The Basics of T Cell-Medicated Immunotherapy on Cancer
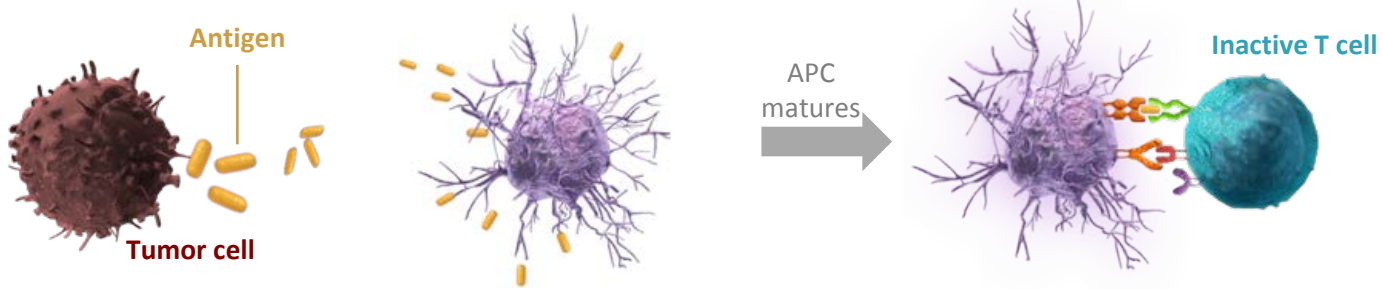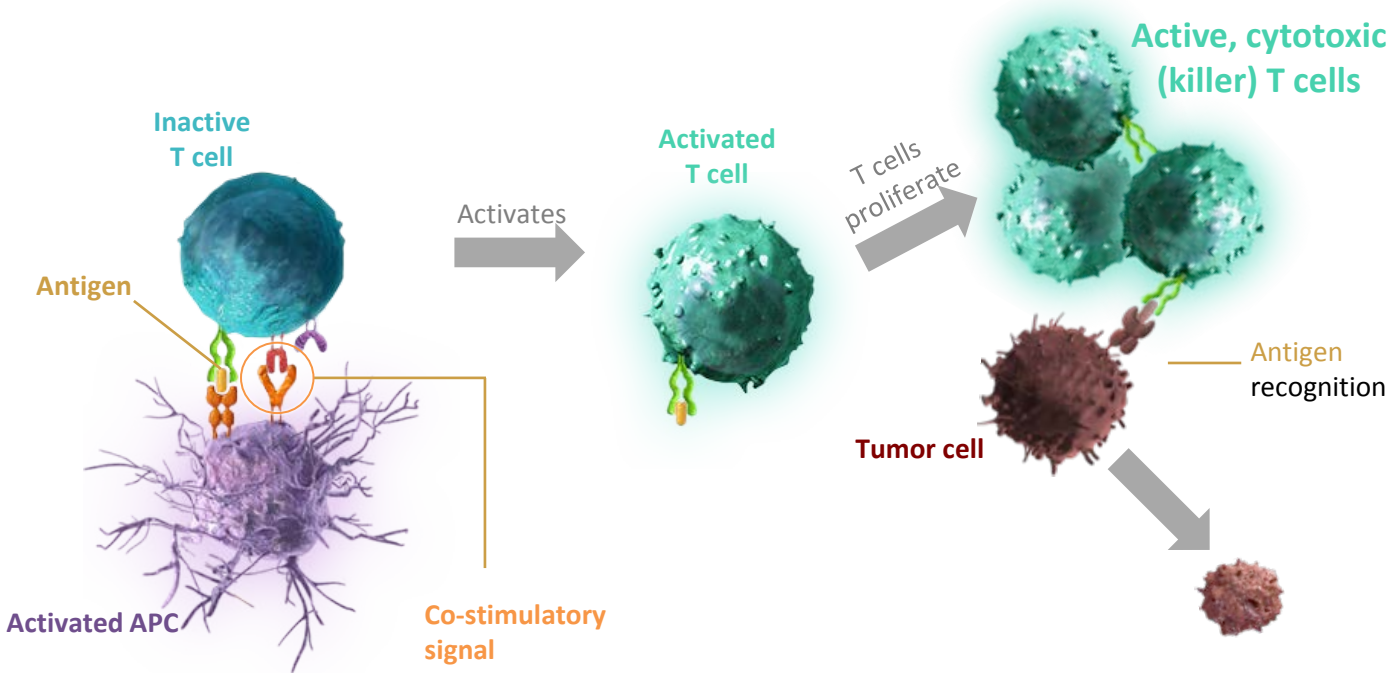
Tumor-specific immune cell responses triggered by tumor-associated antigens
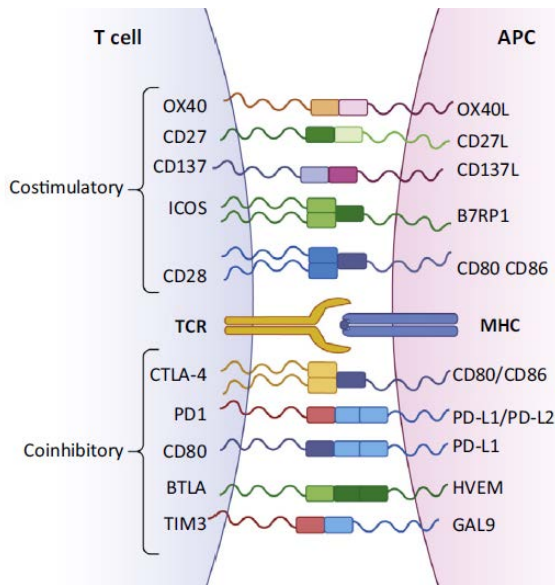
Antigen

Tumor cell

APC matures

Inactive T cell

1 **Tumors** express a multitude of proteins, known as **tumor-associated antigens**

2 **Antigen presenting cell (APC)** captures **tumor-associated antigens**

3 **Activated APC** can interact with T cells

Inactive T cell

Antigen

Activates

Activated T cell

T cells proliferate

Active, cytotoxic (killer) T cells

Antigen recognition

Tumor cell

Activated APC

Co-stimulatory signal

4 **Activated APC** presents the **tumor-associated antigen** to the T cell along with a **co-stimulatory signal**

5 **Cytotoxic T cell** induces *apoptosis* in **tumor** cell

References
Pardoll DM. *Nat Rev Cancer*, 2012.
Heemskerk B, et al. *EMBO J*, 2013.
Mellman I, et al. *Nature*, 2011.
Boudreau JE, et al. *Mol Ther*, 2011.
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Costimulatory and coinhibitory receptors in the immune synapse. Most of these receptors require the T cell receptor (TCR) to specifically recognize a peptide displayed by a MHC molecule on an antigen-presenting cell (APC), to deliver their costimulatory or coinhibitory signal. These interactions can take place either in secondary lymphoid sites where naïve T cells encounter antigen for the first time, or in the periphery where effector cells may be activated (or suppressed).

Image retrieved from Pico de Coaña Y, et al., *Trends Mol Med*, 2015

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B7RP1 (CD275/ICOSLG)	CD112	EGFR	LAG3
BTLA	CD113	EGFR VIII	Mesothelin
CD19	CD123	EphA2	MUC1 (EMA)
CD20	CD133	FAP	OX40 (TNFRSF4)
CD22	CD137 (4-1BB/TNFRSF9)	GAL9 (LGALS9)	OX40L (TNFSF4)
CD27	CD137L (4-1BBL/TNFSF9)	GD2	PD-1
CD27L (CD70)	CD138	GITR	PD-L1 (CD274)
CD28	CD155	GITRL	PD-L2 (PDCD1LG2)
CD30	CD171	GPC3	ROR1R
CD33	CEA (CEACAM5)	HER2	SS1
CD80	CEACAM1	HVEM (TR2/TNFRSF14)	TIGIT
CD86	cMet (MET)	ICOS (CD278)	TIM3 (HAVCR2)