Primary Focus: Immuno-oncology

Dedicating our collective strengths to find new ways to cure cancer globally

Our Goal

Our goal for Primary Focus Immuno-oncology is to deliver curative treatment options for patients with cancer. Utilizing our in-house oncology expertise and in collaboration with our network of external partners, we are working to develop next-generation immuno-therapies, using new modalities and technologies, to benefit patients **who do not respond to currently available cancer immuno-therapies**.

Background

Currently, only approximately 20% of cancers respond to existing immuno-oncology treatments.[1] We are passionate about **turning 20% into 100%**. By activating and enhancing the immune system in new and multiple ways, we can **reinvigorate** its ability to **discover**, **disarm** and **destroy** more cancers in more patients. At Astellas, Primary Focus Immuno-oncology is one of the priority investment areas in our research and development strategy.

Strategic Approach

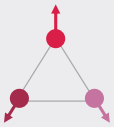
We are allocating significant, sustained investment in the understanding of cancer biology, to establish multi-functional modality platforms and a broad, novel pipeline:

FOCUS

Focusing on learning and evolving our capabilities to create the foundations to catalyze immuno-oncology drug development, investing significantly to enhance our skills and infrastructure.

ENRICH

Leveraging our internal capabilities as well as partnering with the best minds in biotechnology.



EXPAND

Continually seeking new science, new ways to innovate and exciting partnerships to expand treatment opportunities for our patients.

Our platform technologies currently in clinical development include:

Immune checkpoint inhibitors with novel mechanisms of action

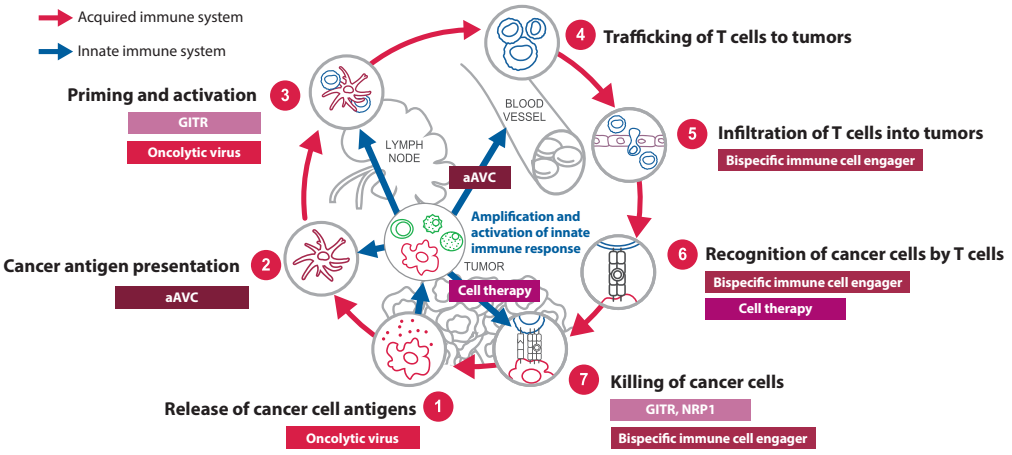
Immuno-stimulating, gene loading oncolytic viruses

An artificial adjuvant vector cells platform (aAVC) technology

Early-stage Pipeline

Our early-stage platforms are built to trigger an anti-tumor immune response by stimulating multiple immune functions at the same time.

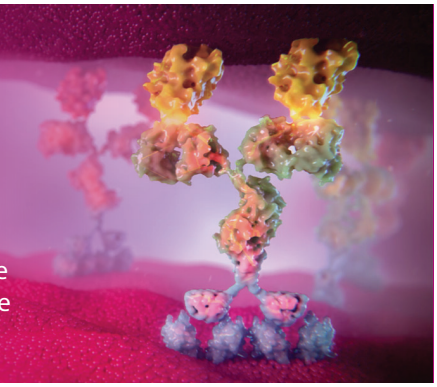
The Cancer Immunity Cycle[2]



aAVC: Artificial adjuvant vector cells, NRP1: Neuropilin-1, GITR: Glucocorticoid-induced TNFR-related protein

Spotlight: Adoptive Cell Therapy

Xyphos' Advanced Cellular Control through Engineered Ligands (ACCEL™) technology platform has the potential to create controllable and versatile cell therapy treatments for hematological and solid tumors. The platform addresses the limitations of traditional chimeric antigen receptor (CAR) immuno-therapies by enabling flexible, sequential and multiplex targeting, in addition to dose control of CAR-T cells. This innovative technology, *convertible*CAR®, will allow us to develop new and potentially better ways to find, modulate and destroy targeted cancer cells throughout the body. The lead *convertible*CAR® candidate is currently in pre-clinical development, scheduled for a first-in-human study in 2021.



Current Status†

Through strategic external collaborations and acquisitions, we have established a robust and competitive immuno-oncology pipeline, with multiple assets in clinical stage:

MODALITY	COMPOUND	MECHANISM	DISCOVERY / PRE-CLIN / PHASE 1	PARTNER
Checkpoint	ASP1948	NRP1		
	ASP1951	GITR agonist		
Oncolytic virus (OV)	ASP9801	OV IL-7, IL-12		Tottori University
	VET2-L2	Systemic OV Leptin-IL2 fusion		KALIVIR IMMUNOTHERAPEUTICS
aAVC	ASP7517	WT1		RIKEN
	ASP0739	NY-ESO-1		
Bispecific immune cell engager	Not disclosed	Bispecific antibody		xencor
	Not disclosed	Probody® T cell engagers		CytomX
	Not disclosed	Bispecific immune cell engager		
Cell therapy	Not disclosed	CD20 *convertible*CAR-T		
	Not disclosed	Mesothelin HiT TCR-T		Adaptimmune
	Not disclosed	*convertible*CAR-NK		

† Accurate as of January 2021.

NRP1: Neuropilin-1, GITR: Glucocorticoid-induced TNFR-related protein, IL: Interleukin, aAVC: Artificial adjuvant vector cell, CAR: Chimeric antigen receptor, TCR: T-cell receptor, HiT: HLA (human leukocyte antigen)-independent TCR, NK: Natural killer, WT: Wilms tumor 1, NY-ESO-1: New York esophageal squamous cell carcinoma 1, CD20: B-lymphocyte antigen CD20

REFERENCES: 1. Ventola CL. Cancer Immunotherapy, Part 3: Challenges and Future Trends. P&T. 2017;42(8):514-521.
2. Chen DS & Mellman I. Immunity. 2013;39(1):1-10 and Demalia O. et al. Nature. 2019;574(7776):45-56.

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