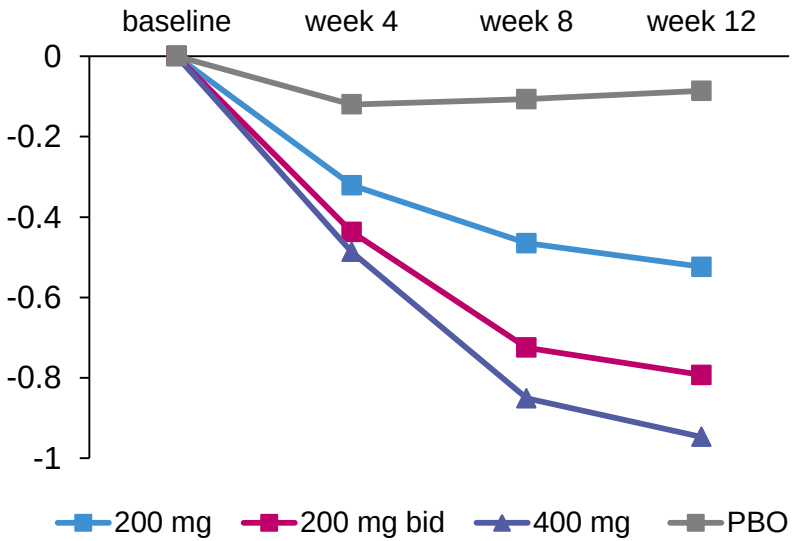
- Metabolic benefits
- Mechanism is independent of insulin and is not affected by declining renal function

(1) Sotagliflozin is an investigational agent and has not been evaluated by any regulatory authority. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.
(2) Sands AT, et al, Diabetes. Diabetes Care 2015;38:1181–88;
(3) Zambrowicz B, et al. Clinical Therapeutics 2015;37:71–82.e12;
(4) Hummel CS, et al. Am J Physiol Cell Physiol 2011;300:C14–C21;
(5) Wright EM, Loo DD, Hirayama BA. Physiol Rev 2011;91:733–94
(6) GLP-1 and PYY

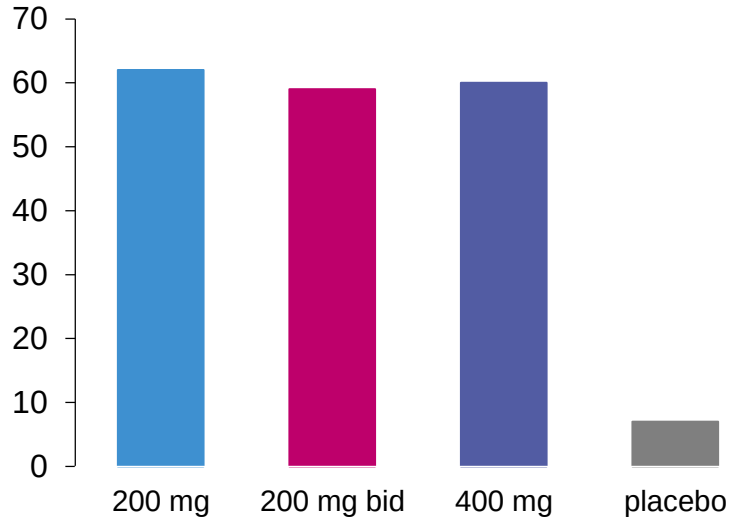
Sotagliflozin is Potentially Differentiated vs. SGLT-2 Inhibitors in Type 2 Diabetes

Additional HbA_{1c} lowering without further increase in urinary glucose excretion

Change in HbA_{1C} (%)(1)



Urinary Glucose Excretion (g/day)(1,2)

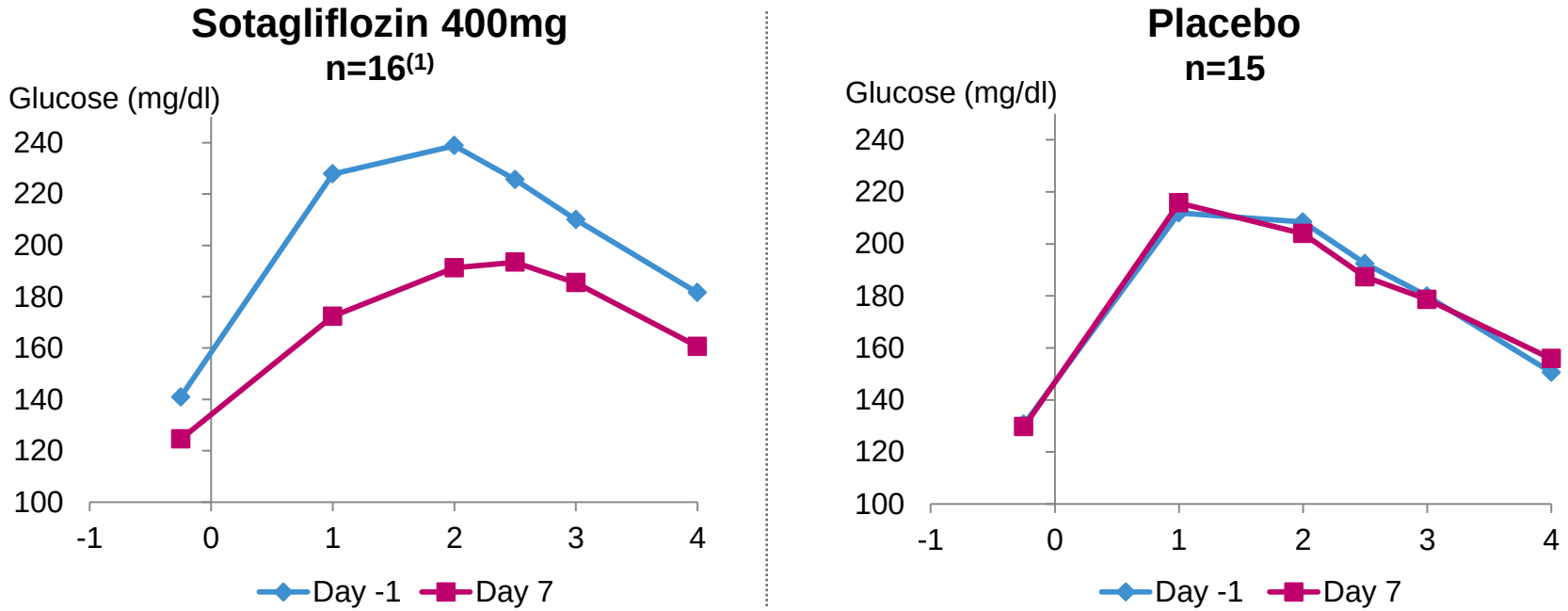


Sotagliflozin is an investigational agent and has not been evaluated by any regulatory authority. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.

(1) Phase 2 data - Rosenstock J, et al. Diabetes Care. 2015;38:431-438.

(2) Change in Urinary Glucose Excretion measured at week 12

Sotagliflozin: Impact on Post Prandial Glucose (PPG) in Type 2 Diabetes



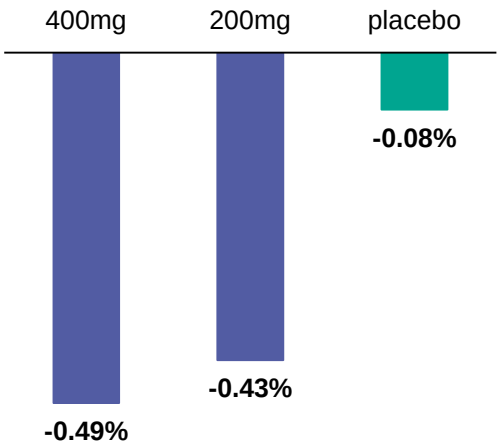
Data from Study 107 in Type 2 Diabetes patients with Chronic Kidney Disease

(1) Sotagliflozin is an investigational agent and has not been evaluated by any regulatory authority. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.
(2) Phase 2 study 107 T2DM with CKD
Plasma glucose after standard meal p=0.003, sotagliflozin vs. placebo

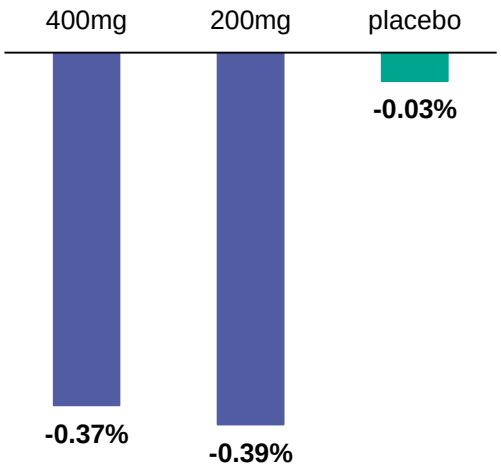
Sotagliflozin(1) Demonstrated Significant HbA1c Reduction when Added to Insulin in Type 1 Diabetes Patients

Phase 3 Clinical Trials in Type 1 Diabetes Patients

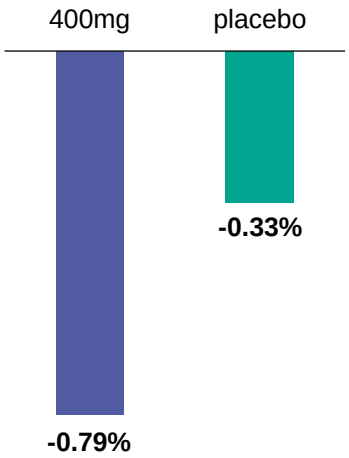
inTandem1 (n=793)(2)
HbA_{1c} reduction (%) after 24 weeks



inTandem2 (n=782)(3)
HbA_{1c} reduction (%) after 24 weeks



inTandem3 (n=1,402)(4)
HbA_{1c} reduction (%) after 24 weeks vs. placebo



(1) Sotagliflozin is an investigational agent and has not been evaluated by any regulatory authority. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.
(2) Buse J et al, Presentation 69-OR at American Diabetes Association 77th Scientific Sessions (ADA 2017), San Diego, CA, US.
(3) Danne T et al, Presentation 146-LB at ADA 2017, San Diego, CA, US.
(4) Garg S et al, New England Journal of Medicine, Sept 2017b

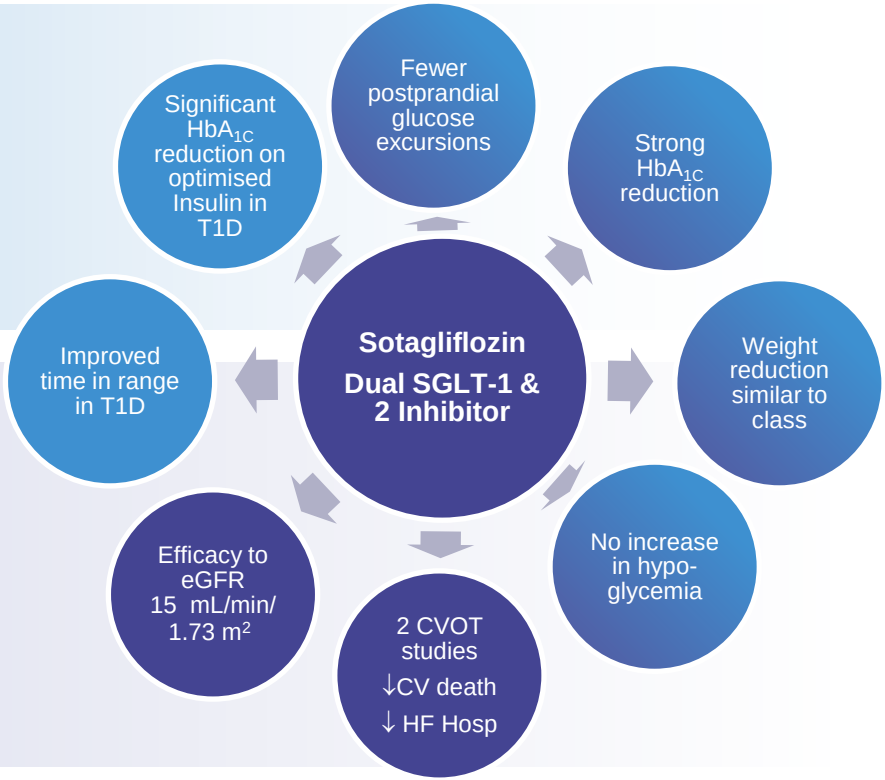
Sotagliflozin[(1)]: A Potentially Differentiated Value Proposition in Type 1 and Type 2 Diabetes

Potential in Type 1 Diabetes

- HbA_{1C} control as an adjunct to insulin
- Potent effect on PPG
- Weight reduction

Potential in Type 2 Diabetes

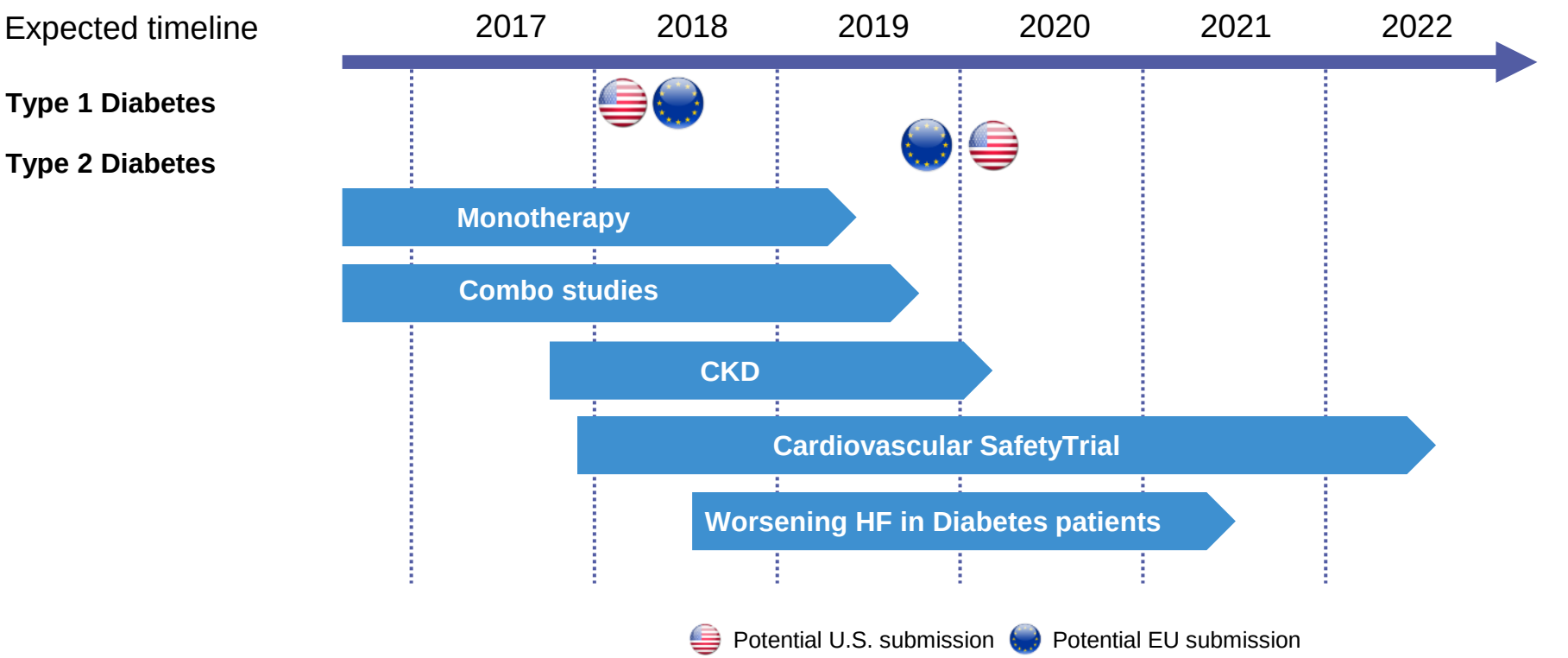
- Efficacy through HbA_{1C}
- Efficacy in patients with renal impairment
- Weight reduction comparable to class
- CV outcomes data in renal and Heart Failure population
- Low risk of hypoglycemia



T1D= Type 1 Diabetes; PPG= Post-Prandial Glucose

(1) Sotagliflozin is an investigational agent and has not been evaluated by any regulatory authority. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.

Broad Phase 3 Program Underway in Type 2 Diabetes for Sotagliflozin(1), Including CKD Focus

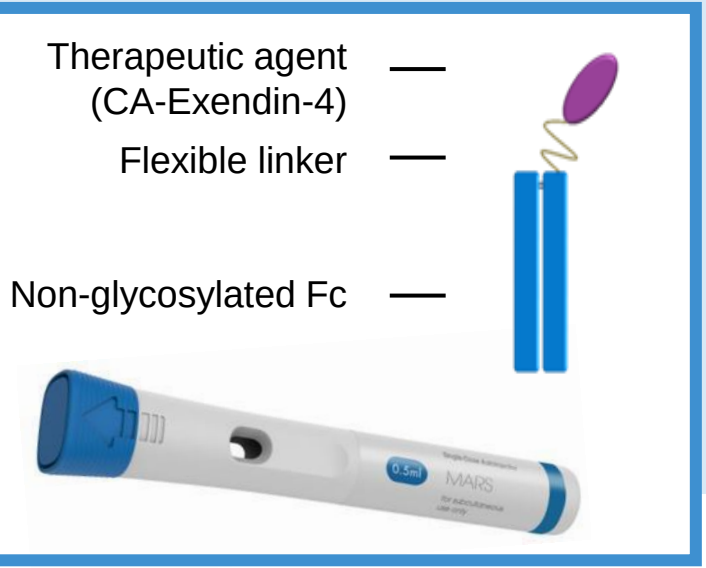


CKD= Chronic Kidney Disease; HF= Heart Failure

(1) Sotagliflozin is investigational. The full risk/benefit assessment with regulators is pending. Sotagliflozin was generally well tolerated.

Efpeglenatide[1,2]: A New Weekly GLP-1 Agonist

Once weekly GLP-1R agonist based on Hanmi Pharmaceuticals strong proprietary technology



Phase 3 in Type 2 Diabetes started in Q4 2017 to confirm expected target profile:

- Significant HbA_{1c} lowering
- Weight loss and favorable GI tolerability
- Convenient device platform

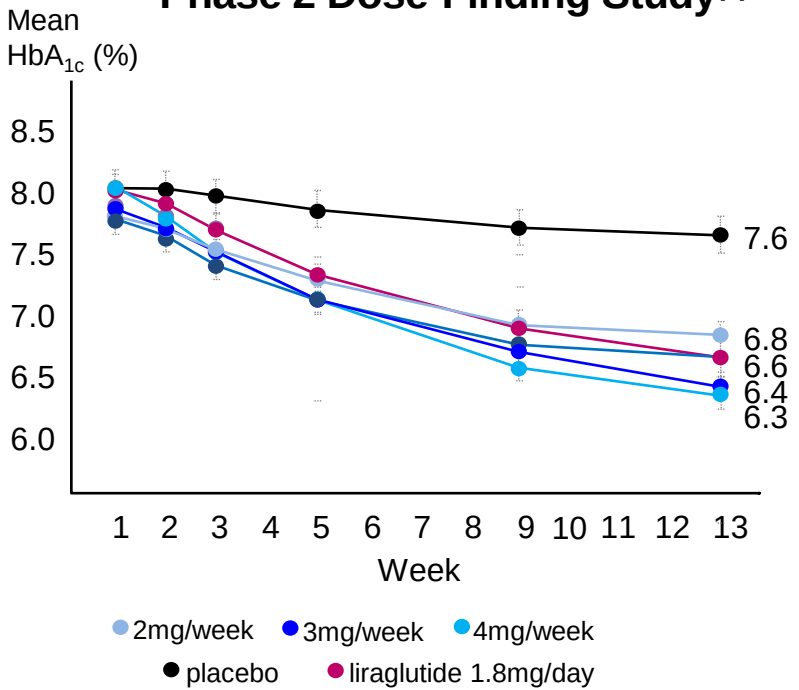
GI=Gastro-Intestinal

(1) Collaboration with Hanmi, efpeglenatide is an investigational agent and has not been evaluated by any regulatory authority.

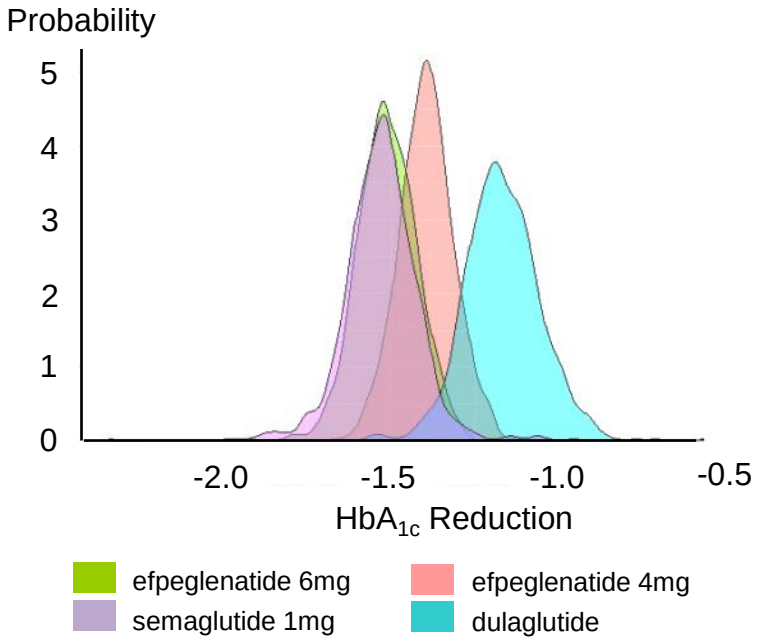
(2) The efficacy and safety of efpeglenatide will be investigated in a Phase 3 program

Efpeglenatide(1) Data and Modelling Suggest Strong HbA1c Reduction Potential

Phase 2 Dose-Finding Study(2)

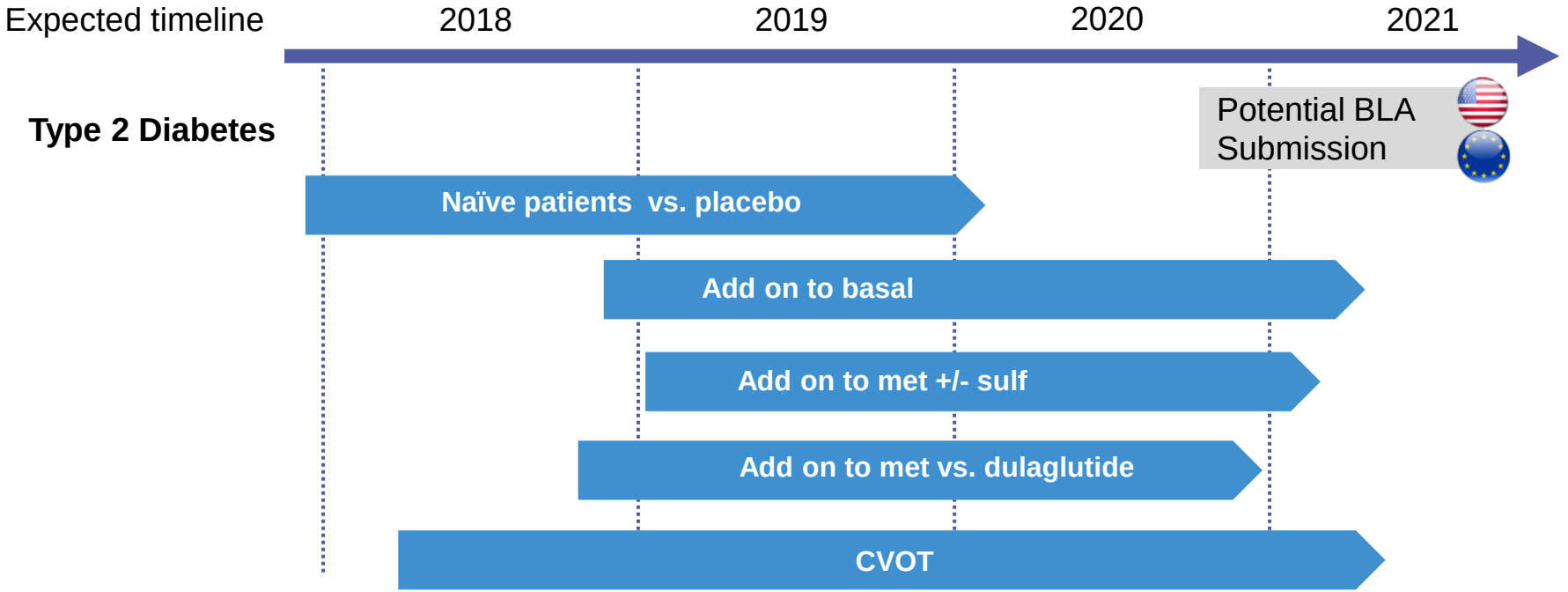


Modeling & Simulation HbA_{1c}

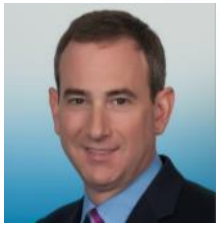


(1) Efpeglenatide is an investigational agent and has not been evaluated by any regulatory authority. The efficacy and safety of efpeglenatide will be investigated in a Phase 3 program
(2) Yoon K-H et al, Abstract 793, European Association for the Study of Diabetes (EASD) 51st Annual Meeting, September 2015, Stockholm, Sweden.

Efpeglenatide Phase 3 Program Initiated



(1) Efpeglenatide is an investigational agent and has not been evaluated by any regulatory authority. The efficacy and safety of efpeglenatide will be investigated in a Phase 3 program
CVOT= Cardiovascular Outcome Trial



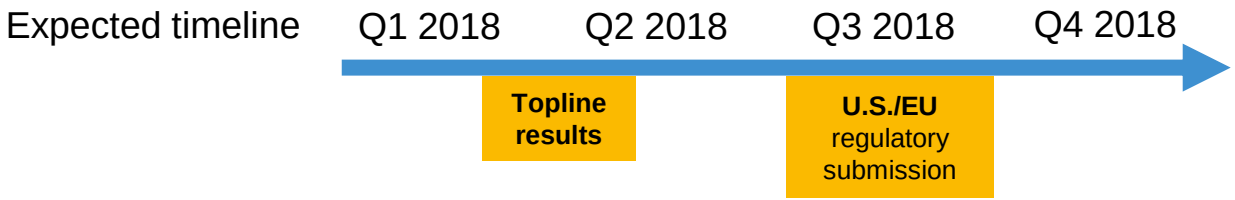
Jay Edelberg
Vice President,
Global Cardiovascular Development

SANOFI

Sustaining Leadership in DCV

Cardiovascular

ODYSSEY Outcomes Study Topline Results Expected in Q1 2018



ODYSSEY OUTCOMES (1)

- All patients enrolled following an Acute Coronary Syndrome
  - Recent ACS: prior coronary event 1-12 months before randomization
- Praluent® added to standard of care maximum tolerated dose of high potency statin
- Average duration of treatment
  - Median exposure - 33 months
  - Some patients treated for up to 5 years

(1) Powered to detect 15% difference in MACE defined as: CHD death, any non-fatal MI, fatal and non-fatal ischemic stroke, unstable angina requiring hospitalization

MyoKardia's Collaboration Represents One of the Largest R&D Commitments to Genetic Forms of Cardiomyopathy

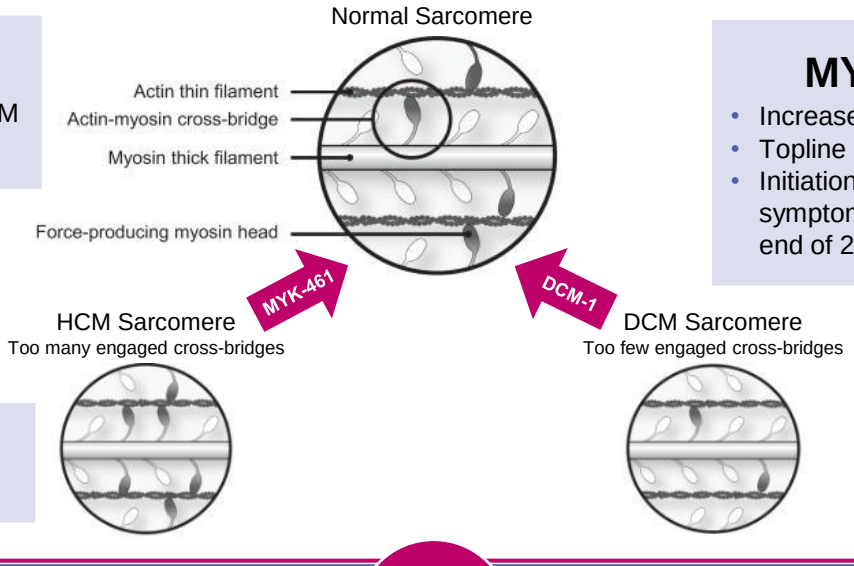
Phase 2

Mavacamten(1)

- Reduced hypercontractility in a HCM heart

Pre-clinical

HCM-2



Phase 1

MYK-491/SAR440181

- Increased cardiac contractility in a DCM heart
- Topline data expected by early 2018
- Initiation of single ascending dose trial in symptomatic DCM patients expected before end of 2017

HCM is the leading cause of sudden cardiac death in young adults

DCM is the leading genetic illness requiring heart transplantation

HCM= Hypertrophic cardiomyopathy; DCM: Dilated Cardiomyopathy
(1) MYK-461/SAR439152

Mavacamten: Positive Results from Phase 2a PIONEER Cohort A(1) Study in Symptomatic oHCM

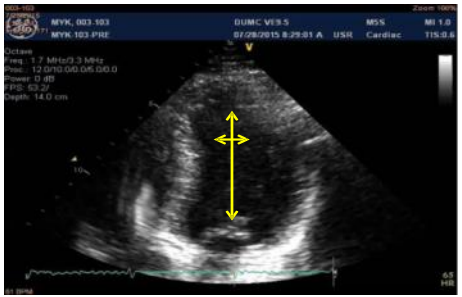
PIONEER-HCM Study in Symptomatic oHCM

		Baseline, mean (SD) n=11	Week 12, mean (SD) n=10	Change from Baseline to week 12, mean (SD) n=10	p-value
Primary endpoint met	Post-exercise peak LVOT gradient, mmHg	125 (60.0)	19 (12.9)	-112 (63.8)	0.002
Key secondary endpoints met, incl. peak VO_2	Peak VO_2, mL/kg/min	20.7 ±7.4	24.6 ±8.8	+3.5 (3.3)	0.004
Change in NT-proBNP	pg/mL	929 (647)	454 (551)	-459 (722)	0.08

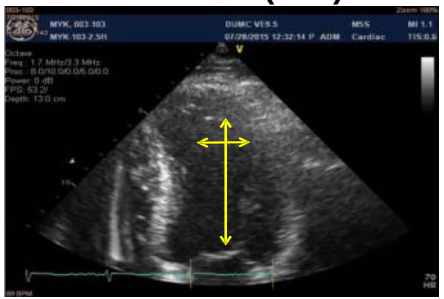
- PIONEER-HCM study in symptomatic oHCM
  - Generally well tolerated (one patient experienced a serious adverse event due to a recurrence of atrial fibrillation)
  - Orphan Drug designation granted for symptomatic oHCM in 2016
- Second low-dose cohort in PIONEER-HCM ongoing
- Expected transition to Phase 2b/3 in 2018

Study 003

Pre-dose



Post-dose (2 hr)



Study 003: *Multiple Ascending Dose (MAD) Trial in Healthy Volunteers*

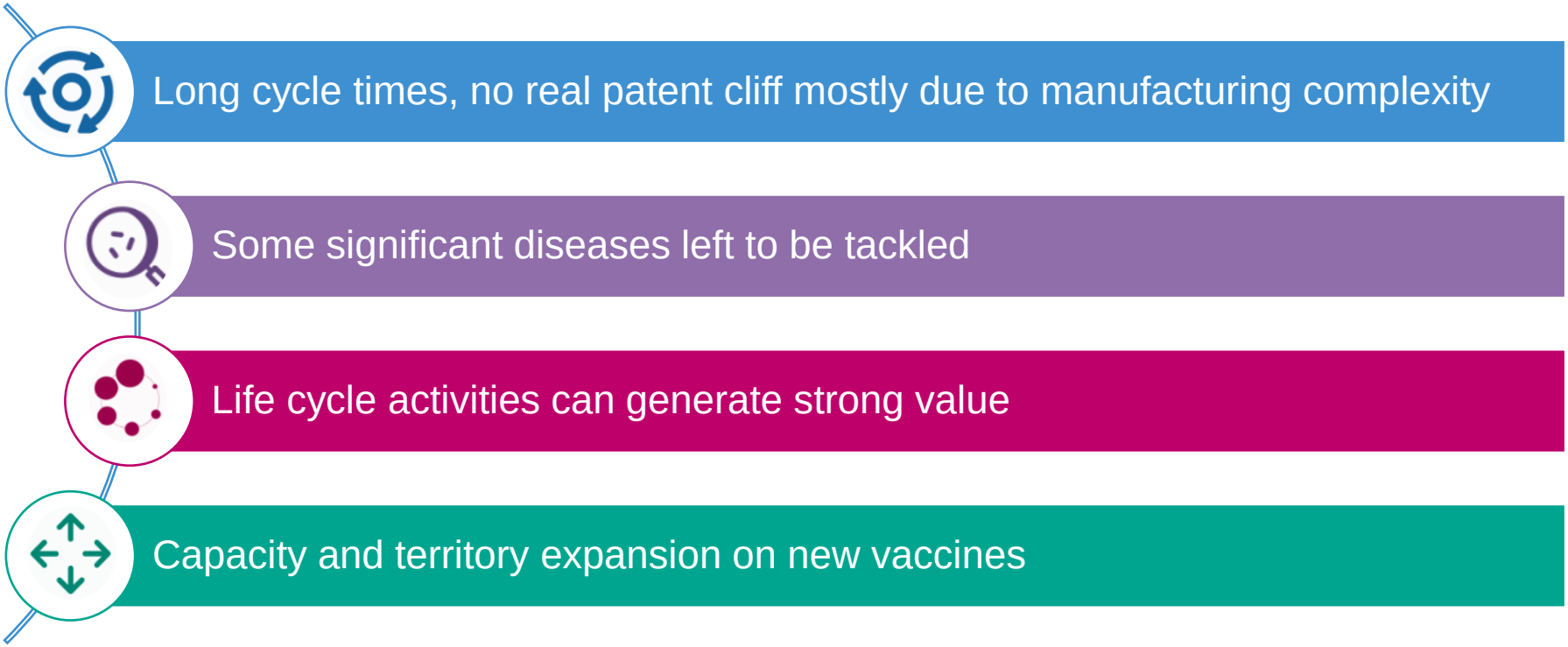
LVOT= Left ventricular outflow tract; oHCM= obstructive Hypertrophic Cardiomyopathy
NT-proBNP: N-terminal pro-brain natriuretic peptide
(1) https://clinicaltrials.gov/ct2/show/NCT02842242

David Loew
Executive Vice President,
Sanofi Pasteur

SANOFI

Sustaining Leadership in Vaccines

Vaccines: An Attractive Business with Major Opportunities



Vaccines R&D Strategy: Aim to Deliver High Value Products

- MenQuadTT
- Influenza
- RSV infants & elderly

- Flublok® / Protein Sciences
- RSV mAb / MedImmune
- RSV infant Vaccine / NIH

- Broadly Protective Flu
- Adjuvants

Flu, RSV and Meningitis Vaccines: Key Innovative Areas for Sanofi Pasteur

Influenza

Influenza segment supported by differentiation, ageing & urbanization

- Differentiation: Fluzone® High-Dose, Flublok®
- Vaccine Coverage Rate increase ex-U.S.

Meningitis

Meningitis segment to be driven by fully liquid formulation, broader age indication and geography

- MenQuadTT Phase 3 ongoing

RSV

Entering RSV segment with two complementary approaches

- Monoclonal antibody – Phase 2
- RSV vaccine – Phase 1

John Shiver
Senior Vice President,
Vaccines R&D

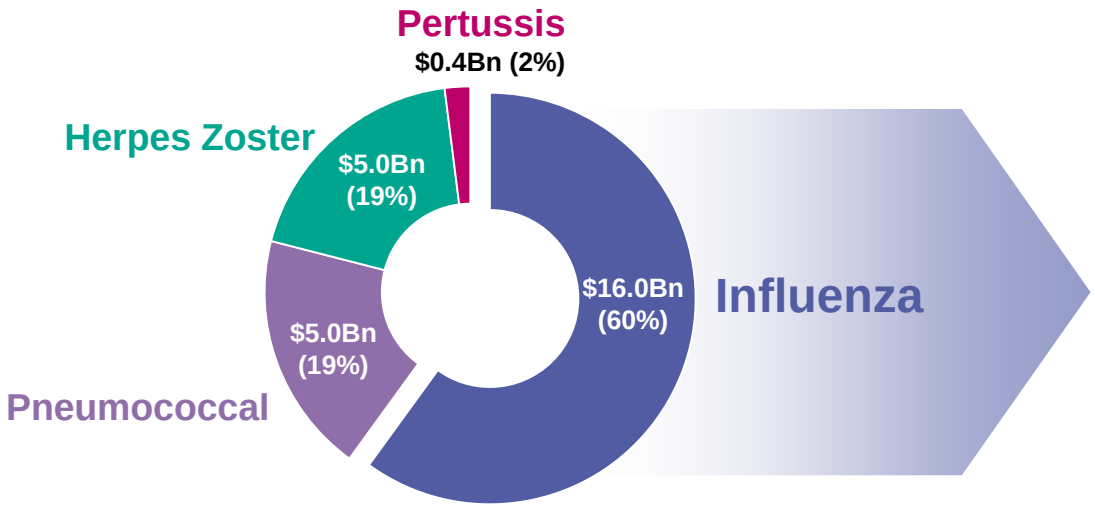
SANOFI

Sustaining Leadership in Vaccines

Burden of Influenza is Underestimated, Resulting in Suboptimal Vaccine Coverage Rates

Flu burden is greater than every other vaccine preventable disease

U.S. Annual costs of four major vaccine-preventable diseases in 50+



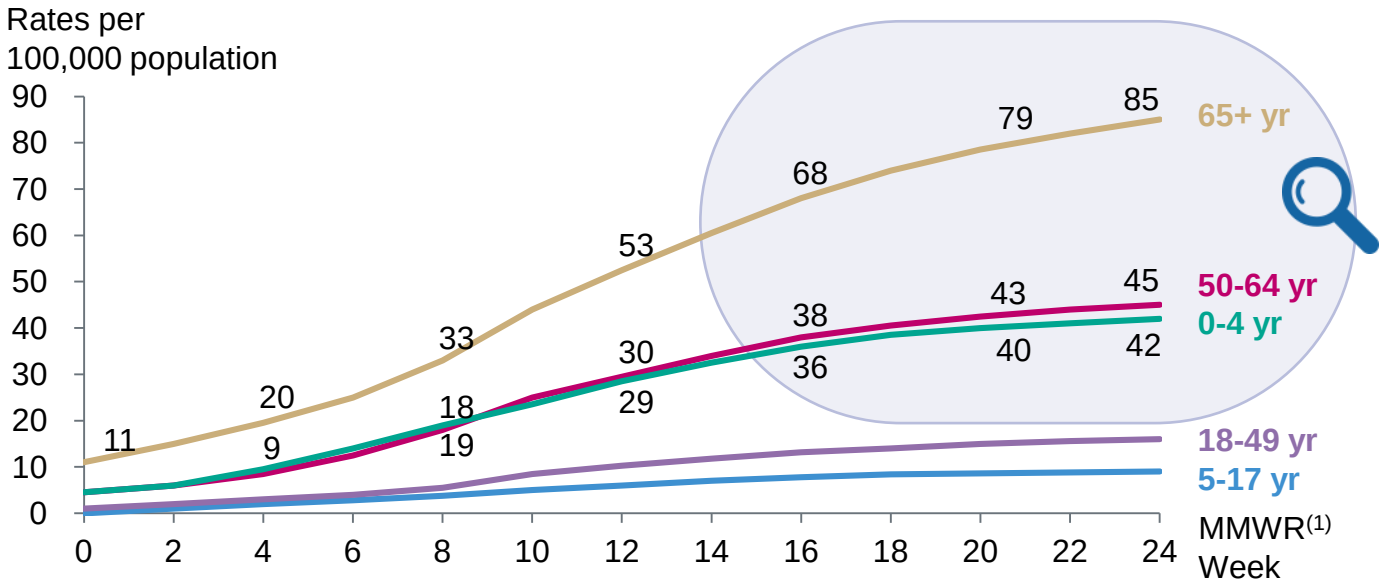
But too often considered as a mild illness

SANOFI

Source: J Primary Prevent (2015)36:259-273

Sanofi Pasteur Focuses Where the Disease Burden Is the Highest

Cumulative Flu Related Hospitalization Rate(1)



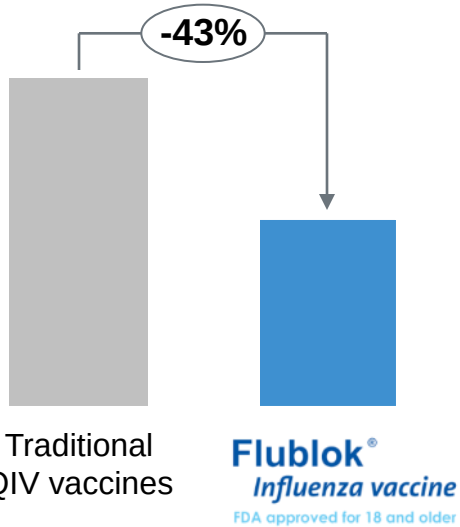
Traditional influenza vaccine response declines with age

(1) Morbidity and Mortality Weekly Report; source: CDC Fluview - FluSurv-NET – Entire Network – 2015-16 Season

Protein Sciences Broadens Our Leading Flu Vaccines Portfolio With Flublok®(1)

Flublok® differentiated with greater efficacy in adults 50 years and older

Cumulative confirmed Flu cases(2,3)



Growth driven by product differentiation

65y old

Differentiate with better efficacy

Fluzone® HD TIV → Fluzone® HD QIV

50y old

Flublok®

6m old

Change standard of care

Fluzone® TIV
VaxiGrip® TIV
→ Fluzone® QIV
VaxiGrip® QIV

HD= High-Dose

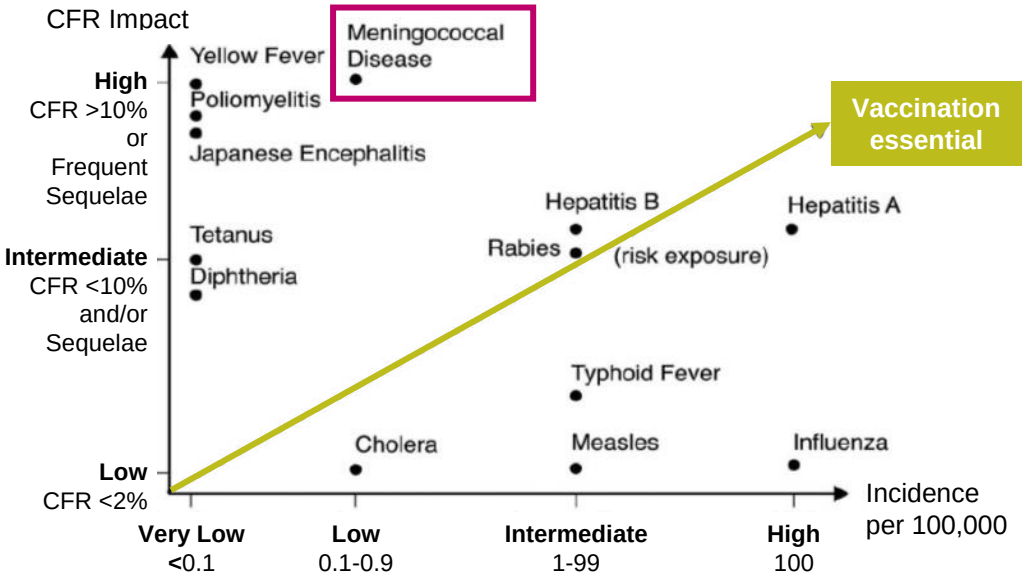
(1) The Only FDA approved recombinant protein-based influenza vaccine approved for all adults 18 and older
(2) Source: Full prescribing information
(3) http://www.nejm.org/doi/full/10.1056/NEJMoa1608862

Meningococcal Disease Has a Low Incidence Rate with High Fatality and Devastating Consequences

Meningococcal Disease

- Unpredictable and affects previously healthy individuals
- Difficult to diagnose early and rapidly progressive
- Potentially fatal, with devastating consequences in 20% of survivors

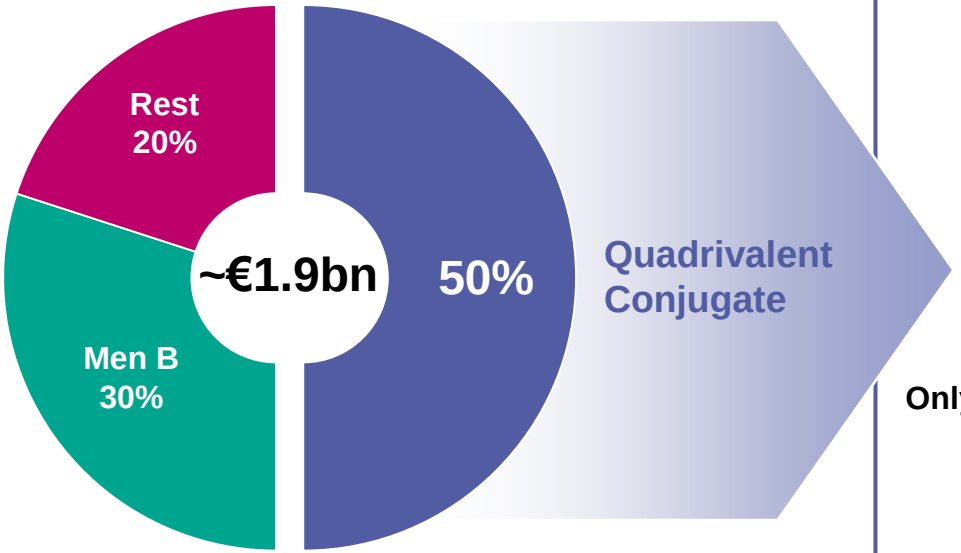
Impact and Incidence of Vaccine-Preventable Diseases



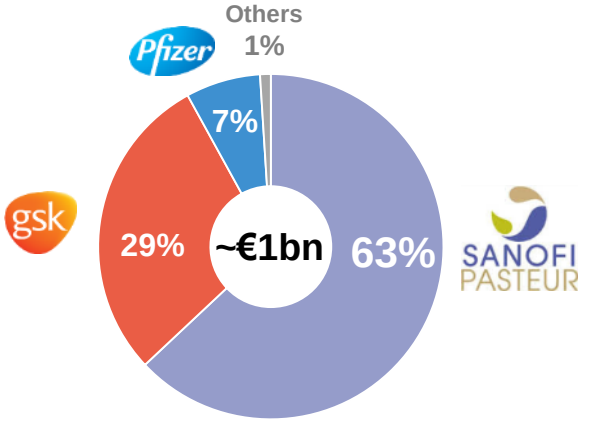
CFR= Case fatality rate
Source: J Travel Med 2005 Intl Soc of Travel Med

Sanofi Pasteur Is the Leader with 63% MS(1) in Quad ACWY Meninge Vaccines Market thanks to Menactra®

Global Meningococcal Market Sales in 2016(1/2)



Meninge ACWY Conjugate Market Sales in 2016



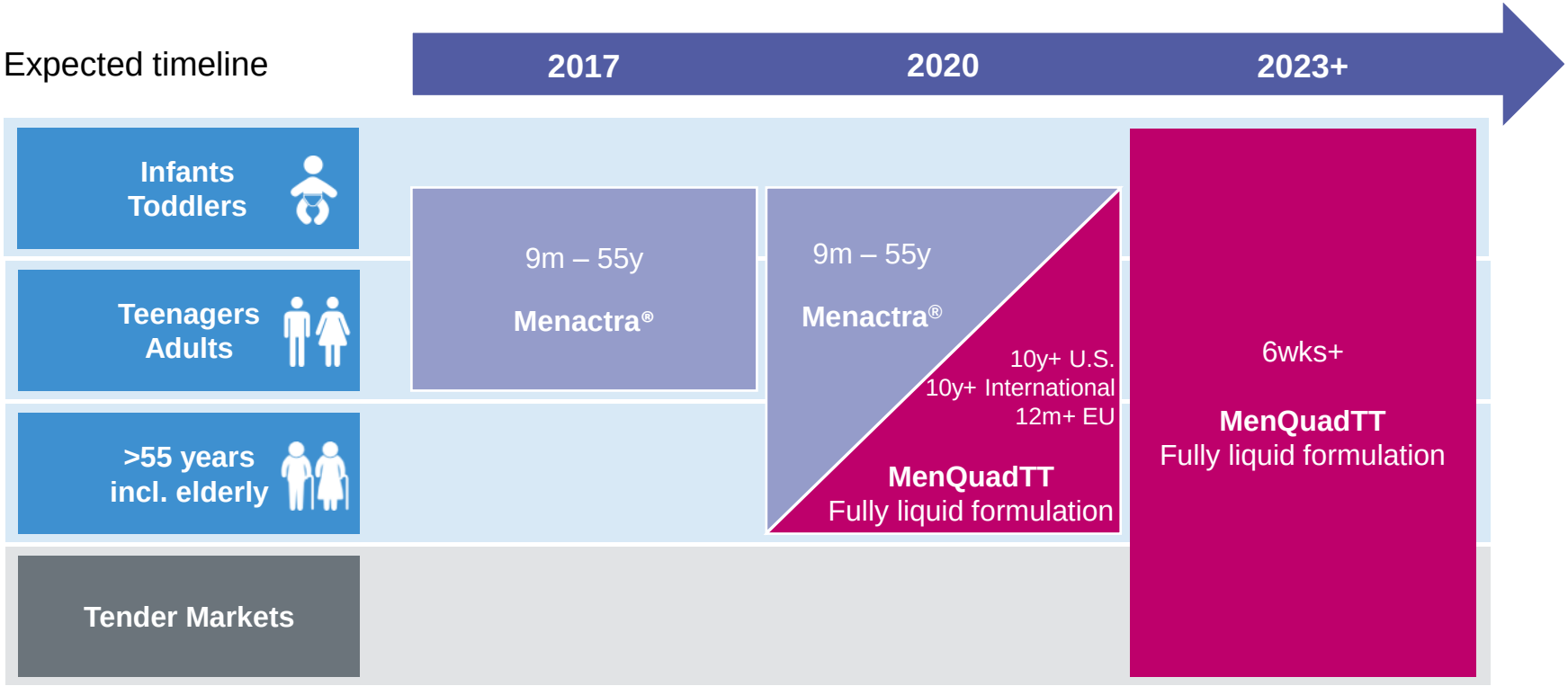
Only fully liquid presentation

≠

GSK Menveo®:
Lyophilized MenA
+ liquid Men CWY

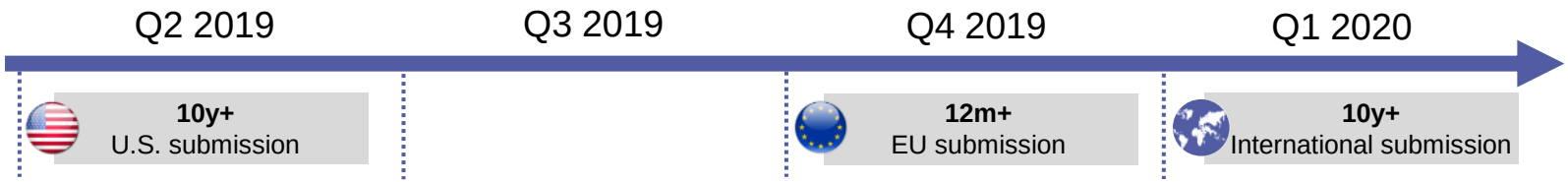
(1) Sources 2016 Actual Sales Pfizer and GSK – based on company reported sales
(2) Men Cj C, Men Cj C Hib, Men ps ACWY, Men Cj A, Men ps AC, Men Cj AC, Men ps A, Men ps BC

Moving From Menactra® to MenQuadTT



MenQuadTT: Phase 3 Program in All Age Groups Ongoing

Potential First Submissions

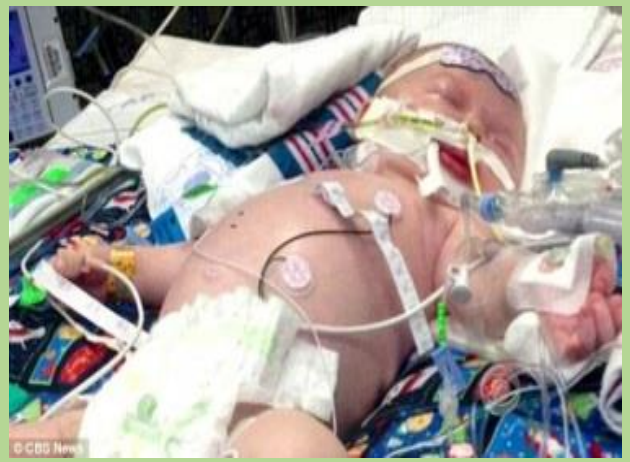


Expected Benefits

- Unique fully liquid formulation vs. competition
- Broad age indication from infants(1) to elderly
- Geographic expansion especially in Europe
- Co-administration possible with multiple routine pediatric vaccines
- Potential Quadrivalent backbone for Pentavalent Meningitis vaccine

(1) 6 weeks

RSV: The Most Common Cause of LRTI in Infants Worldwide



- Circulates seasonally like influenza virus
- Around 30 million children affected per year
- Infants and young children most at risk
- Primary infection tends to cause the most severe respiratory infections
- No vaccine nor broadly effective antiviral drug or prophylactic drug available for all infants

RSV= Respiratory syncytial virus; LRTI= Lower Respiratory Tract Infection

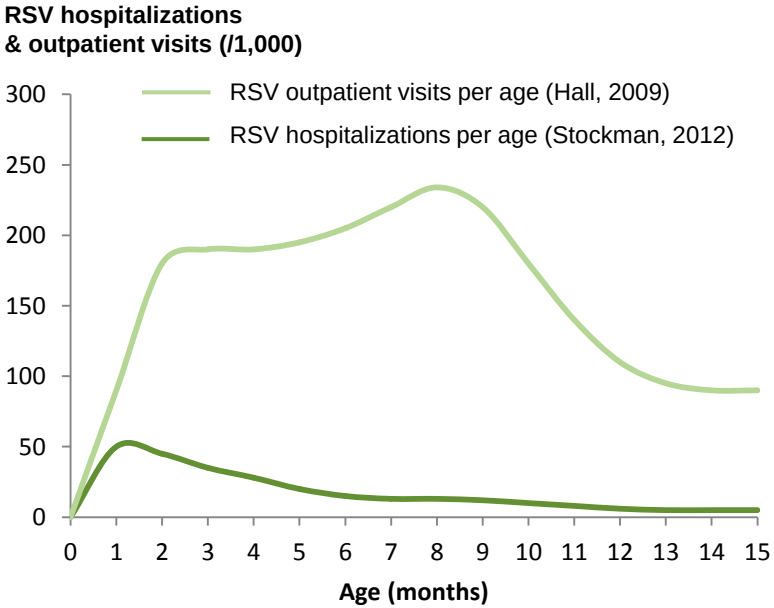
Rate of RSV Hospitalization Is the Highest in Young Infants

1.7 million
GP visits in the U.S.(1)

2.1 million
children require medical care annually in the U.S. (1)

400k
visits in Emergency Room(2)

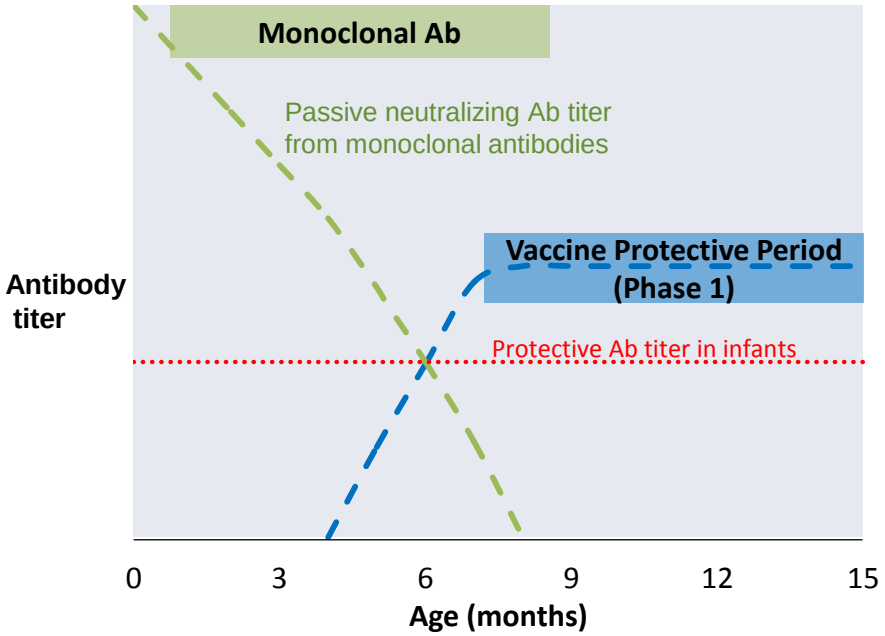
$1.15 bn
of annual medical cost(1)



Most hospitalizations occur during the infant's first RSV season

(1) Regnier, Vaccine. 2013 Sep 13;31(40):4347-54.
(2) Calculation from Crepey. Influenza Other Respir Viruses. 2015 Aug;9 Suppl 1:39-46.

RSV mAb(1) Provides Best Approach for Young Infants



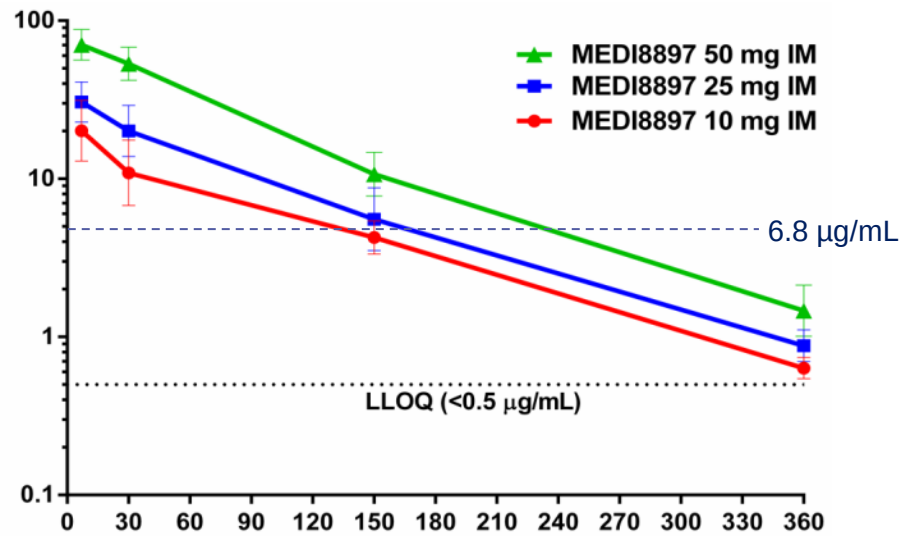
Phase 1b/2a Results

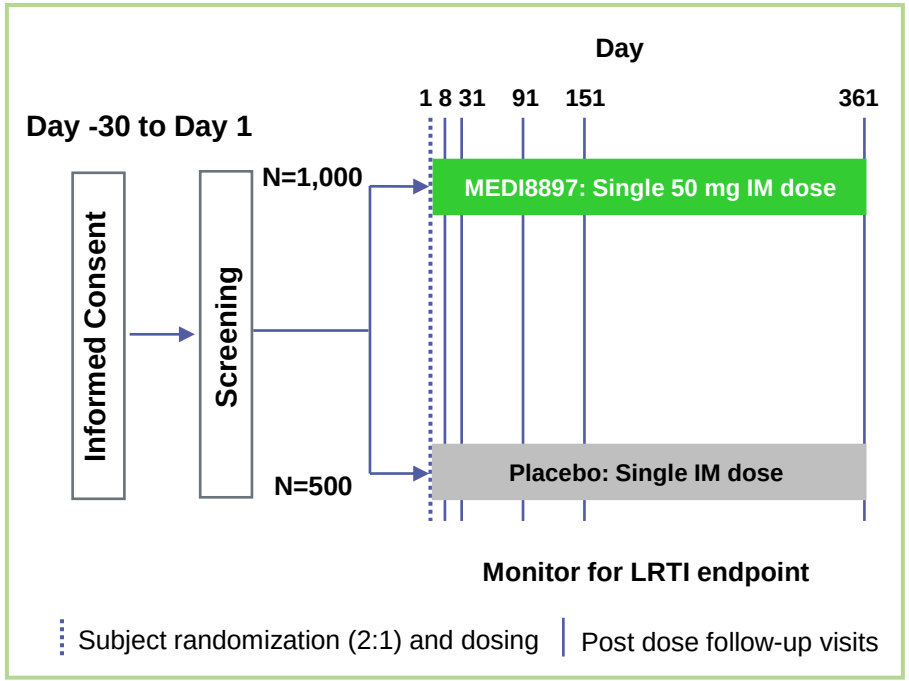
- Subjects were followed 1 year for safety
- Half-life (~70 days) supporting single dose administration for full RSV respiratory season
- Ph1b/2a data (including safety) supported advancing to Phase 2b

(1) Collaboration with Medimmune

Phase 1b/2a First-Time-in-Infant Study in Healthy Preterm Infants

MEDI8897[(1)] Serum Concentrations (µg/mL) (Mean ± SD)

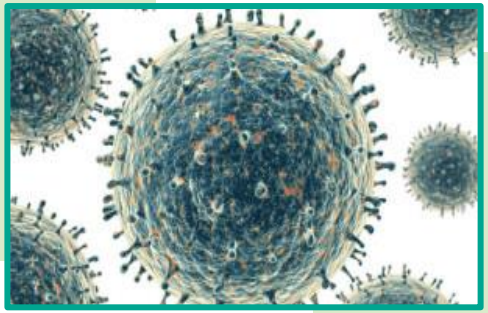




(1) Collaboration with Medimmune

RSV mAb(1) Is a Unique Opportunity for All Infants Entering their First RSV Season

- Solid preliminary Phase 1b/2a Results
- First mAb to market for all infants
- Targeted population: Infants entering their first RSV season



- Phase 2b started in Q4 2016
  - Results expected in H2 2018
- FDA fast track designation granted in 2015

SANOFI (1) Collaboration with Medimmune

Elias Zerhouni

President, Global R&D

SANOFI

Closing Remarks

SANOFI

Clinical Trials Appendix

R&D Pipeline – New Molecular Entities(*)

Phase 1 (Total:15)		Phase 2 (Total:15)		Phase 3 (Total:7)	Registration
SAR440340(**) Anti-IL33 mAb Asthma	**UshStat®** Myosin 7A gene therapy Usher Syndrome 1B	**SAR156597** IL4/IL13 bi-specific mAb Systemic Scleroderma	**SAR425899** GLP-1/GCG dual agonist Obesity/Overweight in T2D	R **isatuximab** Anti-CD38 mAb Relapsing Refractory Multiple Myeloma (ICARIA)	
SAR439794 TLR4 agonist Peanut Allergy	**SAR228810** Anti-protofibrillar AB mAb Alzheimer's Disease	**GZ389988** TRKA antagonist Osteoarthritis	**mavacamten**(7)(**) Myosin inhibitor Obstructive Hypertrophic Cardiomyopathy	**patisiran**(**) siRNA inhibitor targeting TTR Hereditary ATTR Amyloidosis	
SAR408701 Maytansin-loaded anti-CEACAM5 mAb Solid Tumors	**SAR438335** GLP-1/GIP dual agonist Type 2 Diabetes	R **cemiplimab**(4)(**) PD-1 inhibitor mAb Advanced CSCC (Skin cancer)	**SAR407899** rho kinase Microvascular Angina	**GZ402666** avalglucosidase alfa Pompe Disease	
SAR439459 anti-TGFβ mAb Advanced Solid Tumors	**SAR440181**(3)(**) Myosin activation Dilated Cardiomyopathy	R **SAR566658** Maytansin-loaded anti-CA6 mAb Triple Negative Breast Cancer	Combination **ferroquine / OZ439**(**) Antimalarial	**fitusiran**(9)(**) siRNA targeting Anti-Thrombin Hemophilia	
O **REGN3767**(1) Anti LAG-3 mAb Advanced Cancers	**SAR247799** S1P1 agonist Cardiovascular indication	R **olipudase alfa** rhASM Acid Sphingomyelinase Deficiency(5)	**Tuberculosis** Recombinant subunit vaccine	**sotagliflozin**(**) Oral SGLT-1&2 inhibitor Type 1 Diabetes	
SAR439859 SERD Metastatic Breast Cancer	**Herpes Simplex Virus Type 2** HSV-2 vaccine	O **SAR339375**(6) miRNA-21 Alport Syndrome	**HIV** Viral vector prime & rgp120 boost vaccine	**SAR341402** Rapid acting insulin Type 1/2 Diabetes	
O **ALN-TTRsc02**(2) Sub-cutaneous siRNA inhibitor targeting TTR Hereditary ATTR Amyloidosis	**Respiratory syncytial virus** Infants Vaccines	**venglustat** Oral GCS inhibitor Gaucher related Parkinson's Disease	**SP0232**(8) **mAb**(**) Respiratory syncytial virus Monoclonal Antibody	**efpeglenatide**(**) Long-acting GLP-1 agonist Type 2 Diabetes	
O **ALN-GO1**(2) Investigational RNAi therapeutic Primary Hyperoxaluria Type 1 (PH1)		**SAR422459** ABCA4 gene therapy Stargardt Disease			

R Registration Study

O Opt-in rights products for which rights have not been exercised yet

- Immuno-inflammation
- Oncology
- Rare Disease
- MS, Neuro, Gene therapy
- Diabetes Solutions
- Cardiovascular & metabolism
- Infectious Diseases
- Vaccines

(1) Regeneron product for which Sanofi has opt-in right
(2) Alnylam product for which Sanofi has opt-in right
(3) Also known as MYK491
(4) Also known as SAR439684 and REGN2810
(5) Also known as Niemann Pick type B
(6) Regulus product for which Sanofi has opt-in right
(7) Also known as SAR439152 and as MYK461
(8) Also known as MEDI8897
(9) Currently on clinical hold pending outcome of FDA discussion – Expected to resume around year-end
(*) Data related to all studies published in clinicaltrials.gov
(**) Partnered and/or in collaboration – Sanofi may have limited or shared rights on some of these products

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Additional Indications(*)

Phase 1
(Total:5)

- **isatuximab + cemiplimab(1)(**)** — Anti-CD38 mAb + PD1 inhibitor mAb — Relapsing Refractory Multiple Myeloma
- **isatuximab** — Anti-CD38 mAb + CyBord(2) — Newly Diagnosed Multiple Myeloma
- **SAR439459 + cemiplimab(1)(**)** — Anti-TGFβ mAb + PD1 inhibitor mAb — Advanced Solid Tumors
- **SAR439859** — SERD + Palbociclib — Metastatic Breast Cancer
- O **cemiplimab(1)(**) + REGN3767(3)** — PD-1 inhibitor mAb + anti LAG-3 mAb — Advanced Cancers

Phase 2
(Total:11)

- **dupilumab(**)** — Anti-IL4Rα mAb — Eosinophilic Esophagitis
- **sarilumab(**)** — Anti-IL6R mAb — Polyarticular Juvenile Idiopathic Arthritis
- **sarilumab(**)** — Anti-IL6R mAb — Systemic Juvenile Arthritis
- R **cemiplimab(1)(**)** — PD-1 inhibitor mAb — Advanced Basal Cell Carcinoma
- **venglustat** — Oral GCS inhibitor — Gaucher Disease Type 3
- **venglustat** — Oral GCS inhibitor — Fabry Disease
- **sotagliflozin(**)** — (SAR439954) — SGLT 1 & 2 inhibitor – WHF in Diabetes
- **mavacamten(4)(**)** — Myosin inhibitor — Non-Obstructive Hypertrophic Cardiomyopathy
- **Rabies VRVg** — Purified vero rabies vaccine
- **Adacel+** — Tdap booster
- **Shan 6** — DTP-HepB-Polio-Hib — Pediatric hexavalent vaccine

Phase 3
(Total:16)

- **dupilumab(**)** — Anti-IL4Rα mAb — Asthma 6 - 11 years old
- **dupilumab(**)** — Anti-IL4Rα mAb — Asthma 12y+
- **dupilumab(**)** — Anti-IL4Rα mAb — Nasal Polyposis
- **Dupixent®(**)** — Anti-IL4Rα mAb — Atopic Dermatitis 12 – 17 years old
- **Dupixent®(**)** — Anti-IL4Rα mAb — Atopic Dermatitis 6 – 11 years old
- **Dupixent®(**)** — Anti-IL4Rα mAb — Atopic Dermatitis 6 months - 5 years old
- R **cemiplimab(1)(**)** — PD-1 inhibitor mAb — 2nd line Cervical Cancer
- R **cemiplimab(1)(**)** — PD-1 inhibitor mAb — 1st line NSCLC
- R **isatuximab** — Anti-CD38 — 1st line Ti (IMROZ)
- R **isatuximab** — Anti-CD38 mAb — Relapsing Refractory Multiple Myeloma (IKEMA)
- **Aubagio®** — teriflunomide — Relapsing Multiple Sclerosis - Pediatrics
- **sotagliflozin(**)** — Oral SGLT-1&2 inhibitor — Type 2 Diabetes
- **Praluent®(**)** — Anti-PCSK9 mAb — CV events reduction
- **Fluzone® QIV HD** — Quadrivalent inactivated — Influenza vaccine - High dose
- **Men Quad TT** — Advanced generation meningococcal — ACYW conjugate vaccine
- **Pediatric pentavalent vaccine** — DTP-Polio-Hib — Japan

Registration
(Total:2)

- **VaxiGrip® QIV IM** — Quadrivalent inactivated — Influenza vaccine (6-35 months)
- **PR5i** — DTP-HepB-Polio-Hib — Pediatric hexavalent vaccines (U.S.)

R Registration Study

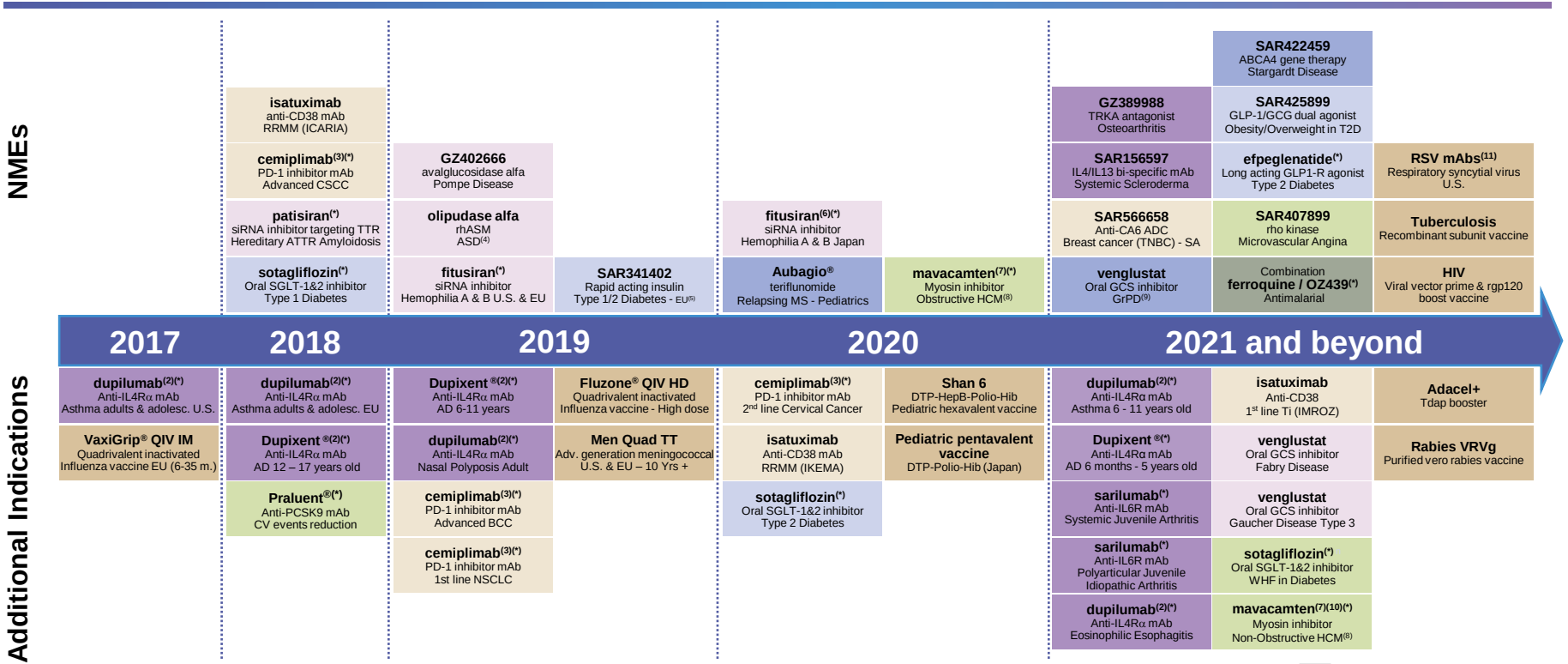
O Opt-in rights products for which rights have not been exercised yet

- Immuno-inflammation
- Oncology
- Rare Disease
- MS, Neuro, Gene therapy
- Diabetes Solutions
- Cardiovascular & metabolism
- Infectious Diseases
- Vaccines

(1) Also known as SAR439684 and REGN2810
(2) Cyclophosmamide + bortezomib (Velcade) + dexamethasone
(3) Regeneron product for which Sanofi has opt-in right
(4) Also known as SAR439152 and as MYK461
(*) Data related to all studies published in clinicaltrials.gov
(**) Partnered and/or in collaboration - Sanofi may have limited or shared rights on some of these products

SANOFI

Expected Submission Timeline(1)



(1) Excluding Phase I - Data related to all studies published in clinicaltrials.gov
(2) Also known as SAR231893
(3) Also known as SAR439684 and REGN2810
(4) Acid Sphingomyelinase Deficiency
(5) Submission strategy for the US under evaluation
(6) Currently on clinical hold pending outcome of FDA discussion – Expected to resume around year-end
(7) Also known as SAR439152 and as MYK461
(8) Hypertrophic Cardiomyopathy
(9) Gaucher Related Parkinson's Disease
(10) Discussion about development plan are ongoing with Health Authorities
(11) Also known as SP0232 and MEDI8897
(*) Partnered and/or in collaboration – Sanofi may have limited or shared rights on some of these products

Pipeline Movements Since Q3 2017

	Additions to the pipeline	Removals from the pipeline
Phase 1	*No changes*	**SAR428926** Maytansin-loaded anti-Lamp1 mAb Cancer **GZ402668** GLD52 (anti-CD52 mAb) Relapsing Multiple Sclerosis
Phase 2	**SAR407899** rho kinase Microvascular Angina	**SAR100842** LPA1 receptor antagonist Systemic Sclerosis **SAR156597** IL4/IL13 bi-specific mAb Idiopathic Pulmonary Fibrosis **isatuximab** Anti-CD38 mAb monotherapy Acute Lymphoblastic Leukemia
Phase 3	**SAR341402** Rapid acting insulin Type 2 Diabetes **efpeglenatide** Long-acting GLP-1 receptor agonist Type 2 Diabetes **cemiplimab** PD-1 inhibitor mAb 2nd line Cervical Cancer	**Clostridium difficile** Toxoid vaccine
Registration	*No changes*	*No changes*

R&D Pipeline Summary – Total Projects(1)

	Phase 1	Phase 2	Phase 3	Registration	TOTAL
Immuno-inflammation	2	5	6	0	13
Oncology	9	3	5	0	17
Rare Diseases	2	4	3	0	9
Multiple Sclerosis, Neurology, Gene therapy	2	2	1	0	5
Diabetes	1	1	4	0	6
Cardiovascular Diseases	2	4	1	0	7
Infectious Diseases	0	1	0	0	1
Vaccines	2	6	3	2	13
TOTAL	**20**	**26**	**23**	**2**	

58

13

71 **Total Projects**

46

25

(1) Includes 4 Phase I products and 1 Phase 2 product for which Sanofi has Opt-in rights but has not yet exercised these rights

List of abbreviations

AE	Adverse Events
APO	Apolipoprotein
BOR	Best Overall Response
CB	Clinical Benefit
CNS	Central Nervous System
CR	Complete Response
CRR	Complete Response Rate
CT	Computed Tomography
CV	Cardiovascular
DE	Data Expected
DCR	Disease Control Rate
DLT	Dose-Limiting Toxicity
DOD	Duration Of Disease
DOR	Duration Of Response
EASI	Eczema Area and Severity Index
FPC	Fasting Plasma Glucose
IAE	Incidence of Adverse Events
IAR	Infusion Associated Reaction
IC	Investigator's Choice
IGA	Investigator's Global Assessment
IMID	Immunomodulatory Drug
ITT	Intent To Treat
LP	Lipoprotein
MRI	Magnetic Resonance Imaging
MTD	Maximum Tolerated Dose
N	Number
NC	Nasal Congestion/obstruction
NNT	Number Needed to Treat
OS	Overall Survival
ORR	Overall Response Rate
PD	Pharmacodynamic
PI	Proteasome Inhibitor
PFS	Progression-Free Survival
PK	Pharmacokinetic
PPG	Postprandial Glucose
PRO	Patient Reported Outcome
QNW	Every N Weeks
QNM	Every N Months
QOL	Quality Of Life
RECIST	Response Evaluation Criteria in Solid Tumors
SAE	Serious Adverse Events
SDMT	Symbol Digit Modalities Test
SMPG	Self Monitored Plasma Glucose
SSD	Study Start Date
TC	Total Cholesterol
TEAE	Treatment Emergent Adverse Events
TSS	Total Symptom Score
TG	Triglycerides
TTP	Time To Progression
TTR	Time To Response
TX	Treatment
VGPR	Very Good Partial Response

Dupilumab (anti-IL4Rα mAb)
Asthma 1/3

Study	Description	Patients	Design	Endpoints	Status
LIBERTY ASTHMA TRAVERSE LTS12551 NCT02134028	Phase 2/3 Open label extension study long-term safety & tolerability evaluation in patients with asthma who participated in previous studies	2,287 expected	• For patients coming from DRI12544, PDY14192, EFC13579, EFC13691 studies: dupilumab loading dose sc on Day 1, followed by 1x dose Q2W added to current controller medications • Open-label, max. 3 weeks screening and 108 weeks Tx	• Primary: N and % of patients experiencing any TEAE • Secondary: Safety	• SSD: Jul. 2014 • DE: 2019

Dupilumab (anti-IL4Rα mAb)
Asthma 2/3

Study	Description	Patients	Design	Endpoints	Status
EXPEDITION ASTHMA PDY14192 NCT02573233	Phase 2a Evaluation of dupilumab's effects on airway inflammation in patients with asthma	42	• Randomized, double-blind, parallel, placebo-controlled Study, 5 to 6 weeks screening, 12 weeks Tx, 12 weeks post Tx	• Primary: Change from baseline in N of inflammatory cells and in mucin-stained area in the bronchial submucosa per mm^2 • Secondary: Safety, Tolerability, Immunogenicity of dupilumab compared to placebo	• SSD: Jan. 2016 • DE: 2018

Dupilumab (anti-IL4Rα mAb)
Asthma 3/3

Study	Description	Patients	Design	Endpoints	Status
CHILDREN ASTHMA VOYAGE EFC14153 NCT02948959	Phase 3 Evaluation of dupilumab in children (6 to <12 years) with uncontrolled asthma	294	• In children 6 to <12 years of age with uncontrolled persistent asthma • Randomized, Double-blind, Placebo-controlled, parallel group 52 weeks Tx, 12 weeks post Tx	• Primary: Annualized rate of severe exacerbation events during Tx period • Secondary: Safety and tolerability, PROs, Systemic exposure and incidence of anti-drug antibodies, Association between dupilumab Tx and pediatric immune responses to vaccines	• SSD: Jun. 2017 • DE: 2021

Dupilumab (anti-IL4Rα mAb)
Atopic Dermatitis (AD)

Study	Description	Patients	Design	Endpoints	Status
OLE Pediatrics AD R668-AD-Reg 1434 NCT02612454	Phase 3 A study to assess the long-term safety of dupilumab administered in patients 6 to <18 years of age with AD	765 expected	• For patients having participated in a prior dupilumab study in pediatrics with AD • Non-Randomized, Parallel Assignment, Open label extension study	• Primary: Incidence and rate of TEAEs • Secondary: SAEs and AEs of special interest, % of patients who achieve and maintain remission, EASI-75: % of patients achieving and maintaining at least 75% reduction in EASI score over time, EASI-50: % of patients achieving and maintaining at least 50% reduction in EASI scores over time	• SSD: Oct. 2015 • DE: 2018
Pediatrics (12 to 17 years) AD R668-AD-Reg 1526 NCT03054428	Phase 3 A study to investigate the efficacy and safety of dupilumab monotherapy in patients 12 to 17 years of age, with moderate-to-severe AD	240	• Pediatric patients (12 to 17 years old) with moderate-to-severe AD • A randomized, double-blind, placebo-controlled, 3-arm: dupilumab dose 1, dupilumab dose 2, placebo	• Primary: % of patients with IGA 0 to 1 (on a 5-point scale), % of patients with EASI-75 • Secondary: % change in EASI score	• SSD: Apr. 2017 • DE: 2018

Dupilumab (anti-IL4Rα mAb)
Atopic Dermatitis (AD)

Study	Description	Patients	Design	Endpoints	Status
LIBERTY AD PRESCHOOL NTC03346434	Phase 2/3 Safety, Pharmacokinetics and Efficacy of Dupilumab in Patients ≥6 Months to <6 Years With Severe Atopic Dermatitis	280	• Part A: Open-label, single-ascending dose, sequential cohort phase 2 study • Part B: Randomized, double-blind, parallel-group, placebo-controlled phase 3 study	• Primary: PK, TEAEs, SAEs • Secondary: SEAs, TEAEs, % chanhe in EASI score, Change in children's Dermatology Quality of Life Index	• SSD: Dec. 2017 • DE: 2022
AD in 6 - 11 Years Old NCT03345914	Phase 3 Efficacy and safety of Dupilumab administered with Topical Corticosteroids in participants ≥6 to <12 years with Severe Atopic Dermatitis	240	• Randomized, Double-blind, Placebo-controlled Study	• Primary: Proportion of patients with Investigator's Global Assessment "0" or "1" (on a 5-point scale) at week 16 • Secondary: Change from baseline to week 16 in Children's Dermatology Life Quality Index, Percent change in EASI score from baseline to week 16, Incidence of serious TEAEs through week 16	• SSD: Dec. 2017 • DE: 2019

Dupilumab (anti-IL4Rα mAb)
Nasal Polyposis (NP)

Study	Description	Patients	Design	Endpoints	Status
NP SINUS-24 EFC14146 NCT02912468	Phase 3 Evaluation of dupilumab in patients with bilateral NP on a background of mometasone furoate nasal spray	276 finally included	• Patients with bilateral sinonasal polyposis that despite prior Tx with systemic corticosteroids have an endoscopic bilateral NPS with a score at least of 5 over 8 • Randomized, double-blind, placebo-controlled study, 4 weeks run-in, 24 weeks Tx, 24 weeks post-Tx	• Primary: NC symptom severity score based on the patient daily morning assessment & by endoscopy, Sinus opacifications as assessed by CT • Secondary: TSS, Loss of smell, Sinus opacification	• SSD: Dec. 2016 • DE: 2018
LIBERTY NP SINUS-52 EFC14280 NCT02898454	Phase 3 Evaluation of dupilumab in patients with bilateral NP on a background of mometasone furoate nasal spray	448 finally included	• Patients with bilateral sinonasal polyposis that despite prior Tx with systemic corticosteroids have an endoscopic bilateral NPS with a score at least of 5 over 8 • Randomized, double-blind, placebo-controlled study, 4 weeks run-in, 52 weeks Tx, 12 weeks post-Tx, 3-arm, dupilumab dose regimen 1, dupilumab dose regimen 2, placebo	• Primary: NC symptom severity score based on the patient daily morning assessment & by endoscopy, Sinus opacifications as assessed by CT • Secondary: TSS, Loss of smell, Sinus opacification	• SSD: Dec. 2016 • DE: 2018

Sarilumab (anti-IL6 mAb)
Rheumatoid Arthritis (RA)

Study	Description	Patients	Design	Endpoints	Status
SARIL-RA-EXTEND LTS11210 NCT01146652	Phase 3 Long-term evaluation of sarilumab in RA patients	2000	• In patients with RA having participated to previous trials • Multi-center, uncontrolled extension, open-label; up to 1 week screening, at least 264 weeks of Tx to 516 weeks max., 6 weeks post-Tx	• Primary: N of patients with AE • Secondary: Long term efficacy of sarilumab in patients with RA (ACR20, DAS28, EULAR response)	• SSD: Jun. 2010 • DE: 2020

Sarilumab (anti-IL6 mAb)
Juvenile Idiopathic Arthritis (JIA)

Study	Description	Patients	Design	Endpoints	Status
Polyarticular JIA Children & Adolescents DRI13925 NCT02776735	Phase 2b Dose-finding study of sarilumab in children and adolescents with Polyarticular-course Juvenile Idiopathic Arthritis (pcJIA)	36	• In children and adolescents, Aged 2 to 17 years, with pcJIA • Open-label, sequential, ascending, repeated dose-finding Study; 4-week screening, 12-week core Tx, 92-week extension, 6-week post-Tx	• Primary: PK parameters (Up to week 12) • Secondary: PD profile, The efficacy and the safety of sarilumab in patients with pcJIA, Long-term safety of sarilumab in patients with pcJIA	• SSD: Sep. 2016 • DE: 2018
Systemic JIA Children & Adolescents DRI13926 NCT02991469	Phase 2b Dose-finding study of sarilumab in children and adolescents with Systemic Juvenile Idiopathic Arthritis (sJIA)	36	• In children and adolescents, aged 1 to 17 years, with sJIA • Open-label, sequential, ascending, repeated dose finding study, 4-week screening, 12-week Tx, 92- week extension, 6-week post-Tx	• Primary: PK parameters (Up to week 12) • Secondary: PD profile, The efficacy and the safety of sarilumab in patients with sJIA, Long term safety of sarilumab in patients with sJIA	• SSD: Dec. 2017 • DE (1st part) (1): 2018

(1) Final Data Collection date for primary outcome measure

SAR156597 (anti-IL13/IL4 mAb)
Scleroderma

Study	Description	Patients	Design	Endpoints	Status
POC in Scleroderma ACT14604 NCT02921971	Phase 2a Efficacy and safety of SAR156597 in the Tx of Diffuse Cutaneous Systemic Sclerosis (dcSSc)	94	• Randomized, double-blind, Parallel Assignment, placebo-controlled, 4-week screening, 24-week Tx period, 11-week follow-up	• Primary: Change from baseline in mRSS • Secondary: Change from baseline in Health Assessment Questionnaire Disability Index (HAQ-DI), assessed with SHAQ, Change from baseline in respiratory function as measured by observed Forced Vital Capacity Change from baseline in observed Carbon Monoxide Diffusing Lung Capacity (DLco [corrected for hemoglobin])	• SSD: Dec. 2016 • DE (1st part) (1): 2018

(1) Final Data Collection date for primary outcome measure

SAR440340 (Anti-IL33 mAb)
Asthma

Study	Description	Patients	Design	Endpoints	Status
Asthma NCT02999711	Phase 1 Assess the safety and tolerability of multiple ascending subcutaneous doses of REGN3500 in adult patients with Moderate Asthma	24	• Randomized, double-blind, Placebo-controlled, Multiple ascending dose study of the safety	• Primary: Incidence of TEAEs after repeat subcutaneous administration, severity of TEAEs • Secondary: Concentration-time profile of REGN3500 after repeat subcutaneous administration, Immunogenicity, % change in total from baseline forced expiratory volume	• SSD: Jan. 2017 • DE: Nov. 2018

Isatuximab (anti-CD38 mAb)
Hematological Malignancies (HM)

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
CD38+HM TED10893 NCT01084252	Phase1/2 Dose escalation and efficacy study of isatuximab in patients with selected CD38+ HM	346	• Phase 1: MTD • Phase 2: Stage 1: isatuximab activity at different doses/schedules and to select dose and regimen as single agent or in combination with dexamethasone Stage 2: activity at the selected dose/schedule from stage1, as single agent (ISA arm) and in combination with dexamethasone (ISAdex arm) • Randomized, Open-label, Parallel assignment	• Primary: DLT, ORR • Secondary: DOR, PFS, OS, Immune Response	• SSD: Jun. 2010 • DE: 2019

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
Lenalidomide Combination **RRMM** TCD11833 NCT01749969	Phase 1b Isatuximab, in Combination With lenalidomide and dexamethasone for the Tx of Relapsed or Refractory MM	60	• Patients with diagnosis of MM and documentation of at least 2 prior therapies (induction therapy, autologous stem cell transplant, consolidation and maintenance therapy is considered one prior therapy) • Open-label, Parallel assignment • Isatuximab (escalating doses) + lenalidomide + dexamethasone • Total duration for one patient: up to 21 days screening, at least 4 weeks Tx, up to 60 days follow-up	• Primary: N of patients with AE • Secondary: ORR, PFS, PK, PD, Immunogenicity	• SSD: Feb. 2013 • DE: 2019

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
Pomalidomide Combination **RRMM** TCD14079 NCT02283775	Phase 1b Isatuximab, in combination with pomalidomide and dexamethasone for the Tx of Relapsed/Refractory MM	45	• Patients previously diagnosed with MM based on standard criteria and currently require Tx because MM has relapsed following a response • Open-label, Parallel assignment • Isatuximab (escalating doses) + pomalidomide + dexamethasone • Total duration for one patient: up to 21 days screening, Tx period up to disease progression or AEs , 60- day follow-up	• Primary: DLTs, N of patients with AE • Secondary: ORR, PK, Immunogenicity, DOR, CB	• SSD: May 2015 • DE: 2018

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
Bortezomib Combination **RRMM** TCD13983 NCT02513186	Phase 1 Isatuximab in combination with bortezomib - based regimens in adult patients with newly diagnosed MM non eligible for transplantation	44	• Patients with a diagnosis of MM with evidence of measurable disease, having received prior Tx with an IMiD and with at least 3 prior lines of therapy • Open-label, Single Group assignment • Isatuximab (escalating dose) + bortezomib + cyclophosphamide + dexamethasone: VCDI cohort (3-week screening, 50-week duration for induction and then up to disease progression, or unacceptable AEs + follow-up) • Isatuximab + bortezomib + dexamethasone + lenalidomide: VRDI cohort to begin after VCDI completion (4-week screening, 24-week duration for induction and then up to disease progression, or unacceptable AEs, + follow-up)	• Primary: DLTs/VCDI For both VCDI & VRDI: ORR, CR • Secondary: N of patients with AE, and significant changes in lab tests, PK, DOR	• SSD: Sep. 2015 • DE: 2024

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
RRMM TED14154 NCT02514668	Phase 1 Safety, PK and Efficacy of isatuximab in patients with Relapsed/Refractory MM	64	• Patients with a diagnosis of MM with evidence of measurable disease and with evidence of disease progression • Open-label, Single Group assignment, isatuximab (escalating doses) • Total duration for one patient: up to 21 days screening, Tx period up to disease progression or AEs , 60- day follow-up at least	• Primary: Part A: DLTs, N of patients with AE; Part B: ORR • Secondary: PK, N of patients with AEs, DOR, CB, PFS, Immunogenicity	• SSD: Sep. 2015 • DE: 2019

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
ISLANDS (Japanese Patients) **RRMM** TED14095 NCT02812706	Phase 1 Phase 2 Isatuximab single-agent in Japanese patients with Relapsed and Refractory MM	42	• Patients with a diagnosis of symptomatic MM, having received at least 3 prior lines of therapy OR whose disease is double refractory to an IMiD and a PI • Open-label, Single Group assignment, isatuximab monotherapy • Total duration for one patient: up to 21-day screening, Tx period up to disease progression or unacceptable AEs, post-Tx follow-up	• Primary: Phase 1: DLTs Phase 2: ORR • Secondary: N of patients with AE, CB, OS, PFS, DOR, TTR, PK, PD, Immunogenicity	• SSD: Sep. 2016 • DE: 2018

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
Cemiplimab Combination **RRMM** TCD14906 NCT03194867	Phase 1 Phase 2 Safety, PK and Efficacy of isatuximab in combination with cemiplimab in patients with Relapsed/Refractory MM	54	• Patients with a diagnosis MM with evidence of measurable disease, having received prior Tx with an IMiD and with at least 3 prior lines of therapy • Open-label, Single Group assignment • Isatuximab + cemiplimab • Total duration for one patient: up to 21-day screening, Tx period up to disease progression or unacceptable AEs, 3-month post-Tx follow-up	• Primary: DLTs, N of patients with AE, ORR • Secondary: CB, DOR, TTR, PFS, OS, PK, Immunogenicity (isatuximab and cemiplimab)	• Not yet recruiting

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
ICARIA-MM RRMM EFC14335 NCT02990338	Phase 3 Isatuximab, pomalidomide, and dexamethasone to pomalidomide and dexamethasone in Refractory or Relapsed and RRMM	300	• Isatuximab in combination with pomalidomide and low-dose dexamethasone, compared to pomalidomide and low-dose dexamethasone in patients with RRMM • Randomized, Open-label, Parallel assignment	• Primary: PFS • Secondary: ORR, OS, TTP, PFS, DOR	• SSD: Jan. 2017 • DE (1st Part)(1): 2018

(1) Final Data Collection date for primary outcome measure

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
IKEMA RRMM EFC15246 NCT03275285	Phase 3 Isatuximab combined with carfilzomib and dexamethasone vs. carfilzomib with dexamethasone in patients With Relapse and/or Refractory MM previously treated with 1 to 3 prior lines	300	• Patients with MM previously treated with prior 1 to 3 lines and with measurable serum M-protein (≥ 0.5 g/dL) and/or urine M-protein (≥ 200 mg/24 hours) • Randomized, Open-label, Parallel assignment, 2-arm: (a) isatuximab +carfilzomib+dexamethasone, (b) carfilzomib+dexamethasone	• Primary: PFS • Secondary: ORR, % of patients with CR, and VGPR, OS, TTP, Second PFS, DOR, AE, PK, Immunogenicity	• SSD: Oct. 2017 • DE (1st Part)(1): 2020

(1) Final Data Collection date for primary outcome measure

Isatuximab (anti-CD38 mAb)
Multiple Myeloma (MM)

Study	Description	Patients	Design	Endpoints	Status
IMROZ NDMM EFC12522 NCT03319667	Phase 3 Isatuximab in combination with bortezomib (Velcade®), lenalidomide (Revlimid®) and dexamethasone vs. bortezomib, lenalidomide and dexamethasone in patients with newly diagnosed MM not eligible for transplant	440	• Newly diagnosed MM not eligible for transplant due to age (≥ 65 years) or patients < 65 years with comorbidities impacting possibility of transplant or patient's refusal of transplant • Randomized, Open-label, Parallel assignment • IVRd arm (Isatuximab/bortezomib/lenalidomide /dexamethasone) • VRd arm (Bortezomiblenalidomide /dexamethasone) • Ird crossover arm (Isatuximab/lenalidomide/ dexamethasone) • Total duration for each patient: screening period up to 4 weeks, induction period of 24 weeks, continuous Tx period and crossover when applicable	• Primary: PFS • Secondary: ORR, % of patients with CR, and VGPR, OS, TTP, DOR, PFS on next line of therapy (PFS2), AE, PK, Immunogenicity, QOL	• SSD: 2017 • DE (1st Part) (1): 2022

(1) Final Data Collection date for primary outcome measure

Cemiplimab (PD-1 inhibitor)
Advanced Malignancies (AM)

Study	Description	Patients	Design	Endpoints	Status
AM R2810-ONC-1423 NCT02383212	Phase 1 A first-in-human study of repeat dosing with cemiplimab, as single therapy and in combination with other Anti-Cancer therapies in patients with AM	1,167	• Non-Randomized, Open-label, Parallel assignment, ascending-dose • Monotherapy, cemiplimab alone • Dual combination: cemilplimab in combination with hypofractionated radiotherapy or with cyclophosphamide or with docetaxel • Triple combination: cemiplimab with hypofractionated radiotherapy plus cyclophosphamide, or hypofractionated radiotherapy plus GM-CSF or carboplatin plus paclitaxel or carboplatin plus pemetrexed or carboplatin plus docetaxel • Quadruple combination: cemiplimab with hypofractionated radiotherapy plus GM-CSF plus cyclophosphamide	• Primary: TEAE, Incidence of abnormal laboratory findings, N of participants with DLT • Secondary, RECIST as measured by CT or MRI, Immune-Related Response	• SSD: Jan. 2015 • DE: 2020

Cemiplimab (PD-1 inhibitor)
Advanced Malignancies (AM)

Study	Description	Patients	Design	Endpoints	Status
PK in Japanese patients AM R2810-ONC-1622 NCT03233139	Phase 1 To investigate the safety and PKs of cemiplimab in Japanese patients with AM	6	• Histologically or cytologically confirmed diagnosis of malignancy with no alternative standard-of-care therapeutic option • Single Group assignment, Open-label	• Primary: TEAEs cemiplimab PK parameters • Secondary: Immunogenicity against cemiplimab	• SSD: Sep. 2017 • DE: 2019

Cemiplimab (PD-1 inhibitor)
Melanoma

Study	Description	Patients	Design	Endpoints	Status
Biomarkers Melanoma R2810-ONC-1606 NCT03002376	Phase 1 Exploratory Tumor Biopsy-driven study to understand the relationship between biomarkers and clinical response in Melanoma patients receiving cemiplimab	30	• For Histologically confirmed diagnosis of stage III (unresectable) or stage IV melanoma with at least 1 lesion that is measurable by RECIST 1.1 criteria and accessible for biopsies • Non-Randomized, Open-label, Parallel assignment • Group 1: Patients with metastatic CSCC: to distant sites or lymph nodes. cemiplimab administered intravenously every 2 weeks • Group 2: Patients with unresectable locally advanced CSCC. cemiplimab administered intravenously every 2 weeks • Group 3: Patients with metastatic CSCC, to distant sites or lymph nodes. cemiplimab administered intravenously every 3 weeks	• Primary: Correlation between changes in the tumor microenvironment and the change in tumor volume following cemiplimab Tx • Secondary: Correlation between baseline tumor characteristics and the change in tumor volume following Tx, cemiplimab serum concentrations, antibodies levels, PFS, ORR	• SSD: Apr. 2017 • DE (1st Part)(1): 2018

(1) Final Data Collection date for primary outcome measure

Cemiplimab (PD-1 inhibitor)
Cutaneous Squamous Cell Carcinoma (CSCC)

Study	Description	Patients	Design	Endpoints	Status
Advanced CSCC R2810-ONC-1540 NCT02760498	Phase 2 Cemiplimab monotherapy for patients with metastatic (nodal or distant) CSCC (Groups 1 and 3) or with unresectable locally advanced CSCC (Group 2)	150	• Non-Randomized, Open-label, Parallel assignment • Group 1: Patients with metastatic CSCC: to distant sites or lymph nodes cemiplimab administered intravenously every 2 weeks • Group 2: Patients with unresectable locally advanced CSCC. cemiplimab administered intravenously every 2 weeks • Group 3: Patients with metastatic CSCC: to distant sites or lymph nodes, cemiplimab administered intravenously every 3 weeks	• Primary: ORR (96 weeks), Groups 1 and 3: RECIST version 1.1 will be used to determine ORR, Group 2: Clinical response criteria will be used to determine ORR • Secondary: Investigator Assessments of ORR, DOR, DOD, PFS, OS, CRR	• SSD: May 2016 • DE: 2019

Cemiplimab (PD-1 inhibitor)
Basal Cell Carcinoma (BCC)

Study	Description	Patients	Design	Endpoints	Status
BCC R2810-ONC-1620 NCT03132636	Phase 2 Cemiplimab in patients with Advanced BCC who experienced progression of disease on Hedgehog Pathway Inhibitor Therapy, or were intolerant of Prior Hedgehog Pathway Inhibitor Therapy	147	• Patients with confirmed diagnosis of invasive BCC • Non-Randomized, Open-label, Parallel assignment • Group 1: Patients with metastatic BCC • Group 2: Patients with unresectable locally advanced BCC	• Primary: ORR for mBCC measured by RECIST version 1.1 ORR for unresectable locally advanced BCC measured by Composite Response Criteria • Secondary: DOR, CR, PFS, OS	• SSD: July 2017 • DE (1st Part) (1): 2018

(1) Final Data Collection date for primary outcome measure

Cemiplimab (PD-1 inhibitor)
Non-Small Cell Lung Cancer (NSCLC)

Study	Description	Patients	Design	Endpoints	Status
mNSCLC R2810-ONC-1624 NCT03088540	Phase 3 First-line Tx in patients with advanced or metastatic NSCLC whose tumors express PD-L1, vs. Platinum Based Chemotherapy	300	• For histologically or cytologically documented squamous or non squamous NSCLC with stage IIIB or stage IV disease who received no prior systemic Tx for recurrent or metastatic NSCLC • Randomized, Open-label, Cross-over assignment • Active Comparator: Standard-of-care chemotherapy: paclitaxel + cisplatin OR paclitaxel + carboplatin OR gemcitabine + cisplatin or gemcitabine + carboplatin OR Pemetrexed + cisplatin followed by optional pemetrexed maintenance OR pemetrexed + carboplatin followed by optional pemetrexed maintenance	• Primary: PFS as assessed by a blinded Independent review committee using RECIST 1.1 • Secondary: OS, Objective response rates, BOR, DOR	• SSD: May 2017 • DE: 2021

Cemiplimab (PD-1 inhibitor)
Cervical cancer (CC)

Study	Description	Patients	Design	Endpoints	Status
CC R2810-ONC-1676 NCT03257267	Phase 3 Cemiplimab vs. therapy of IC chemotherapy in Recurrent or Metastatic Platinum-Refractory CC	800	• Patients with recurrent or metastatic platinum-refractory CC treated with either REGN2810 or IC chemotherapy • Randomized, Open-label, Parallel assignment, Tx cycle 6 weeks, Planned Tx for up to 96 weeks	• Primary: OS • Secondary: PFS, ORR, DOR, QOL	• SSD: Oct. 2017 • DE (1st Part)(1): 2020

(1) Final Data Collection date for primary outcome measure

SAR566658 (maytansin loaded anti-CA6 mAb)
Triple Negative Breast Cancer (TNBC)

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
mTNBC ACT14884 NCT02984683	Phase 2b Efficacy and safety of SAR566658 Tx in patients with CA6 Positive Metastatic TNBC	62	• Patients with Measurable Metastatic TNBC, with CA6-positive disease • Randomized, Open-label, Parallel assignment; Tx cycle 3 weeks • Part 1: SAR566658 will be given as Dose 1 (cohort 1) and Dose 2 (cohort 2) at Day 1 and Day 8 every 3 weeks intravenously (dose selection) • Part 2: SAR566658 will be given as Dose 1 or Dose 2 (depending on dose level selected from part 1) at Day 1 and Day 8 every 3 weeks intravenously (efficacy of the selected dose)	• Primary: ORR • Secondary: DCR, DOR, PFS, TTP, Impact of ocular primary prophylaxis on the incidence of keratopathies, Potential immunogenicity of SAR566658	• SSD: Mar. 2017 • DE: 2019

SAR439459 (TGFß inhibitor mAb)
Advanced Solid Tumors (AST)

Study	Description	Patients	Design	Endpoints	Status
AST **Monotherapy and combination with cemiplimab** TCD14678 NCT03192345	Phase 1/1b PK, PD and Anti-tumor activity of SAR439459 Monotherapy and in combination with cemiplimab in adult patients with AST	130 expected	• Patients with histologically confirmed, advanced unresectable or metastatic solid tumor • Randomized, Open-label, Parallel assignment • Part 1A: SAR439459 monotherapy escalating doses/14-day cycle • Part 2A: SAR439459 monotherapy/14-day cycle with the previously recommended dose • Part 1B: SAR439459 escalating dose + cemiplimab standard dose /14-day cycle • Part 2B: SAR439459 at previously recommended dose + cemiplimab standard dose / 14-day • Escalation periods non randomized followed par expansion periods randomized	• Primary: DLTs (Part 1), ORR (Part 2) • Secondary: Safety, Immunogenicity, PFS, TTP, PK	• SSD: Jun. 2017 • DE: 2020

SAR408701 (maytansin loaded anti-CEACAM5 mAb) Advanced Solid Tumors (AST) 1/2

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
First-in-Human TED13751 NCT02187848	Phase 1 Phase 2 PK and antitumor activity of SAR408701 in patients with AST	152 expected	• Patients with locally advanced or metastatic solid malignant tumor • Non-Randomized, Open-label, Parallel assignment • Arm 1 : SAR408701 monotherapy escalating cohorts • Arm 2: SAR408701 expansion cohort in CRC with MTD previously defined • Arm 3: SAR408701 expansion cohort lung adenocarcinoma at MTD • Arm 4: SAR408701 expansion cohort gastric adenocarcinoma at MTD • Arm 5: SAR408701 loading dose at first cycle followed by MTD	• Primary: MTD, Anti-tumor response RECIST • Secondary: Safety, Immunogenicity, PK	• SSD: Sep. 2014 • DE: 2019

SAR408701 (maytansin loaded anti-CEACAM5 mAb) Advanced Solid Tumors (AST) 2/2

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
Japanese patients **Monotherapy and Combination** TCD15054 NCT03324113	Phase 1 Safety and PK of SAR408701 Monotherapy and in combination with other anti-tumor drug in Japanese patients with Advanced Malignant Solid Tumors	27	• Patients with malignant solid tumor • Non-Randomized, Open-label, Sequential assignment • Phase 1 : SAR408701 monotherapy escalating doses/ 4 weeks • Phase 1B: SAR408701 at MTD in combinations with other anti-tumor drugs, 4 weeks	• Primary: DLTs, Phase 1 and 1B • Secondary: Safety, Immunogenicity, PK, Plasma CEACAM5 levels, Anti-tumor response RECIST	• SSD: Oct. 2017 • DE: 2019

GZ402666 (avalglucosidase alfa)
Pompe disease (PD) 1/3

Study	Description	Patients	Design	Endpoints	Status
COMET **Late Onset** EFC14028 NCT02782741	Phase 3 To compare efficacy and safety of Enzyme Replacement therapies avalglucosidase alfa and alglucosidase alfa in patients with Late-onset PD who have not been previously treated for PD	96	• Repeated Biweekly Infusions of avalglucosidase alfa (GZ402666) and alglucosidase alfa in Tx-naïve patients with late-onset PD age 3 years and older • Randomized, Double-Blind, Parallel Assignment • Total study duration for one patient: 3 years [14-day screening, 49-week blinded Tx period, 96-week open-label Tx and 4-week post-Tx observation period	• Primary: Change from baseline in percent predicted forced vital capacity (%FVC) in upright position • Secondary: Change from baseline in six-minute walk test scores, maximal inspiratory / expiratory pressure in upright position, hand-held dynamometry measurement of lower extremity muscle strength in Quick Motor Function Test scores, 12- Item Short-form health survey scores	• SSD: Nov. 2016 • DE (1st Part)(1): 2019

(1) Final Data Collection date for primary outcome measure

GZ402666 (avalglucosidase alfa)
Pompe disease (PD) 2/3

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
Mini-COMET Infantile Onset ACT14132 NCT03019406	Phase 2 To assess safety and efficacy of avalglucosidase alfa in Pediatric patients with infantile-onset PD previously treated With alglucosidase alfa	20	• In Patients with Infantile-onset PD treated with alglucosidase alfa who demonstrate clinical decline or sub-optimal clinical response • Randomized, Open-label, Ascending dose, Parallel assignment • Total study duration for one patient: 3 years [14-day screening, 25-week Tx period, a 120-week extension period and 4-week post-Tx observation period	• Primary: N of participants with AE • Secondary: PK parameters, Change from baseline in Gross Motor Function (GMF) Measure-88 Test, Change from baseline revised GMF Classification System score, Pompe specific Pediatric Evaluation of Disability Inventory, Functional Skills Scale, Mobility Domain Test score and Quick Motor Function Test scores, Left Ventricular Mass Index, Eyelid position measurements, Creatine kinase value	• SSD: Oct. 2017 • DE (1st Part)(1): 2019

(1) Final Data Collection date for primary outcome measure

GZ402666 (avalglucosidase alfa)
Pompe disease (PD) 3/3

Study	Description	Patients	Design	Endpoints	Status
NEO-EXT LTS13769 NCT02032524	Phase 2 Phase 3 Long-term safety and PK of repeated biweekly infusions of avalglucosidase alfa in patients with PD	24	• In patients with PD who previously completed a avalglucosidase alfa study [adult, senior] • Non-randomized, Open-label, Parallel assignment • Total study duration for one patient: 6 years [until the patient withdraws, the Investigator withdraws the patient, or the Sponsor terminates the study]	• Primary: AEs and TEAEs, including IARs & deaths, Hematology, biochemistry and urinalysis, vital signs • Secondary: ECG, PK parameters, anti-avalglucosidase alfa immunoglobulin G (IgG) antibodies, and neutralizing antibody formation in IgG seropositive patients, anti-alglucosidase alfa IgG antibodies, Skeletal muscle glycogen content, Qualitative and quantitative muscle degenerative assessments MRI, Urinary Hex4, plasma analyses of circulating mRNA and micro RNA, Serum analyses of skeletal muscle RNA expression	• SSD: Feb. 2014 • DE: 2020

Patisiran (siRNA targeting TTR)
Hereditary ATTR (hATTR) Amyloidosis

Study	Description	Patients	Design	Endpoints	Status
APOLLO Global OLE FAP LTE14730 ALN-TTR02-006 NCT02510261	Phase 3 Patisiran for the Tx of transthyretin mediated Polyneuropathy Familial Amyloidotic Polyneuropathy	228	• For patients having completed a previous patisiran efficacy study • Safety and tolerability of long-term dosing of patisiran • Single Group assignment, Open-label	• Primary: Safety and tolerability of long-term dosing of patisiran as measured by the proportion of subjects with AE leading to discontinuation of study drug • Secondary: Changes from baseline in neurologic impairment assessed using the Neuropathy Impairment Score (NIS), the Modified NIS (mNIS +7) composite score, the NIS+7 QOL [(QOL-DN) and EuroQOL (EQ-5D)], autonomic and motor function, disability, nutritional status, serum TTR lowering	• SSD: Jul. 2015 • DE: 2019

Fitusiran (siRNA targeting Antithrombin/AT3)[1]
Hemophilia A & B

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
Hemophilia A or B LTE14762 ALN- AT3SC-002 NCT02554773	Phase 1/2 Hemophilia A and Hemophilia B Fitusiran in patients with moderate or severe hemophilia A or B	34	• For patients having participated in a previous fitusiran study • Single Group assignment, Open-label	• Primary: % of patients experiencing AEs, SAEs, and AEs leading to study drug discontinuation • Secondary: Changes in the N of Bleeding Event, the Amount of Factor VIII or Factor IX administered for the Tx of bleeding episodes, health-related QOL plasma levels of antithrombin and thrombin generation	• SSD: Sep. 2015 • DE: 2019

(1) Currently on clinical hold pending outcome of FDA discussion – Expected to resume around year-end

Olipudase Alfa (rhASM ERT) 1/3
Acid Sphingomyelinase Deficiency (ASMD)

Study	Description	Patients	Design	Endpoints	Status
ASCEND **Niemann-Pick disease type B**[1] DFI12712 NCT02004691	Phase 2 Phase 3 Efficacy, Safety, PD, and PK study of olipudase alfa in patients with ASD	36	• Randomized, Double-blinded, Placebo-controlled, Parallel assignment • Total study duration for one patient at least 3 years up to 5 years and 3 months [2-month screening, 52-week double-blind Tx period, 4-year and 1 month open label extension period with olipudase	• Primary: % change in spleen volume, % change in diffusing capacity of the lung for carbon monoxide • Secondary: Change in splenomegaly-related symptom score (except US, where it is part of the primary "combination spleen endpoint"), % change in liver volume, % change in platelet count, Change in fatigue severity as measured by item 3 of the Brief Fatigue Inventory scale, Change in pain severity as measured by item 3 of the Brief Pain Inventory scale, Change in dyspnea severity as measured by the Functional Assessment of Chronic Illness Therapy dyspnea tool	• SSD: Jun. 2016 • DE (1st Part)[2]: 2019

(1) Non-neurological manifestations of ASMD
(2) Final Data Collection date for primary outcome measure

Olipudase Alfa (rhASM ERT) 2/3
Acid Sphingomyelinase Deficiency (ASMD)

Study	Description	Patients	Design	Endpoints	Status
ASCEND Peds DFI13803 NCT02292654	Phase 1 Phase 2 Safety, Tolerability, PK, and efficacy evaluation of ollipudase alfa in pediatric patients <18 years of age with ASMD	20	• Open-label, ascending dose, Single group assignment • Total study duration for one patient approximately 18 months [up to 60-day screening, 64-week Tx period, 37-day post Tx period except if patient enrolled in a long-term extension study]	• Primary: N of AE, Clinically significant changes in laboratory parameters, Clinically significant changes in physical examinations • Secondary: PK parameters, Change in sphingomyelin levels and sphingomyelin metabolite levels	• SSD: Jun. 2015 • DE: 2019

Olipudase Alfa (rhASM ERT) 3/3
Acid Sphingomyelinase Deficiency (ASMD)

Study	Description	Patients	Design	Endpoints	Status
Long-Term LTS13632 NCT02004704	Phase 2 Long-term study of olipudase alfa in patients with ASDM	25	• For patients who have completed a previous study with olipudase alfa (DFI13803 for pediatric patients, and DFI13412 for adult patients) • Open-label, Single group assignment • Total study duration for one patient: 5 years	• Primary: N of patients experiencing AE, Physical examinations including neurologic examinations, Clinical laboratory tests, Safety biomarkers, IR assessments, Vital signs, echocardiogram and electrocardiogram, Liver biopsy and Liver ultrasound/Doppler for patients previously enrolled in DFI13412 • Secondary: Spleen and Liver Volumes, Pulmonary imaging and function tests, Hematology and Lipid profiles, Health Outcomes Questionnaires For pediatrics patients: Hand X-ray for bone age and bone maturation, Tanner Staging and Linear patient growth by height Z-score	• SSD: Dec. 2013 • DE: 2021

Venglustat (GCS inhibitor)
Fabry disease (FD)

Study	Description	Patients	Design	Endpoints	Status
FABRY LONG-TERM LTS14116 NCT02489344	Phase 2 Long-term safety, PD, and exploratory efficacy of venglustat in Tx-naïve adult male patients with FD	8	• Male patients with FD who previously completed study ACT13739 • Open-label, Single group Assignment • Total study duration for one patient: up to 31 months	• Primary: Safety profile, Clinically significant changes in laboratory parameter, and physical examinations • Secondary: Change from baseline in plasma globotriaosylceramide (GL-3), plasma lyso GL-3, Change from baseline in plasma glucosylceramide (GL 1), Urine GL-3	• SSD: Jul. 2015 • DE: 2018

Venglustat (GCS inhibitor)
Gaucher disease (GD) Type 3

Study	Description	Patients	Design	Endpoints	Status
LEAP GD Type 3 PDY13949 NCT02843035	Phase 2 Tolerability, PK, PD, and exploratory efficacy of venglustat in combination with cerezyme in adult patients with GD Type 3	10	• 52-week Two-part, Open-label, Single group Assignment • Part 1: Evaluate CNS biomarkers in adult GD type 3 patients that distinguish GD3 from GD type 1, Screen adult GD3 patients who qualify for Tx with venglustat in Part 2, Total duration 45 days • Part 2 : Safety and tolerability in GD3 patients, Total duration up to 61 weeks including 52 weeks of treatment	• Primary: N of patients with AE, Change from baseline in biomarker levels (CSF and Plasma) • Secondary: PK parameters (CSF and Plasma)	• SSD: Mar. 2017 • DE (1st Part)(1): 2021

(1) Final Data Collection date for primary outcome measure

Teriflunomide
Multiple Sclerosis (MS)

Study	Description	Patients	Design	Endpoints	Status
TERIKIDS RMS EFC11759 NCT02201108	Phase 3 Efficacy, Safety and PK of teriflunomide in Pediatric Patients With Relapsing Forms of MS	165	• Patients with RMS meeting the criteria of MS based on McDonald criteria 2010 and International Pediatric MS Study Group criteria for pediatric MS • With at least one relapse (or attack) in the 12 months preceding randomization or at least two relapses (or attack) in the 24 months preceding randomization • Randomized, Double-Blind, Placebo-Controlled, Parallel Group , Tx 96 weeks followed by Open-label extension (96 weeks up to a max of 192 weeks after randomization), follow-up 4 weeks after Tx discontinuation	• Primary: Time to first clinical relapse after randomization • Secondary: % of relapse free patients, N of new/newly enlarged T2 lesions, N of T1 Gd-enhancing T1 lesions , Change in volume of T2 lesions , of T1 hypointense lesions , brain atrophy, % of patients free of new or enlarged MRI T2-lesions, Change in performance on SDMT and Cognitive Battery Test , Safety, PK	• SSD: Jul. 2014 • DE: 2019

SAR422459 (ABCA4 gene therapy)
Stargardt Disease

Study	Description	Patients	Design	Endpoints	Status
Stargardt's Macular Degeneration TDU13583 NCT01367444	Phase 1 Phase 2a Safety and tolerability of ascending doses of SAR422459 in patients with Stargardt's Macular Degeneration	46	• Patients with a diagnosis of Stargardt's Macular Degeneration, with at least one pathogenic mutant ABCA4 allele on each chromosome • Non-randomized, Single Group assignment, Open-label, ascending doses	• Primary: IAE, Change from baseline in ocular safety assessments • Secondary: Delay in retinal degeneration	• SSD: Jun. 2011 • DE: 2020
Stargardt's Macular Degeneration LTS13588 SG1/002/11 NCT01736592	Phase 2b Long term safety, tolerability and Biological activity of an experimental gene transfer agent, SAR422459, designed to treat patients With Stargardt Macular Degeneration	28	• Long Term follow up of patients who received SAR422459 in a previous study (TDU13583) • Single Group assignment, Open-label • Follow-up 15 years	• Primary: IAE • Secondary: Delay in retinal degeneration	• SSD: 2012 • DE: 2036

SAR421869 (Myosin 7A gene therapy)
Usher 1B Syndrome

Study	Description	Patients	Design	Endpoints	Status
UshStat® **Usher Syndrome Type 1B** TDU13600 NCT01505062	Phase 1 Phase 2a Safety and tolerability of ascending doses of subretinal injections of UshStat® in patients with Retinitis Pigmentosa associated with Usher syndrome Type 1B	18	• Patients with clinical and molecular diagnosis of Retinitis Pigmentosa associated with Usher Syndrome type 1B. With at least one pathogenic mutation in the MYO7A gene on each chromosome • Non-randomized, Single Group assignment, Open-label, ascending doses	• Primary: IAE • Secondary: Delay in retinal degeneration	• SSD: Apr. 2012 • DE: 2020
UshStat® **Usher Syndrome Type 1B** LTS13619 NCT02065011	Phase 2b Long-Term Safety, Tolerability and Biological Activity of UshStat® in Patients With Usher Syndrome Type 1B	28	• Long-term follow up of patients who received UshStat® in a previous study (TDU13600) • Single Group assignment, Open-label	• Primary: IAE • Secondary: Change from baseline in ocular safety assessments, Delay in retinal degeneration	• SSD: Dec. 2012 • DE: 2035

GZ402668 (Anti-CD52 mAb)
Relapsing Multiple Sclerosis (RMS)

Immuno-inflammation | Diabetes
Oncology | Cardiovascular
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
Long Term Follow-Up **MS** LTS14120 NCT02313285	Phase 2b Open-label, Long-term follow-up study of MS patients who participated in previous Genzyme-sponsored studies of GZ402668	72	• Long Term safety follow up of patients who received GZ402668 in a previous study (TDU13475 or TDU14981) • No administration of GZ402668 in the LTS14120 study, Patients who already received investigational medicinal product (GZ402668 or placebo) in TDU13475 or TDU14981 will be followed up to 47 months in the LTS14120	• Primary: N of patients with AE, Safety, as assessed by clinical (physical examination), laboratory (hematology, creatinine, and urinalysis with microscopy), ECG, vital sign events, Clinically significant changes in thyroid function tests from baseline • Secondary: Time to lymphocyte repopulation, Number of patients with anti-drug antibodies	• SSD: Jan. 2015 • DE: 2022

Venglustat (GCS inhibitor)
GBA-PD

Study	Description	Patients	Design	Endpoints	Status
MOVES-PD ACT14820 NCT02906020	Phase 2 Drug Dynamics, Efficacy, Safety of venglustat in Parkinson's Disease (PD) patients carrying a Glucocerebrosidase (GBA) Gene Mutation	15	• Male and female adults with a diagnosis of PD and who are heterozygous carriers of a GBA mutation associated with PD • Randomized, Double-blind, Placebo Controlled, Parallel Assignment • Part 1: Increasing dose of venglustat administered once per day. Duration: up to 48 weeks outside Japan, and up to 64 weeks in Japan • Part 2: venglustat dose determined in Part 1 administered once a day Duration: 5,6-week screening, 52-week Tx period, 104-week follow-up period and 6-week post Tx observation	• Primary: Change from baseline in Movement Disorder Society Unified PD Rating Scale Part II and III score • Secondary: Change from baseline in PD Cognitive Rating Scale, Movement Disorder Society Unified PD Rating Scale Part I, II, and III score, Hoehn and Yahr score	• SSD: Jan. 2017 • DE: 2021

Insulin glargine / lixisenatide
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
LIXILAN-G **EFC13794** NCT02787551	Phase 3 Efficacy and safety of lixilan vs. GLP-1 receptor agonist in patients with type 2 Diabetes not controlled on GLP-1 RAs + OADs, with an extension period	500	• Patients with T2DM • Randomized, Open-label, Active Controlled, Parallel-group • Active comparator: Liraglutide/Exenatide/Exenatide ER/Albiglutide/Dulaglutide, Metformin, pioglitazone and SGLT2 inhibitor if taken prior to the study continued • 1st period: up to 2 weeks screening, 26-week Tx period and 3 to 9 days follow-up post Tx • Extension period 26-week extension after the 26-week Tx for the lixiLan arm only, 3-day follow-up post extension	• Primary: Change from baseline in HbA1c • Secondary: % of participants reaching HbA1c targets, Change from baseline in FPG, in 7-point SMPG, in 2-hour PPG during standardized meal test, in blood glucose excursion during standardized meal test , in body weight, Symptomatic hypoglycemia, Safety, % of patients requiring rescue therapy	• SSD: Jul. 2016 • DE: 2018

Insulin glargine / lixisenatide
Type 2 Diabetes Mellitus (T2DM) - Japan

Study	Description	Patients	Design	Endpoints	Status
LIXILAN JP-O1 **EFC14112** NCT02749890	Phase 3 Efficacy and safety of lixilan compared to lixisenatide on top of OADs in Japanese patients with T2DM with an extension period	318	• Japanese Patients with T2DM • Randomized, Open-label, Active Controlled, Parallel-group, 2- Tx arm • Active comparator: lixisenatide • Background therapy with OADs (except dipeptidyl-peptidase-4 inhibitor) should be continued during the Tx period • Study duration: approximately 55 weeks: up to 2-week screening, 26-week Tx period, 26-week safety extension Tx period and 3-day post Tx follow-up	• Primary: Change from baseline in HbA1c • Secondary: % of patients reaching HbA1c <7% or ≤6.5%, Change from baseline in FPG, in 7 point SMPG, % of patients reaching HbA1c <7% with no body weight gain, Change from baseline in body weight, % of patients requiring a rescue therapy, Change in daily dose of lixiLan for the combination group, N of hypoglycemic events, N of AE, Measurement from baseline of anti-lixisenatide antibodies and of anti-insulin antibodies	• SSD: May 2016 • DE: 2018

Insulin glargine / lixisenatide
Type 2 Diabetes Mellitus (T2DM) - Japan

Study	Description	Patients	Design	Endpoints	Status
LIXILAN JP-L **EFC14113** NCT02752412	Phase 3 Efficacy and safety of lixilan compared to insulin glargine with Metformin in Japanese patients with T2DM inadequately controlled on Basal Insulin and Oral Antidiabetic Drugs	534	• Japanese Patients with T2DM • Randomized, Open-label, Active Controlled, Parallel-group, 2- Tx arm • Active comparator: insulin glargine • Background therapy: Metformin will be continued • Study duration: approximately 41 weeks: up to 2-week screening, 12-week run-in, 26-week randomized Tx period and 3-day post Tx follow-up	• Primary: Change from baseline in HbA1c • Secondary: % of patients reaching HbA1c <7% or ≤6.5%, Change from baseline, in 2-hour PPpG, in blood glucose excursion during standardized meal test, in 7-point SMPG profiles (each time point and average daily value), in body weight, in FPG, in daily dose of insulin glargine, % of patients reaching HbA1c <7% with no body weight gain/no documented symptomatic hypoglycemia, % of patients requiring a rescue therapy, hypoglycemic events , AE, Measurement from baseline of anti-lixisenatide antibodies and of anti-insulin antibodies from baseline	• SSD: Aug. 2016 • DE: 2018

Insulin glargine / lixisenatide
Type 2 Diabetes Mellitus (T2DM) - Japan

Study	Description	Patients	Design	Endpoints	Status
LIXILAN JP-O2 **EFC14114** NCT02752828	Phase 3 Efficacy and safety of lixilan compared to Insulin Glargine on top of OADs in Japanese patients with T2DM	534	• Japanese Patients with T2DM • Randomized, Open-label, Active Controlled, Parallel-group, 2- Tx arm • Active comparator: insulin glargine • Background therapy with OADs (except dipeptidyl-peptidase-4 inhibitor) should be continued during the Tx period • Study duration: approximately 29 weeks: up to 2-week screening, 26-week randomized open-label Tx period and 3-day post Tx follow-up	• Primary: Change from baseline in HbA1c • Secondary: % of patients reaching HbA1c <7% or ≤6.5%, Change from baseline, in 2-hour PPG, in 7 point SMPG profiles during standardized meal test, in body weight % of patients reaching HbA1c <7% with no body weight gain/no documented symptomatic hypoglycemia, % of patients requiring a rescue therapy, N of AE, N of hypoglycemic events, Measurement from baseline of anti-lixisenatide antibodies and of anti-insulin antibodies from baseline	• SSD: Jun. 2016 • DE: 2018

Lantus – Toujeo
U300 Type 1 Diabetes Mellitus (T1DM) - Children

Study	Description	Patients	Design	Endpoints	Status
EDITION JUNIOR **EFC13957** NCT02735044	Phase 3 Efficacy and safety of a new formulation of insulin glargine (U300) and Lantus® injected once daily in children and adolescents Age 6 - 17 years with T1DM with a 6-month safety extension period	450	• Children: 6 to 17 years old with T1DM • Randomized, Open-label, Parallel-group, 2- Tx arm • Active comparator: insulin glargine • Study duration: approximately 58 weeks: up to 2-week screening, 6-month comparative Tx period , 6-month comparative extension period and 4-week post Tx follow-up	• Primary: Change from baseline in HbA1c • Secondary: % of patients with HbA1c values of <7.5% and % of patients with FPG of ≤130 mg/dL (7.2 mmol/L) without any episode of severe and/or documented (SMPG <54 mg/dL; 3.0 mmol/L) symptomatic hypoglycemia during the last 3 months of the main 6-month randomized period, Change from baseline in FPG, Change from baseline in 24-hour mean plasma glucose and in variability of 24-hour mean plasma glucose based on 8-point SMPG profiles, % of patients with hypoglycemia, % of patients with hyperglycemia with ketosis, % of patients with AE	• SSD: April 2016 • DE: 2018

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-MONO (301) **T2DM** **EFC14833** NCT02926937	Phase 3 Efficacy and safety of sotagliflozin vs. placebo in patients with T2DM not currently treated with antidiabetic therapy	400	• Patients (male and female) with T2D, who are treated with diet and exercise only during the 12 weeks prior to screening • Randomized, Double-blind, Placebo-controlled, Parallel-group, 3-Tx arm, sota dose 1/200mg, sota dose 2/400mg, placebo • Study duration: up to 34-week: up to 2-week screening period, 2-week single-blind placebo run-in, 26-week double-blind Tx period and 4-week post Tx follow-up	• Primary: Change from Baseline in HbA1c in comparison of sotagliflozin dose 1 vs. placebo • Secondary: Change from baseline in 2-hour PPG following a mixed meal in comparison of sotagliflozin doses 1/2 vs. placebo, FPG in comparison of sotagliflozin dose 1 vs. placebo, Body weight in comparison of sotagliflozin doses 1/2 versus placebo, % of patients with HbA1c <6.5% in comparison of sotagliflozin dose 1 vs. placebo, % of patients with HbA1c <7.0% in comparison of sotagliflozin dose 1 vs. placebo, Change from Baseline in HbA1c in comparison of sotagliflozin dose 2 vs. placebo, Change from baseline in SBP for patients with baseline SBP ≥130 mmHg in comparison of sotagliflozin dose 1 vs. placebo and SBP for all patients in comparison of sotagliflozin doses 1/2 vs. placebo	• SSD: Dec. 2016 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-MET (302) **T2DM** **EFC14834** NCT02926950	Phase 3 Efficacy and safety of sotagliflozin added to metformin in patients with T2DM who have inadequate glycemic control on metformin	500	• Patients with T2DM currently treated with diet and exercise and on metformin at a stable dose ≥1500 mg/day for at least 12 weeks • Randomized, Double-blind, Placebo-controlled, Parallel-group, 2-Tx arm (placebo – sota 400mg), On top of metformin • Study duration: up to 87-week: up to 2-week screening period, 2-week single-blind placebo run-in, 26-week double-blind core Tx period , 53-week double-blind extension period and 4-week post Tx follow-up	• Primary: Change from Baseline in HbA1c • Secondary: Change from Baseline I in 2-hour PPG following a mixed meal, in FPG, in body weight % of patients with HbA1c <6.5% - % patients with HbA1c <7.0% Change from Baseline I in systolic blood pressure (SBP) for patients with baseline SBP ≥130 mmHg in SBP for all patients.	• SSD: Dec. 2016 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-SU (307) T2DM **EFC14835** NCT03066830	Phase 3 Efficacy and safety of sotagliflozin added to a sulfonylurea alone or in combination with metformin in patients with Type 2 Diabetes who have inadequate glycemic control on a sulfonylurea alone or with metformin	500	• Patients with T2DM treated with a sulfonylurea (≥half the maximum recommended dose as per local label or MTD as monotherapy or in combination with metformin (≥1500 mg per day or MTD) each at a stable dose for at least 12 weeks • Randomized, Double-blind, Placebo-controlled, Parallel-group, 2-Tx arm (placebo – sota 400mg) • On top of sulfonylurea alone or in combination with metformin • Study duration: up to 85-week: up to 2-week screening period, 2-week single-blind run-in, 26-week double-blind core Tx period, 53-week double-blind extension period and 2-week post Tx follow-up	• Primary: Change from Baseline in HbA1c • Secondary: Change from baseline in FPG, in body weight, in Systolic Blood Pressure (SBP) for patients with baseline SBP ≥130 mmHg, in SBP for all patients, % of patients with HbA1c <6.5%, % of patients with HbA1c <7.0%	• SSD: Mar. 2017 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-CKD3 (306) **T2DM** **EFC14837** NCT03242252	Phase 3 Evaluate the efficacy and safety of sotagliflozin in patients with T2DM and Moderate Renal Impairment who have inadequate glycemic control	780	• Patients with T2DM (drug-naïve or on antidiabetic therapy) and documented moderate renal insufficiency defined by an estimated glomerular filtration rate (based on the 4 variable Modification of Diet in Renal Disease equation) of ≥30 and <60 mL/min/1.73 m2 (CKD 3A, 3B) • Randomized, Double-blind, Placebo-controlled, Parallel-group, 3-Tx arm (placebo – sota 200mg - sota 400mg) • Study duration: up to 60-week: up to 2-week screening period, 2-week single-blind run-in, 52-week randomized Tx period and 4-week post Tx follow-up	• Primary: Change in HbA1c for sota dose 1 and sota dose 2 • Secondary: Change from Baseline in FPG (doses 1/2) in SBP for patients with baseline SBP ≥130 mmHg (doses 1/2), in SBP for all patients (doses 1/2) and in body weight (doses 1/2), % change in UACR for patients with UACR > 30 mg/g (doses 1/2), % of patients with HbA1c less than 6.5% (doses 1/2), % of patients with HbA1c less than 7.0% (doses 1/2), % of patients with AE (doses 1/2)	• SSD: Sept. 2017 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-CKD4 (306) **T2DM** **EFC15166** NCT03242018	Phase 3 Evaluate the efficacy and safety of sotagliflozin in patients with T2DM and severe renal impairment who have inadequate glycemic control	276	• Patients with T2DM (drug-naïve or on antidiabetic therapy) and documented severe renal insufficiency - CKD4 - defined by an estimated glomerular filtration rate equation (based on the 4 variable modification of diet in renal disease equation) of ≥15 and <30 mL/min/1.73 m2 • Randomized, Double-blind, Placebo-controlled, Parallel-group, 3-Tx arm (placebo – sota 200mg - sota 400mg) • Study duration: up to 60-week: up to 2-week screening period, 2-week single-blind run-in, 52-week randomized Tx period and 4-week post Tx follow-up	• Primary: Change from Baseline in HbA1c comparing sotagliflozin dose 1 vs. placebo in CKD4 patients • Secondary: Change from baseline in HbA1c comparing sotagliflozin dose 2 vs. placebo, in FPG (doses 1/2), in SBP at for patients with SBP greater than or equal to 130 mmHg (doses 1/2), in SBP in all patients (doses 1/2), in body weight (doses 1/2), % change in the UACR for patients with a UACR > 30 mg/g at baseline (doses 1/2), % of patients with HbA1c less than 6.5% (doses 1 and 2), % of patients with HbA1c less than 7.0% (doses 1 and 2), N of patients with AE (doses 1/2)	• SSD: Sept. 2017 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SOTA-INS (312) T2DM **EFC14868** NCT03285594	Phase 3 Efficacy and safety of sotagliflozin in patients with T2DM who have inadequate glycemic control on Basal Insulin alone or in addition to Oral Antidiabetes Drugs (OADs)	560	• Patients with T2DM using any types of basal insulin alone or in combination with up to 2 OADs • Randomized, Double-blind, Placebo-controlled, Parallel-group, 3-Tx arm (placebo – sota 200mg - sota 400mg) • Background therapy with insulin glargine (Lantus®) (with or without OADs) throughout the study • Study duration: up to 60-week: up to 2-week screening period, 4-week Lantus® titration single-blind placebo run-in period, 52-week double-blind Tx period and 2-week post Tx follow-up	• Primary: Absolute change in hemoglobin A1c (HbA1c) (for sotagliflozin dose 1) • Secondary: Change in FPG (for sotagliflozin doses 1/2), in Body Weight (for sotagliflozin doses 1/2), in HbA1c (for sotagliflozin dose 2), in SBP for patients with baseline SBP ≥130 mmHg (for sotagliflozin doses 1/2), in SBP for all patients (for sotagliflozin dose 1), % of patients with Hemoglobin A1c (HbA1c) <7.0% (for sotagliflozin doses 1/2), % of patients with Hemoglobin A1c (HbA1c) <6.5% (for sotagliflozin doses 1/2), % of patients with AE	• SDD: Oct. 2017 • DE: 2019

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SCORED (303) T2DM **EFC14875** NCT03315143	Phase 3 Effects of sotagliflozin on CV and renal events in patients with T2DM, CV risk factors and moderately impaired renal function	10 500	• Patients : T2DM with glycosylated hemoglobin (HbA1c) ≥ 7%, Estimated glomerular filtration rate (eGFR) ≥ 25 and ≤ 60 mL/min/1.73 m2, Age 18 years or older with at least one major CV risk factor or age 55 years or older with at least two minor CV risk factors • Randomized, Double-blind, Placebo-controlled, Parallel-group, 2-Tx arm (placebo - sota 400mg) • Total Study duration: approximately 27 to 51 months, 24-month recruitment and 27-month of follow-up after the last patient randomized	• Primary: Baseline to approx. 51 months, Time to the first occurrence of any of the following clinical events: CV death, Non-fatal myocardial infarction, Non-fatal stroke, Time to the first occurrence of any of the following clinical events: CV death; Hospitalization for heart failure • Secondary: Baseline to approx. 51 months, Time to first composite renal event, Time to first composite renal event in subgroup of patients with macroalbuminuria, Total N of heart failure events, CV death , All cause mortality	• SSD: Nov. 2017 • DE: 2022

Sotagliflozin (SGLT 1/2 inhibitor)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
GLIM (304) T2DM **EFC14838** NCT03332771	Phase 3 Efficacy and safety of sotagliflozin vs. glimepiride and placebo in patients with T2DM that are taking metformin monotherapy	930	• Patients : Patients with T2DM treated with metformin at a stable dose ≥1500 mg/day or MTD (documented) for at least 12 weeks prior to screening visit • Randomized, Double-blind, Double-dummy, Active and Placebo-controlled, Parallel-group, 4-Tx arm (placebo – glimepiride, sota dose 1, sota dose 2) • Total Study duration: up to 58 weeks including 2-week screening phase, 2-week singlr-blind placebo run-in, 52-week double-blind Tx period and 2-week post Tx follow-up	• Primary: Absolute change in hemoglobin A1c (HbA1c) (for sotagliflozin dose 1) • Secondary: Change in Body Weight (for sotagliflozin dose), in HbA1c (for sotagliflozin dose 2), in SBP for patients with baseline SBP ≥130 mmHg (for sotagliflozin dose 1), in SBP for all patients (for sotagliflozin dose 1), % of patients with at least one hypoglycemic event (for sotagliflozin dose 1), % of patients with AE	• SSD: Nov. 2017 • DE: 2019

SAR341402 (Rapid Acting Insulin)
T1 & T2 DM

Study	Description	Patients	Design	Endpoints	Status
GEMELLI 1 **EFC15081** NCT03211858	Phase 3 Comparison of SAR341402 to NovoLog®/NovoRapid® in adult patients with Diabetes also using Insulin Glargine, with a 6-month safety extension period	500	• Patients with T1DM or T2DM diagnosed for at least 12 months, who have been treated with a multiple daily injection regimen with NovoLog®/NovoRapid® OR insulin lispro (100 U/mL) in the last 6 months prior to screening visit AND insulin glargine (100 U/mL) in the last 6 months prior to screening visit OR insulin detemir (Levemir®) in the last 12 months prior to screening visit • Randomized, Open-label, Parallel-group • Active comparator: NovoLog®/NovoRapid® • Study duration: 54-week per patient: 2-week screening period, 26-week Tx period, 26-week comparative safety extension, 1-day follow-up period	• Primary: Change in HbA1c (%) from baseline to Week 26 • Secondary: Change in HbA1c, Patients with HbA1c <7%, Change in FPG, Change in mean 24-hour plasma glucose concentration, Change in PPG, Change in 7-point SMPG, Hypoglycemic patients, Hypoglycemic events, Anti-SAR341402/NovoLog/NovoRapid antibody status, Tx-induced, Tx-boosted and Tx-emergent anti-insulin antibodies	• SSD: Aug. 2017 • DE: 2019

SAR425899 (GLP-1R/GCGR)
Type 2 Diabetes Mellitus (T2DM)

Study	Description	Patients	Design	Endpoints	Status
SAR425899 **T2DM** **EFC13940** NCT02973321	Phase 2b Safety and efficacy of SAR425899 in overweight to obese patients with T2DM	270	• Overweight and obese patients with T2DM for at least 3 months before the screening visit. On diet/exercise and/or Tx with metformin (stable dose of ≥1500 mg/day or maximal tolerated dose) for at least 3 months prior to screening • Randomized, Double-blind, Placebo-controlled, Dose-ranging (SAR425899 3 doses, placebo) • Active comparator: liraglutide • Study duration: approximately 30-week: 3-week screening period at site, 26-week Tx period, 3-day follow-up period	• Primary: Change in HbA1c (%) • Secondary: Change in body weight, % of patients achieving predefined HbA1c targets of <7%, % of patients achieving predefined HbA1c targets of <6.5%, % of patients achieving ≥5% body weight loss, % of patients achieving ≥10% body weight loss, PK parameters	• SSD: Dec. 2016 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
CV Events Reduction

Study	Description	Patients	Design	Endpoints	Status
ODYSSEY Outcomes EFC11570 NCT01663402	Phase 3 Evaluate the effect of alirocumab on the occurrence of CV Events in patients who have recently experienced an Acute Coronary Syndrome (ACS)	18 600	• Patients recently (< 52 weeks) hospitalized for ACS • Randomized, Double-Blind, Placebo-Controlled, Parallel-Group • Study duration: max 64 months: up to 4 months run-in period, 60 months randomized Tx period	• Primary: Time from randomization to first occurrence of one of the following clinical events: CHD death, any non-fatal MI, fatal and non-fatal ischemic stroke, unstable angina requiring hospitalization • Secondary: Time to the first occurrence of any CHD event, major CHD event, any CV event, composite of all cause mortality/non-fatal MI/non-fatal ischemic stroke, all cause mortality, Change from baseline in blood lipids and LP levels	• SSD: Nov. 2012 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
Heterozygous Familial Hypercholesterolemia (HeFH)

Study	Description	Patients	Design	Endpoints	Status
ODYSSEY KIDs DFI14223 NCT02890992	Phase 2 Efficacy and safety of alirocumab in children and adolescents with heFH followed by an extension phase	30	• Patients with diagnosis of heFH through genotyping or clinical criteria., 8 to 17 years old, treated with optimal dose of statin +/- other LMT(s) or non-statin LMT(s) if statin intolerant at stable dose for at least 4 weeks prior to screening lipid sampling • Open-Label, Sequential, Repeated Dose-Finding Study (6 doses tested) • Backgroung therapies: optimal dose of statin with or without other LMT or non-statin LMT if statin intolerant at stable dose • Study duration: approximately 16-23 weeks: up to 6 (+1) weeks screening period, 8 weeks open-label Tx period, 6 to 8 weeks follow-up period	• Primary: % change in calculated LDL-C • Secondary: Absolute change in calculated LDL-C, % change in APO B (Apo B), % change in non-high density LP cholesterol (non HDL-C), % change in Total-C, in LP, in TG, in HDL-C, in Apo A-1, Absolute change in Apo B, in non-HDL-C, in Total C, in Lp(a), in TG, in HDL-C, in Apo A-1, in ratio apo B/Apo A-1, % of participants achieving a calculated LDL-C level lower than 130 mg/dL (3.37 mmol/L), % of participants achieving a calculated LDL-C level lower than 110 mg/dL (2.84 mmol/L)	• SSD: Sep. 2016 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
HeFH & non-FH Japan

Study	Description	Patients	Design	Endpoints	Status
ODYSSEY NIPPON EFC14305 NCT02584504	Phase 3 Efficacy and safety of alirocumab in patients with Hypercholesterolemia not adequately controlled with non-statin lipid modifying therapy or the lowest strength of statin	159	• Japanese Patients with hypercholesterolemia heFH or non-familial hypercholesterolemia receiving non statin LP modifying therapies (LMTs) or the lowest strength of statin • Randomized, Double-blind, Placebo-controlled, Parallel Group, 3-arm (alirocumab dose 1, alirocumab dose 2, placebo) • Backgroung therapies: stable and lowest-dose statin therapy or stable non-statin LMTs (eg, atorvastatin, fenofibrate, bezafibrate, ezetimibe) including diet therapy • Study duration: approximately 71 weeks: 4-week run-in period, 3-week screening period, 12-week double-blind Tx period, 52-week open-label Tx period	• Primary: % change in calculated LDL-C using all LDL-C values regardless of adherence to Tx • Secondary: % change in calculated LDL-C using all LDL-C values during the efficacy Tx period, % change in calculated LDL-C, % change in Apo-B, non-HDL-C, in TC, % of patients reaching LDL-C goal, % change in Lp(a), HDL-C, fasting TG, Apo A-1	• SSD: Sep. 2016 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
LDL Lowering China

Study	Description	Patients	Design	Endpoints	Status
ODYSSEY EAST EFC13889 NCT02715726	Phase 3 Efficacy and safety of alirocumab vs. ezetimibe in Asia in High CV risk patients with Hypercholesterolemia not adequately controlled with their statin therapy	600	• Patients with hypercholesterolemia and established coronary heart disease (CHD) or CHD risk equivalents who are not adequately controlled with a maximally tolerated daily dose of statin at a stable dose for at least 4 weeks prior to the screening visit (Week -3) • Randomized, Double-blind, Parallel Group, 2-Arm • Active comparator: ezetimibe • Background therapies: atorvastatin, rosuvastatin, or simvastatin continued during the course of the trial • Study duration: max 35 weeks: 3-week screening period, 24-week randomized Tx period, 8-week follow-up period	• Primary: % change in calculated LDL-C in the intent-to-treat (ITT) population • Secondary: % change in calculated LDL-C in the modified ITT (mITT) population, % change in calculated LDL-C, % change in Apo B, in non-HDL-C, in TC, in Lp(a), in HDL-C, in fasting TG, in Apo A-1, % of patients reaching calculated LDL-C <70 mg/dL (1.81 mmol/L)	• SSD: Aug. 2016 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
Homozygous Familial Hypercholesterolemia (HoFH)

Study	Description	Patients	Design	Endpoints	Status
HoFH **Regeneron** R727-CL-1628 NCT03156621	Phase 3 Evaluate the efficacy and safety of alirocumab in patients with HoFH	54	• Diagnosis of HoFH by specific genotype or clinical criteria (all patients on LDL apheresis must be diagnosed based on genotype) • Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, 2-Arm (alirocumab Q2W, placebo) • Study duration: 12-week double-blind Tx period followed by 10-week alirocumab open-label Tx period	• Primary: % change in LDL-C ITT population • Secondary: % change in Apo B, % change in non-HDL-C, % change in TC, % change in LP(a), % change in HDL-C, % change in fasting TG, % change in Apo A-1, % change in LDL-C, % change in LDL-C, ApoB B, non-HDL-C, TC, Lp(a), HDL-C, fasting TG, Apo A-1 / (m)ITT population, Absolute change in the ratio of Apo B/Apo A-1 (*ITT)*, % of patients with ≥15% reduction in LDL-C, % of patients with ≥30% reduction in LDL-C, % of patients with ≥50% reduction in LDL-C, % of patients with ≥15% reduction, ≥30% reduction, and ≥50% reduction in LDL-C	• SSD: Oct. 2017 • DE: 2019

SAR439152 (Myosin inhibitor)
Obstructive Hypertrophic Cardiomyopathy (OHCM)

Immuno-inflammation | Diabetes
Oncology | **Cardiovascular**
Rare Diseases | Infectious disease
MS, Neuro, Gene therapy | Vaccines

Study	Description	Patients	Design	Endpoints	Status
PIONEER-HCM **MyoKardia collaboration** MYK-461-004 NCT02842242	Phase 2 Efficacy, PK, PD, Safety and tolerability of SAR439152/MYK-461 in subjects with Symptomatic Hypertrophic Cardiomyopathy and Left Ventricular Outflow Tract Obstruction	21	• Patients with HCM (hypertrophied and non-dilated left ventricle in absence of systemic or other known cause), with LV wall thickness ≥ 15 mm at time of initial diagnosis or ≥ 13 mm with a positive family history of HCM • Open-label, Pilot, Single Group Assignment	• Primary: Change in post-exercise peak LVOT gradient from baseline to Week 12 • Secondary: Not provided	• SSD: Oct. 2016 • DE: 2018

SAR407899 (Rho.kinase inhibitor)
Microvascular Angina (MA)

Study	Description	Patients	Design	Endpoints	Status
Rho-Kinase ACT14656 NCT03236311	Phase 2a Effects of SAR407899 in patients with MA and/or Persistent Stable Angina despite angiographically successful elective Percutaneous Coronary Intervention	78	• Patients with Symptomatic stable angina pectoris (typical or atypical symptoms with at least once weekly episodes); ECG evidence of ischemia with ST-segment depression during a symptom limited exercise test or non-invasive evidence of ischemia • Randomized, Double-blind, Placebo-controlled Parallel Arm Dose Titration over 4-week administration	• Primary: Assess effects of SAR407899 on coronary vasomotor function using coronary flow reserve assessed by 13N-ammonia or 82rubidium PET scan • Secondary: Assess effects of SAR407899 on QOL using Seattle Angina Questionnaire physical limitation domain (SAQ-PL) safety with a focus on hypotension and orthostatic hypotension plasma concentrations	• SSD: Oct. 2017 • DE: 2018

Alirocumab (anti-PCSK-9 mAb)
Neurocognitive Evaluation

Study	Description	Patients	Design	Endpoints	Status
Neurocognitive Evaluation **Regeneron** R727-CL-1532 NCT02957682	Phase 3 Evaluate the effect of alirocumab on Neurocognitive function in patients with HeFH and non-HeFH at high and very high cardiovascular risk	2100	• Patients with hypercholesterolemia and established coronary heart disease (CHD) or CHD risk equivalents who are not adequately controlled with a maximally tolerated daily dose of statin at a stable dose for at least 4 weeks prior to the screening visit • Randomized, Double-Blind, Placebo-Controlled, Parallel-Group, 2-Arm (alirocumab Q2W, placebo, 1:1) • Study duration: 3 weeks screening, 96-weeks double-blind Tx period	• Primary: Change in Cambridge Neuropsychological Test Automated Battery (CANTAB) cognitive domain Spatial Working Memory (SWM) strategy score from baseline to week 96. • Secondary (safety) at week 96 in the CANTAB domains and compared to baseline raw scores: Paired Associates Learning, Reaction Time, SWM, global composite • Secondary (efficacy): % change in calculated LDL-C, % change in Apo B, in non-HDL-C, in TC, in Lp(a), in HDL-C, in fasting TG, in Apo A-1, % of patients reaching calculated LDL-C <70 mg/dL (1.81 mmol/L) and LDL-C < 50mg/dL(1.29 mmol/L).	• SSD: Nov 2016 • DE: 2020

Ferroquine – Artefenomel / OZ439
Malaria

Study	Description	Patients	Design	Endpoints	Status
FALCI **DRI12805** NCT02497612	Phase 2 Efficacy, Safety, Tolerability and PK of a single dose regimen of ferroquine with artefenomel (OZ439) in adults and children with Uncomplicated Plasmodium Falciparum Malaria	662	• Patients from 6 months to 70 years suffering from mono-infection by P. falciparum • Randomized, Double-blind, Parallel Assignment • 4 doses of ferroquine associated to 1 dose of artefenomel according to age and body weight • Study duration: up to 67 days for each patient	• Primary: % of patients with Polymerase Reaction Chain (PCR)-adjusted Adequate Clinical and Parasitological Response (ACPR) • Secondary: Time to re-emergence, Time to recrudescence, Parasite clearance time, % of patients with PCR - crude ACPR, SAE, AESI, TEAE, % of patients with PCR - adjusted ACPR	• SSD: Jul. 2015 • DE: 2019

Dengue Vaccine
Co-administration w/ Tdap booster

Study	Description	Patients	Design	Endpoints	Status
NCT02992418	Phase 3 Study of a Tetravalent Dengue Vaccine Administered Concomitantly or Sequentially With Adacel® in Healthy Subjects	688	• Randomized, multicenter, open-label study in 688 subjects aged from 9 to 60 years	• Immunogenicity and safety of CYD dengue vaccine and Tdap vaccine when both vaccines are administered concomitantly or sequentially	• SSD: Dec. 2016 • DE: 2019

Dengue Vaccine
Different schedules

Study	Description	Patients	Design	Endpoints	Status
NCT02628444	Phase 2a Immunogenicity and Safety of 3-Dose and Booster Dose of Tetravalent Dengue Vaccine in Healthy Subjects 9 to 50 Years of Age	1050	• Two-stage, multi-national, multi-center, observer-blind, randomized, placebo-controlled Phase II immunogenicity and safety study of tetravalent dengue vaccine	• Immunogenicity and safety of 3-dose primary series and booster dose	• SSD: May. 2016 • DE: 2020

Dengue Vaccine
Booster dose

Study	Description	Patients	Design	Endpoints	Status
NCT02623725	Phase 2b Study of a Booster Dose of a Tetravalent Dengue Vaccine in Subjects Who Previously Completed the 3-dose Schedule	252	• Multi-center, observer-blind, randomized, placebo-controlled, Phase II trial	• Immunogenicity and safety of a booster dose	• SSD: Apr. 2016 • DE: 2019

Rabies Vaccine
Verorab

Study	Description	Patients	Design	Endpoints	Status
NCT01622062	Phase 3 Immunogenicity and Safety of Verorab® in a "One-week" Intradermal Post-exposure Prophylaxis Regimen	600	• Open-label, randomized, controlled, multi-center, multi-country trial	• Immunogenicity and safety of Verorab® in a "One-week" intradermal post-exposure prophylaxis regimen	• SSD: Jun. 2012 • DE: 2019

Flu Vaccine
Fluzone HD-QIV HV

Study	Description	Patients	Design	Endpoints	Status
NCT03282240	Phase 3 Safety and Immunogenicity of High-Dose Quadrivalent Influenza Vaccine in Participants ≥65 Years in the US	2616	• Ph3 randomized ,modified double blind, active controlled, multi center	• Safety, immunogenicity, consistency	• SSD: Sep. 2017 • DE: 2018

Flu Vaccine
Fluzone HD-QIV HV (Japan)

Study	Description	Patients	Design	Endpoints	Status
NCT03233217	Phase 1/2 Safety and Immunogenicity of High-Dose Quadrivalent Influenza Vaccine in Patients ≥65 Years	175	• Ph1/2 randomized, modified double blind, multi center	• Safety and immunogenicity	• SSD: Sep. 2017 • DE: 2018

Meninge Vaccine
MenQuadTT

Study	Description	Patients	Design	Endpoints	Status
NCT03205371	Phase 3 Immunogenicity and Safety of a Meningococcal Conjugate Vaccine Given Concomitantly With Other Vaccines in Toddlers	1200	• Open-label (immunology laboratory technicians will be blinded to group assignment), randomized, parallel-group, active-controlled, multi-center study	• Immunogenicity and safety	• SSD: Nov. 2016 • DE: 2020

Dengue Vaccine
Booster

Study	Description	Patients	Design	Endpoints	Status
NCT02824198	Phase 2b Immunogenicity and Safety of a Tetravalent Dengue Vaccine Booster Injection in Subjects Who Previously Completed a 3-dose Schedule	260	• Multi-center, observer-blind, randomized, placebo-controlled, Phase II non-inferiority trial	• Immunogenicity and safety of a booster dose	• SSD: Jul. 2016 • DE: 2019

Rabies Vaccine
Purified Vero Rabies

Study	Description	Patients	Design	Endpoints	Status
NCT03145766	Phase 2 Immunogenicity and Safety of a Purified Vero Rabies Vaccine	320	• Multicenter, observer-blind, controlled, randomized, Phase II study	• Immunogenicity and safety	• SSD: Apr. 2017 • DE: 2018

Dengue Vaccine
Co-administration w/ HPV

Study	Description	Patients	Design	Endpoints	Status
NCT02979535	Phase 3b Immunogenicity and Safety of a Tetravalent Dengue Vaccine Administered Concomitantly or Sequentially With Cervarix®	480	• Randomized, open-label, multicenter study	• Immunogenicity and safety of a Tetravalent Dengue Vaccine administered concomitantly or sequentially with Cervarix®	• SSD: Nov. 2016 • DE: 2019

Dengue Vaccine
Co-administration w/ HPV

Study	Description	Patients	Design	Endpoints	Status
NCT02993757	Phase 3b Immunogenicity and Safety of a Tetravalent Dengue Vaccine Administered Concomitantly or Sequentially With Gardasil®	528	• Randomized, open-label, multicenter study	• Immunogenicity and safety of a Tetravalent Dengue Vaccine administered concomitantly or sequentially with Gardasil®	• SSD: Dec. 2016 • DE: 2019

Dengue Vaccine
Asia

Study	Description	Patients	Design	Endpoints	Status
NCT01373281	Phase 3 Study of a Novel Tetravalent Dengue Vaccine in Healthy Children Aged 2 to 14 Years in Asia	10275	• Randomized, double-blind, controlled, multicenter	• Efficacy and safety	• SSD: Jun. 2011 • DE: 2018

Dengue Vaccine
Latin America

Study	Description	Patients	Design	Endpoints	Status
NCT01374516	Phase 3 Study of a Novel Tetravalent Dengue Vaccine in Healthy Children and Adolescents Aged 9 to 16 Years in Latin America	20869	• Randomized, double-blind, controlled, multicenter	• Efficacy and safety	• SSD: Jun. 2011 • DE: 2019