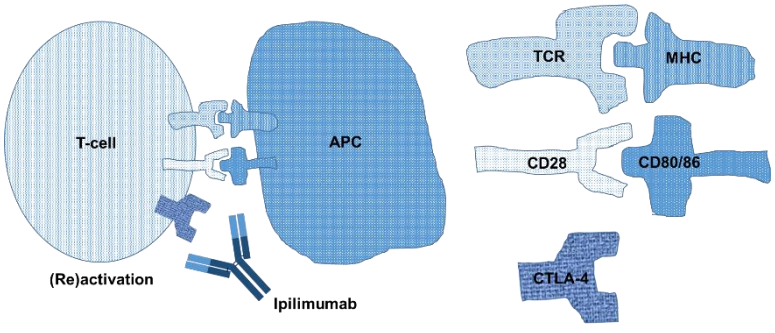
Ipilimumab – Fact Sheet

Molecule

Ipilimumab (Yervoy®) is targeting the immune checkpoint T-lymphocyte-associated protein 4 (CTLA-4). It is a fully humanized monoclonal antibody with two heavy chains and two kappa light chains linked together by disulfide bonds. The molecular weight is approximately 148 kDa.

Mode of Action

The anti-CTLA-4 blocking antibody ipilimumab was the first immune checkpoint inhibitor to be approved for the treatment of cancer. CTLA-4 is a B7/CD28 family member that inhibits T-cell functions. It is constitutively expressed by regulatory T-cells but can also be upregulated by other T-cell subsets, especially CD4+ T-cells, upon activation. CTLA-4 mediates immunosuppression by indirectly diminishing signaling through the co-stimulatory receptor CD28. Cancer cells can thus avoid immune recognition and immune-mediated destruction. The function of ipilimumab is thus a (re)activation of the immune system.



APC	Antigen-presenting cell
CD28	Cluster of differentiation 28 surface protein
CD80/86	Cluster of differentiation 80/86 surface protein
CTLA-4	Cytotoxic T-lymphocyte-associated protein 4
MHC	Major histocompatibility complex
TCR	T-cell receptor

Indication

Yervoy® is indicated for unresectable or metastatic melanoma, as an adjuvant in the treatment of cutaneous melanoma, to treat microsatellite-high or mismatch repair deficient metastatic colorectal cancer, hepatocellular carcinoma, and in combination with nivolumab (Opdivo®) for advanced renal cell carcinoma.

Patent Situation

Yervoy® patents will expire in the US in 2023 and expired in the EU in 2021. Basic patents related to anti-CTL4 have been already expired.

Market and Competitive Field

The originator product Yervoy® was developed by Bristol-Myers Squibb and Medarex. The first approvals by FDA and EMA were in 2011. In 2021, Yervoy® had sales of 1.87 billion €, up from 1.39 billion € in 2020. Biosimilar developments are currently at an early stage.

VelaLabs GmbH
Brunner Straße 69 / Obj. 3, A-1230 Vienna / Austria
Phone: +43 1 890 5979 11, Fax: +43 1 890 5979 10
E-Mail: office@vela-labs.at

VelaLabs Portfolio

		Ipilimumab
		Yervoy®
	Clone selection/ comparability	
HPLC	Separation based on **size** (SE-HPLC)	
HPLC	Separation based on **hydrophobicity** (RP-HPLC)	
HPLC	Detection of **charge variants** (CEX-HPLC)	
Binding	Binding to **cell surface** expressed target (Flow cytometry)	n.a
Binding	Binding to **soluble target** (ELISA)	
Binding	Binding to specific **antibody or antigen** (SPR-BIACORE, ELISA)	
Binding	**Affinity/ kinetic** to recombinant target (SPR-BIACORE)	
Effector function	Binding to C1q, [1]**CDC surrogate** (ELISA)	
Effector function	**Affinity** to recombinant Fc-receptors (SPR-BIACORE)	
Effector function	Reporter gene assays, [2]**ADCC surrogate** (Luminescence)	
Effector function	[1]**CDC** (Flow cytometry)	
Effector function	[2]**ADCC** (DELFIA, Fluorescence)	
Effector function	Additional **bioassays** (Luminescence, fluorescence)	
Gly	Glyco-pattern with **Lectin Microarray** (45 different lectins)	
	(Pre)clinical application	
Clinics	Pharmacokinetics – **PK** (ECL, ELISA)	
Clinics	Pharmacodynamics – **PD** (ECL, ELISA, flow cytometry, bioassay)	
Clinics	Immunogenicity - [3]**ADAs** (ECL, Biacore, ELISA, neutr. assay)	

[1]CDC = Complement Dependent Cytotoxicity
[2]ADCC = Antibody Dependent Cellular Cytotoxicity
[3]ADA = Anti-Drug Antibody

	VelaLabs portfolio
	VelaLabs planned
n.a.	not applicable

If you are interested in the full version including patent and originator data please contact us: velabd@vela-labs.at

VelaLabs GmbH
Brunner Straße 69 / Obj. 3, A-1230 Vienna / Austria
Phone: +43 1 890 5979 11, Fax: +43 1 890 5979 10
E-Mail: office@vela-labs.at