Pipeline

Novartis is consistently rated as having one of the industry's most respected development pipelines, with more than 200 projects in clinical development, as of December 31, 2016.

Many of these projects, which include new molecular entities as well as additional indications and different formulations for marketed products, are for potentially best-in-class or first-in-class medicines that could significantly advance treatment standards for patients worldwide. This table provides an overview of selected projects in confirmatory development.

We use the traditional pipeline model as a platform (e.g., Phase I-III). However, we have tailored the process to be simpler, more flexible and more efficient.

Glossary

Project/product Project refers to the Novartis reference code (combination of three letters and three numbers) used for projects in development. Product refers to the brand name for a marketed product.

Common name Official international non-proprietary name or generic name for an individual molecular entity as designated by the World Health Organization

Glossary continued on page 54

Major development projects

Project/product	Common name	Mechanism of action	Potential indication/disease area	Route of administration	Planned filing dates [1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Oncology									
ABL001	asciminib	BCR-ABL inhibitor	Chronic myeloid leukemia (CML), 3rd line	Oral	2020	PHASE I			
PIM447	–	Pan-PIM inhibitor	Hematologic tumors	Oral	≥2021	PHASE I			
CTL019	tisagenlecleucel-T	CD19-targeted chimeric antigen receptor T-cell immunotherapy	Pediatric acute lymphoblastic leukemia [lead indication]; diffuse large B-cell lymphoma	Intravenous infusion	2017		PHASE II		
INC280	capmatinib	c-MET inhibitor	Non-small cell lung cancer (NSCLC) [lead indication]; NSCLC (EGFRm)	Oral	2018		PHASE II		
BYL719	alpelisib	PI3Kα inhibitor	Hormone receptor-positive (HR+)/human epidermal growth factor receptor 2-negative (HER2-) advanced breast cancer (postmenopausal women), 2nd line (+ fulvestrant)	Oral	2019			PHASE III	
Jakavi	ruxolitinib	JAK1/2 inhibitor	Graft-versus-host disease [lead indication]; early myelofibrosis	Oral	2019			PHASE III	
LCI699	osilodrostat	Aldosterone synthase inhibitor	Cushing's disease	Oral	2018			PHASE III	
Promacta/Revolade	eltrombopag	Thrombopoietin receptor agonist	Severe aplastic anemia, 1st line	Oral	2017			PHASE III	
SEG101	crizanlizumab	P-selectin inhibitor	Sickle cell disease	Intravenous infusion	2020			PHASE III	
Arzerra	ofatumumab	Anti-CD20 monoclonal antibody	Refractory non-Hodgkin's lymphoma	Oral	2018			PHASE III	
LEE011	ribociclib	CDK4/6 inhibitor	HR+/HER2- advanced breast cancer (postmenopausal women), 1st line (+ letrozole) [lead indication]; HR+/HER2- advanced breast cancer (postmenopausal women), 1st/2nd line (+ fulvestrant); HR+/HER2- advanced breast cancer (premenopausal women), 1st line (+ tamoxifen + goserelin or NSAI[3] + goserelin); HR+/HER2- breast cancer (adjuvant)	Oral	US/EU registration				SUBMISSION
PKC412	midostaurin	Signal transduction inhibitor	Acute myeloid leukemia (AML) [lead indication]; advanced systemic mastocytosis; AML (FLT3 wild type)	Oral	US/EU registration				SUBMISSION
Signifor LAR	pasireotide	Somatostatin analogue	Cushing's disease	Long-acting release/ intramuscular injection	US/EU registration[4]				SUBMISSION
Tafinlar + Mekinist	dabrafenib + trametinib	BRAF inhibitor + MEK inhibitor	BRAF V600+ NSCLC [lead indication]; BRAF V600+ melanoma (adjuvant); BRAF V600+ colorectal cancer	Oral	US/EU registration				SUBMISSION
Zykadia	ceritinib	ALK inhibitor	ALK+ advanced NSCLC (1st line, treatment naïve) [lead indication]; ALK+ NSCLC (brain metastases)	Oral	US/EU registration				SUBMISSION
Afinitor/Votubia	everolimus	mTOR inhibitor	Tuberous sclerosis complex seizures	Oral	EU registration US 2017				SUBMISSION
Tasigna	nilotinib	BCR-ABL inhibitor	CML treatment-free remission	Oral	EU registration US 2017				SUBMISSION

[1] Filings that have received approval in either the US or EU but are awaiting approval in the other market
[2] Phase and planned filing dates refer to the lead indication in development.
[3] Non-steroidal aromatase inhibitor
[4] Submission pending acceptance by the FDA

Pipeline
continued

Mechanism of action Specific biochemical interaction with a molecular target such as a receptor or enzyme, through which a drug substance produces its pharmacological effect

Potential indication/indications Disease or condition for which a compound or marketed product is in development and is being studied as a potential therapy

Route of administration Path by which a medicinal preparation is administered into the body, such as oral, subcutaneous or intravenous

Phase I First clinical trials of a new compound, generally performed in a small number of healthy human volunteers, to assess the clinical safety and tolerability, as well as metabolic and pharmacologic properties of the compound

Phase II Clinical studies with patients who have the target disease, with the aim of continuing the Phase I safety assessment in a larger group, assessing the efficacy of the drug in the patient population, and determining the appropriate doses for further evaluation

Phase III Large-scale clinical studies with several hundred to several thousand patients, which are conducted to establish the safety and efficacy of the drug in specific indications for regulatory approval. Phase III trials also may be used to compare a new drug against a current standard of care to evaluate the overall benefit-risk relationship of the new medicine.

Glossary continued on page 56

Major development projects

Project/product	Common name	Mechanism of action	Potential indication/disease area	Route of administration	Planned filing dates [1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Cardiovascular and metabolism									
LIK066	–	SGLT1/2 inhibitor	Weight loss	Oral	≥2021		PHASE II		
ACZ885	canakinumab	Anti-interleukin-1ß monoclonal antibody	Secondary prevention of cardiovascular events	Subcutaneous injection	2017			PHASE III	
Entresto	valsartan, sacubitril (as sodium salt complex)	Angiotensin receptor/neprilysin inhibitor	Chronic heart failure with preserved ejection fraction [lead indication]; post-acute myocardial infarction	Oral	2019			PHASE III	
RLX030	serelaxin	Recombinant form of human relaxin-2 hormone	Acute heart failure	Intravenous infusion	2017			PHASE III	
Respiratory									
QBW251	–	CFTR potentiator	Cystic fibrosis	Oral	≥2021		PHASE II		
QMF149	indacaterol, mometasone furoate (in fixed-dose combination)	Long-acting beta2-agonist and inhaled corticosteroid	Asthma	Inhalation	2019			PHASE III	
QAW039	fevipiprant	CRTH2 antagonist	Asthma	Oral	2019			PHASE III	
QVM149	indacaterol, mometasone furoate, glycopyrronium bromide (in fixed-dose combination)	Long-acting beta2-agonist, long-acting muscarinic antagonist and inhaled corticosteroid	Asthma	Inhalation	2019			PHASE III	
Immunology and dermatology									
CJM112	–	Anti-interleukin-17 monoclonal antibody	Immune disorders	Subcutaneous injection	≥2021		PHASE II		
QAW039	fevipiprant	CRTH2 antagonist	Atopic dermatitis	Oral	≥2021		PHASE II		
LJN452	–	FXR agonist	Non-alcoholic steatohepatitis	Oral	≥2021		PHASE II		
VAY736	–	Anti-BAFF (B-cell-activating factor) monoclonal antibody	Primary Sjoegren's syndrome	Subcutaneous injection	≥2021		PHASE II		
QGE031	ligelizumab	High-affinity anti-IgE monoclonal antibody	Chronic spontaneous urticaria; chronic idiopathic urticaria	Subcutaneous injection	2020		PHASE II		
Cosentyx	secukinumab	Anti-interleukin-17 monoclonal antibody	Non-radiographic axial spondyloarthritis [lead indication]; psoriatic arthritis head-to-head study versus adalimumab; ankylosing spondylitis head-to-head study versus adalimumab	Subcutaneous injection	2018			PHASE III	
Ilaris	canakinumab	Anti-interleukin-1ß monoclonal antibody	Periodic fever syndromes	Subcutaneous injection	US approved EU registration				SUBMISSION
Neuroscience									
CAD106	amilomotide	Beta-amyloid-protein therapy	Alzheimer's disease	Intramuscular injection	≥2021		PHASE II		
CNP520	–	BACE inhibitor	Alzheimer's disease	Oral	≥2021		PHASE II		
EMA401	–	Angiotensin II receptor antagonist	Neuropathic pain	Oral	≥2021		PHASE II		
BYM338	bimagrumab	Inhibitor of activin type II receptor	Hip fracture; sarcopenia	Intravenous infusion	≥2021		PHASE II		
BAF312	siponimod	Sphingosine-1-phosphate receptor modulator	Secondary progressive multiple sclerosis	Oral	2019[5]			PHASE III	
FTY720	fingolimod	Sphingosine-1-phosphate receptor modulator	Pediatric multiple sclerosis	Oral	2017			PHASE III	
AMG 334	erenumab	Selective CGRP receptor antagonist	Migraine	Subcutaneous injection	2017			PHASE III	
OMB157	ofatumumab	Anti-CD20 monoclonal antibody	Relapsing multiple sclerosis	Subcutaneous injection	2019			PHASE III	

[1] Filings that have received approval in either the US or EU but are awaiting approval in the other market
[2] Phase and planned filing dates refer to the lead indication in development.
[5] Ongoing discussions with health authorities to agree on next steps

Pipeline
continued

Advanced development Medical device project for which a positive proof of concept has been established, and clinical and non-clinical studies are being conducted to establish the device's safety, efficacy or performance. This is needed to address regulatory requirements for obtaining marketing authorization.

Submission Application for marketing approval has already been submitted to one or both of the following regulatory agencies: the US Food and Drug Administration (FDA), the European Medicines Agency (EMA). Novartis has not yet received marketing authorization from both regulatory agencies. The application contains comprehensive data and information gathered during human clinical trials and animal studies conducted through the various phases of drug development.

Major development projects

Project/product	Common name	Mechanism of action	Potential indication/disease area	Route of administration	Planned filing dates [1,2]	PHASE I	PHASE II	PHASE III	SUBMISSION
Infectious diseases									
KAF156	–	Imidazolopiperazines derivative	Malaria	Oral	≥2021		PHASE II		
KAE609	cipargamin	PfATP4 inhibitor	Malaria	Oral	≥2021		PHASE II		
LAM320	clofazimine	Mycobacterial DNA binding	Multi-drug resistant tuberculosis	Oral	2018			PHASE III	
Ophthalmology									
RTH258	brolucizumab	Anti-vascular endothelial growth factor (VEGF) single-chain antibody fragment	Neovascular age-related macular degeneration [lead indication]; diabetic macular edema	Intravitreal injection	2018			PHASE III	
Lucentis	ranibizumab	Anti-VEGF monoclonal antibody fragment	Retinopathy of prematurity	Intravitreal injection	2018			PHASE III	
Clareon Monofocal IOL	–	N/A	Next-generation IOL	Cataract implant	EU 2017 US 2019	ADVANCED DEVELOPMENT			
CyPass Micro-Stent	–	N/A	Micro-invasive glaucoma surgical device for implant during cataract surgery	Glaucoma implant	EU 2017	ADVANCED DEVELOPMENT			
A02238	–	N/A	Mid-tier phacoemulsification device	Cataract equipment	US 2018 EU 2018	ADVANCED DEVELOPMENT			
A00717	–	N/A	Daily disposable line extension	Vision care	US 2018 EU 2018	ADVANCED DEVELOPMENT			
A01660	–	N/A	New daily disposable lens	Vision care	US 2018 EU 2018	ADVANCED DEVELOPMENT			
AcrySof IQ PanOptix IOL	–	N/A	Trifocal IOL	Cataract implant	US 2019	ADVANCED DEVELOPMENT			
AcrySof IQ PanOptix Toric IOL	–	N/A	Trifocal IOL for astigmatism	Cataract implant	US 2019	ADVANCED DEVELOPMENT			
AcrySof IQ ReSTOR Toric 2.5 D IOL	–	N/A	Multifocal IOL for astigmatism	Cataract implant	US				SUBMISSION
Biosimilars									
GP1111	infliximab	TNF-α inhibitor	Inflammatory bowel disease; rheumatoid arthritis; plaque psoriasis (same as originator)	Intravenous	EU 2017			PHASE III	
GP2017	adalimumab	TNF-α inhibitor	Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis); plaque psoriasis and others (same as originator)	Subcutaneous	2017			PHASE III	
HX575	epoetin alfa	Erythropoiesis-stimulating agent	Anemia in chronic kidney disease; chemotherapy-induced anemia and others (same as originator)	Subcutaneous and intravenous	US 2017			PHASE III	
GP2013	rituximab	Anti-CD20 monoclonal antibody	Non-Hodgkin's lymphoma; chronic lymphocytic leukemia; rheumatoid arthritis; granulomatosis with polyangiitis; microscopic polyangiitis (same as originator)	Intravenous	EU registration US 2017				SUBMISSION
GP2015	etanercept	TNF-α inhibitor	Arthritides (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis); plaque psoriasis and others (same as originator)	Subcutaneous	US approved EU registration				SUBMISSION
LA-EP2006	pegfilgrastim	Pegylated granulocyte colony-stimulating factor	Chemotherapy-induced neutropenia and others (same as originator)	Subcutaneous	EU registration US 2018[6]				SUBMISSION

[1] Filings that have received approval in either the US or EU but are awaiting approval in the other market
[2] Phase and planned filing dates refer to the lead indication in development.
[6] Resubmission to address FDA complete response letter