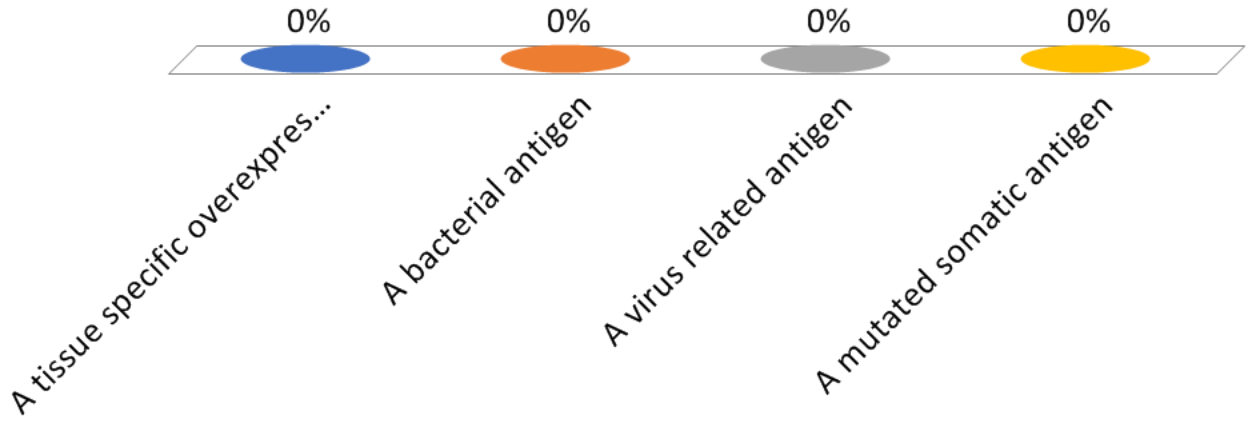
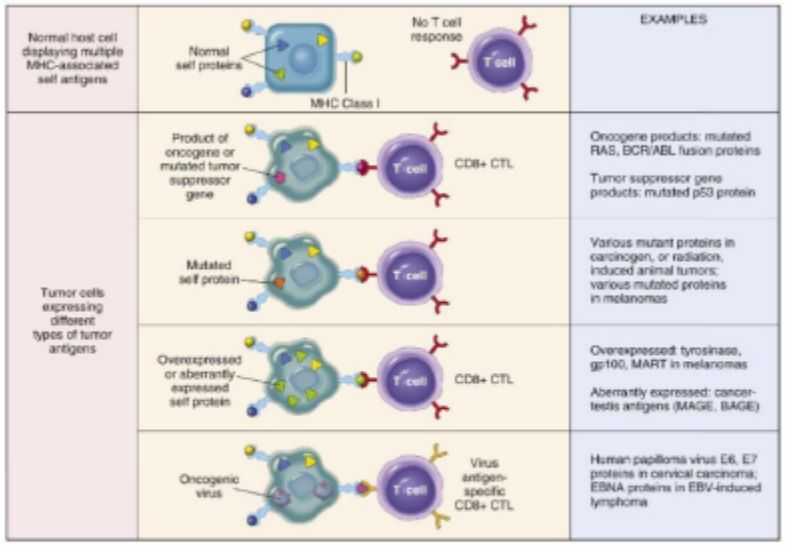
1. What is a neoantigen?

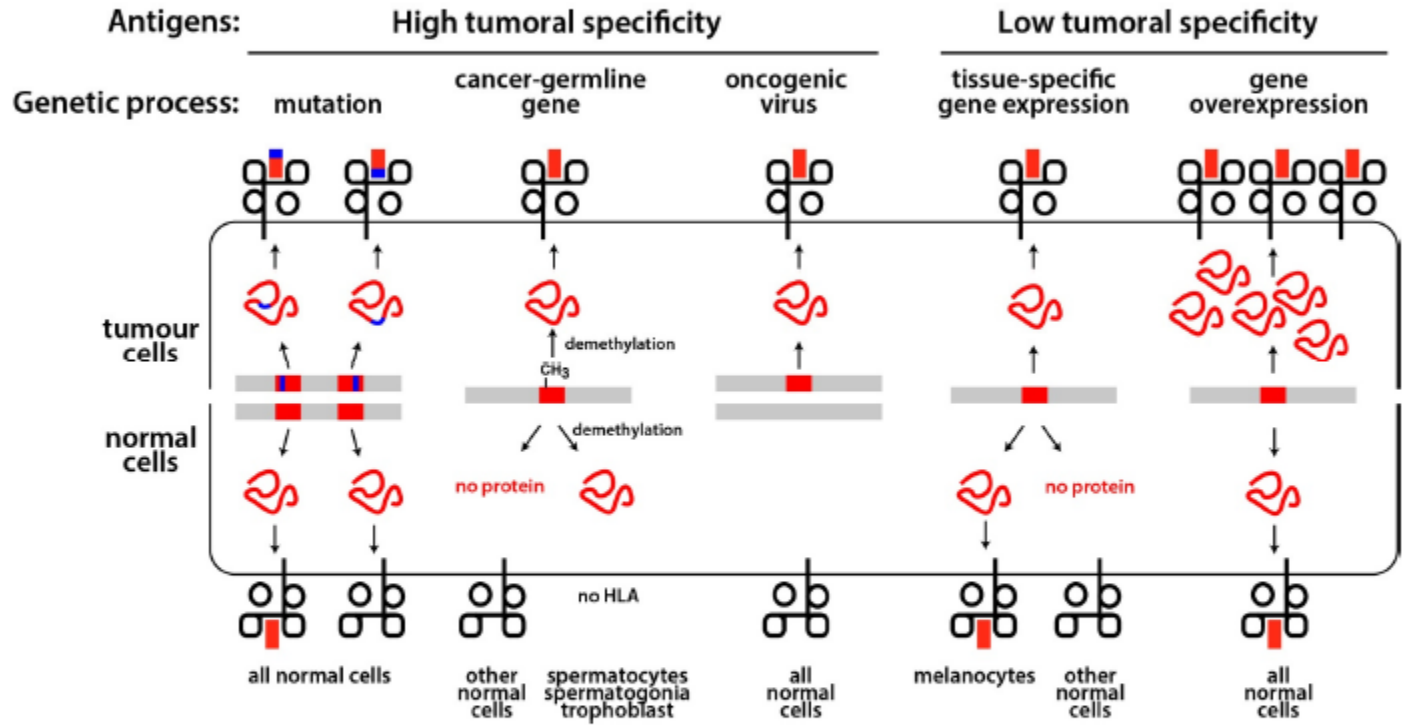
A. A tissue specific overexpressed antigen
B. A bacterial antigen
C. A virus related antigen
D. A mutated somatic antigen



What antigens are T-cells responding to?



Tumor antigens recognized by CD8+ T cells.



- Neo-antigens
- Cancer-testis antigens (CT Ags, or oncofetal Ags, such as MAGE, NY-ESO-1; expressed only in germ cells but not somatic (tissue) cells
- Viral antigens

http://slideplayer.com/slide/11983008/ https://www.slideshare.net/csbrprasad/neoplasia-robbins-path-13540987

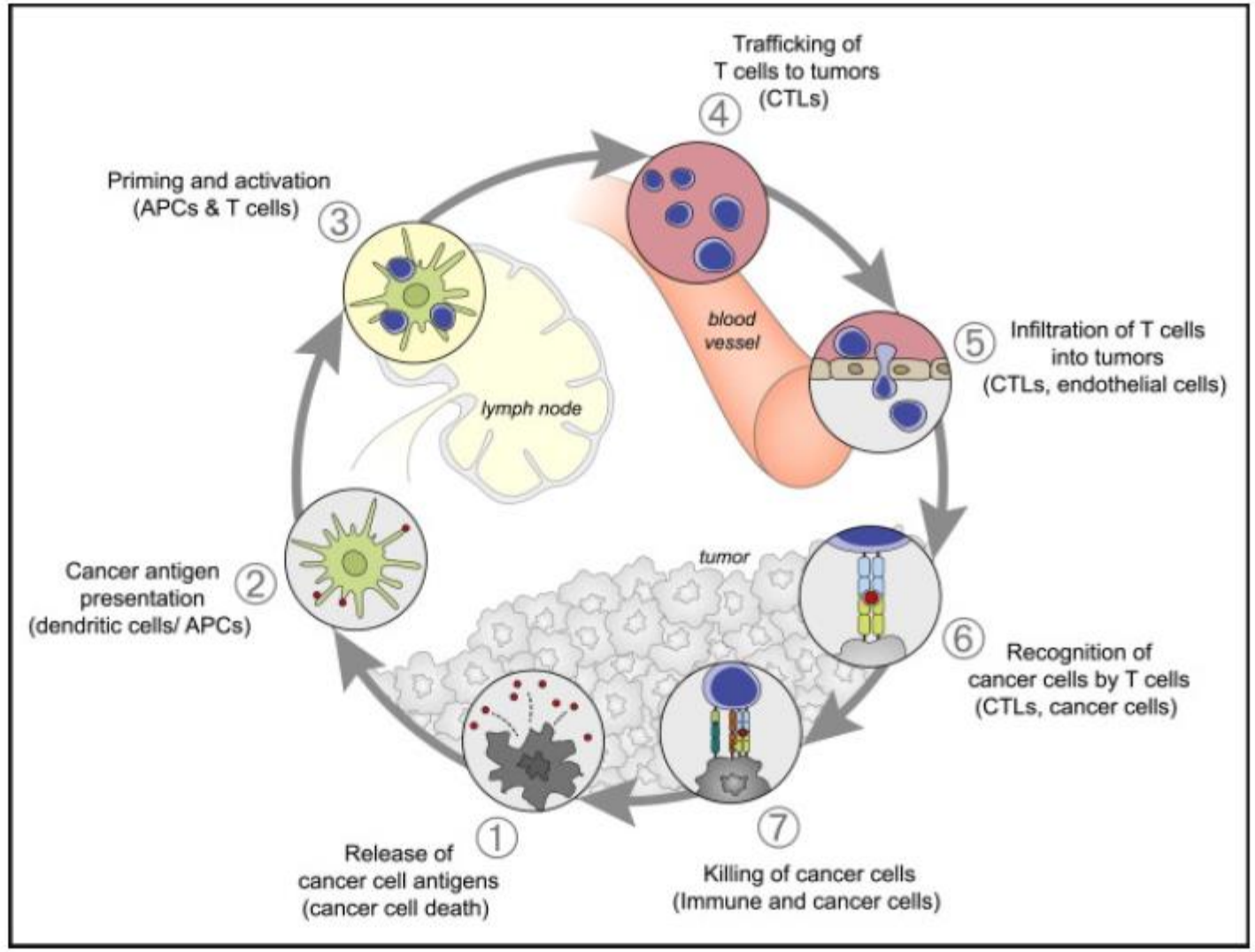
2. For the cancer immunity cycle, which one is correct?

A. Cancer cell death →priming and activation →trafficking of T cells to tumors → cancer antigen presentation → infiltration of T cells into tumors →recognition of cancer cells by T cells → killing of cancer cells

B. Cancer cell death→cancer antigen presentation→priming and activation→trafficking of T cells to tumors→infiltration of T cells into tumors→recognition of cancer cells by T cells → killing of cancer cells

C. Cancer cell death →cancer antigen presentation → trafficking of T cells to tumors →infiltration of T cells into tumors→priming and activation → recognition of cancer cells by T cells → killing of cancer cells

Cancer-immunity cycle



Chen, D. S. and I. Mellman (2013). Immunity **39**(1): 1-10.

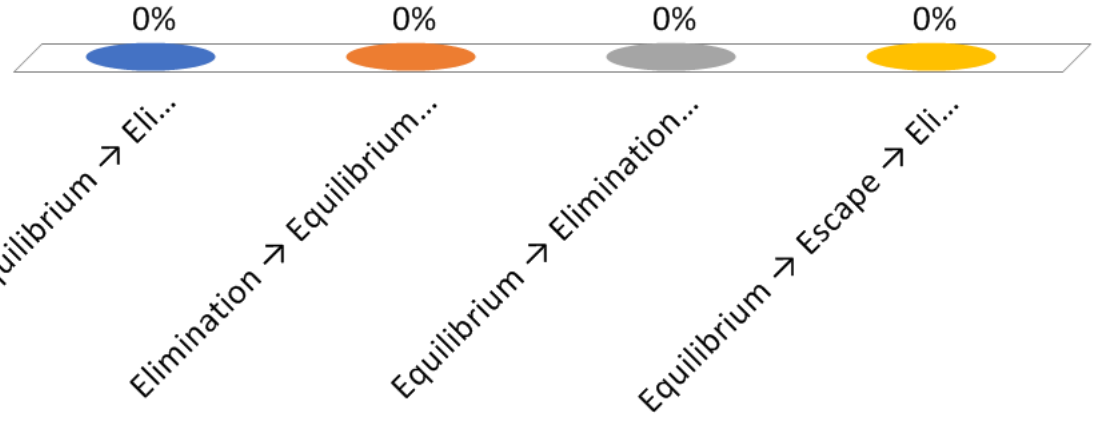
3. According to immunoediting theory, the correct sequence of events is?

A. Escape →Equilibrium → Elimination

B. Elimination → Equilibrium → Escape

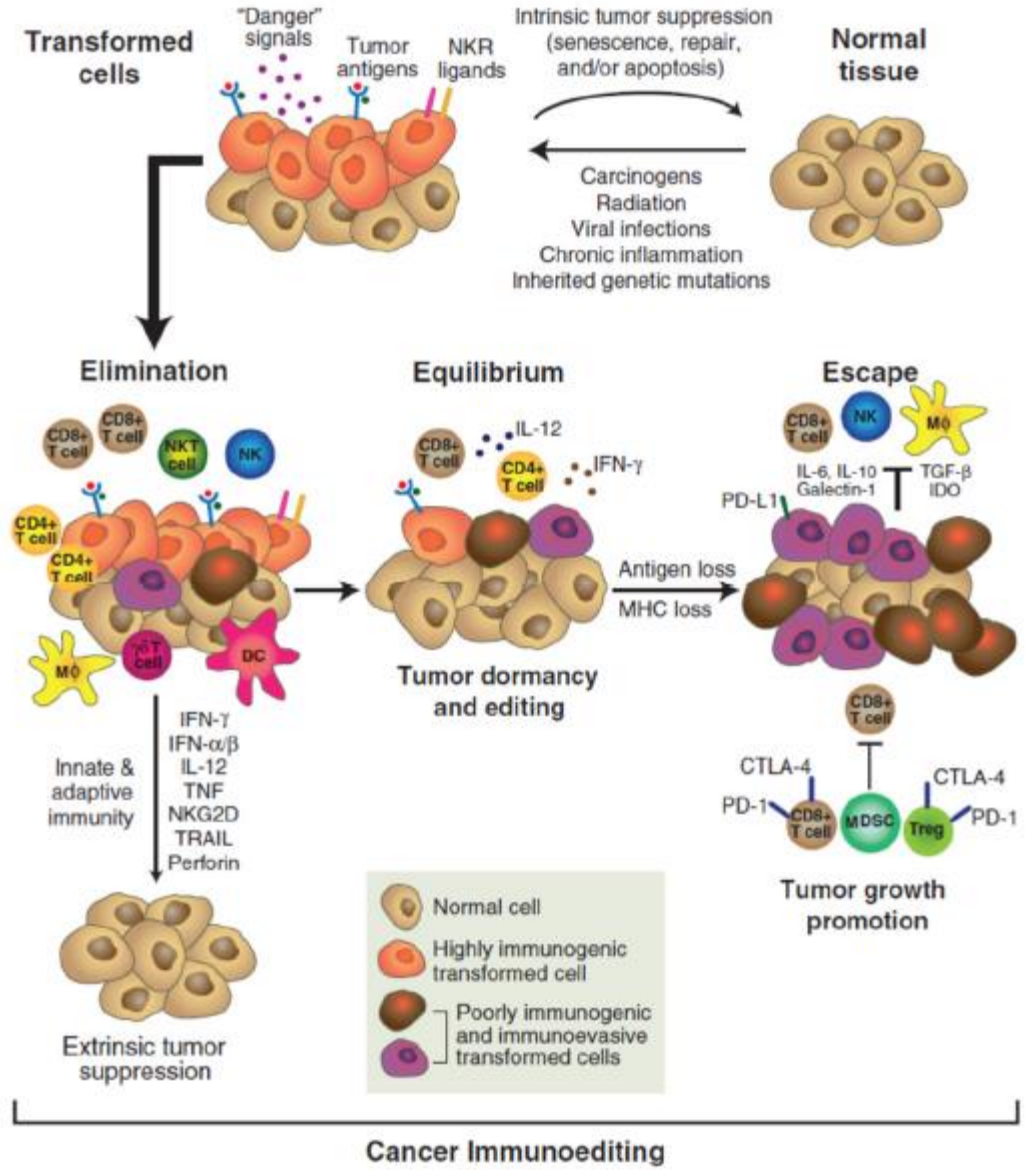
C. Equilibrium → Elimination → Escape

D. Equilibrium → Escape → Elimination



The immunoediting hypothesis

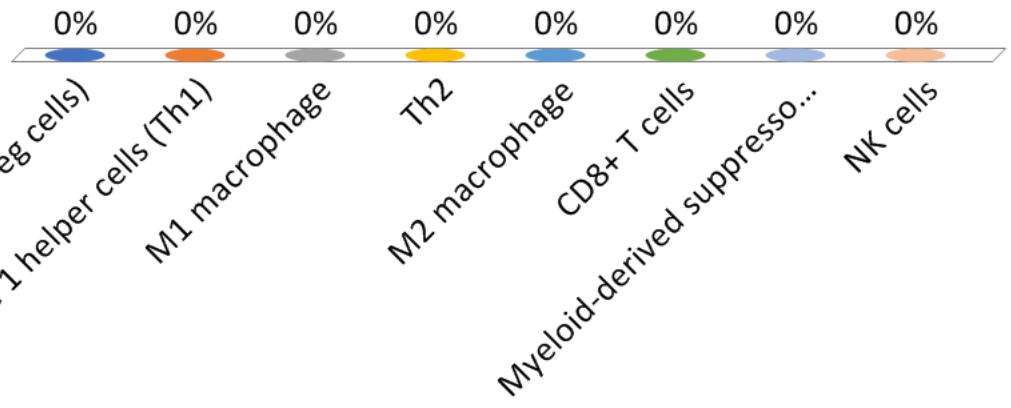
Cancer immunoediting encompasses three process.
(a) Elimination corresponds to immunosurveillance.
(b) Equilibrium represents the process by which the immune system iteratively selects and/or promotes the generation of tumor cell variants with increasing capacities to survive immune attack.
(c) Escape is the process wherein the immunologically sculpted tumor expands in an uncontrolled manner in the immunocompetent host.

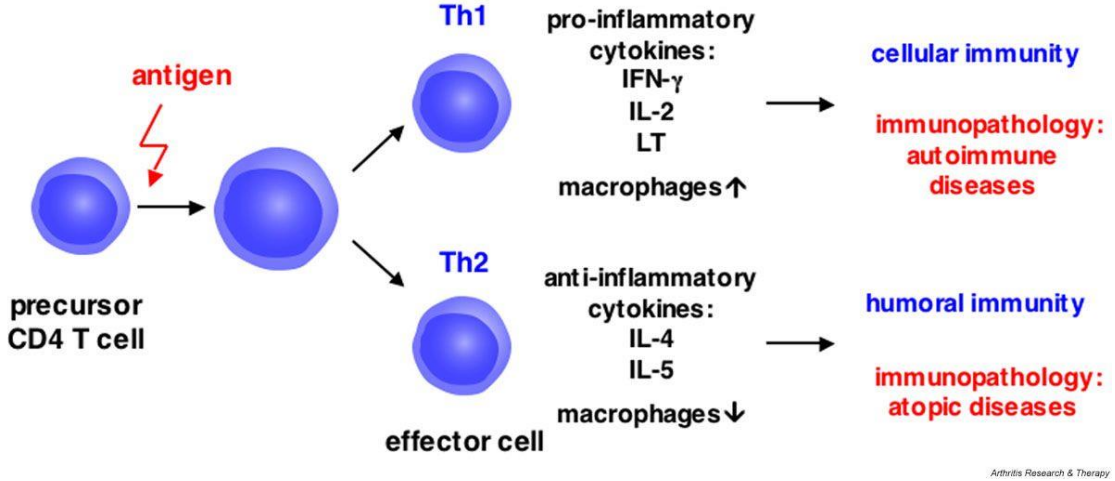


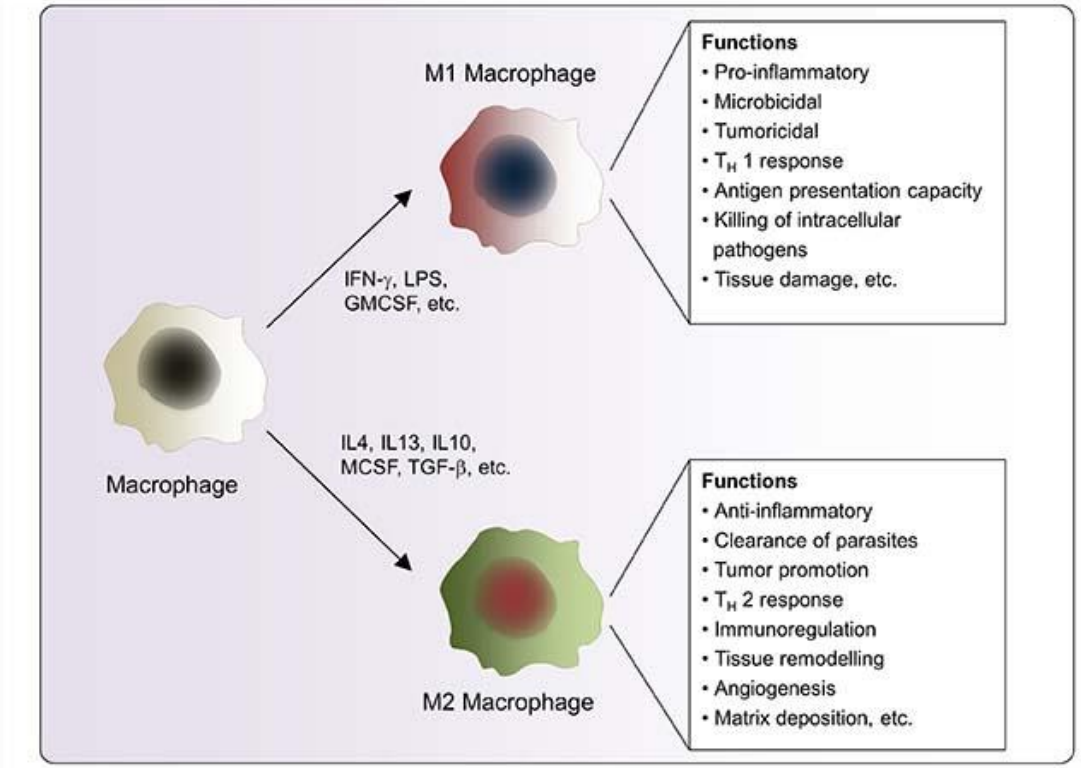
Schreiber, R. D., Old, L. J., & Smyth, M. J. *Science*, *331*(6024), 1565–1570 (2011)

4. According to the understanding of cancer immunology, which of the following cells is antagonist of growing tumors?

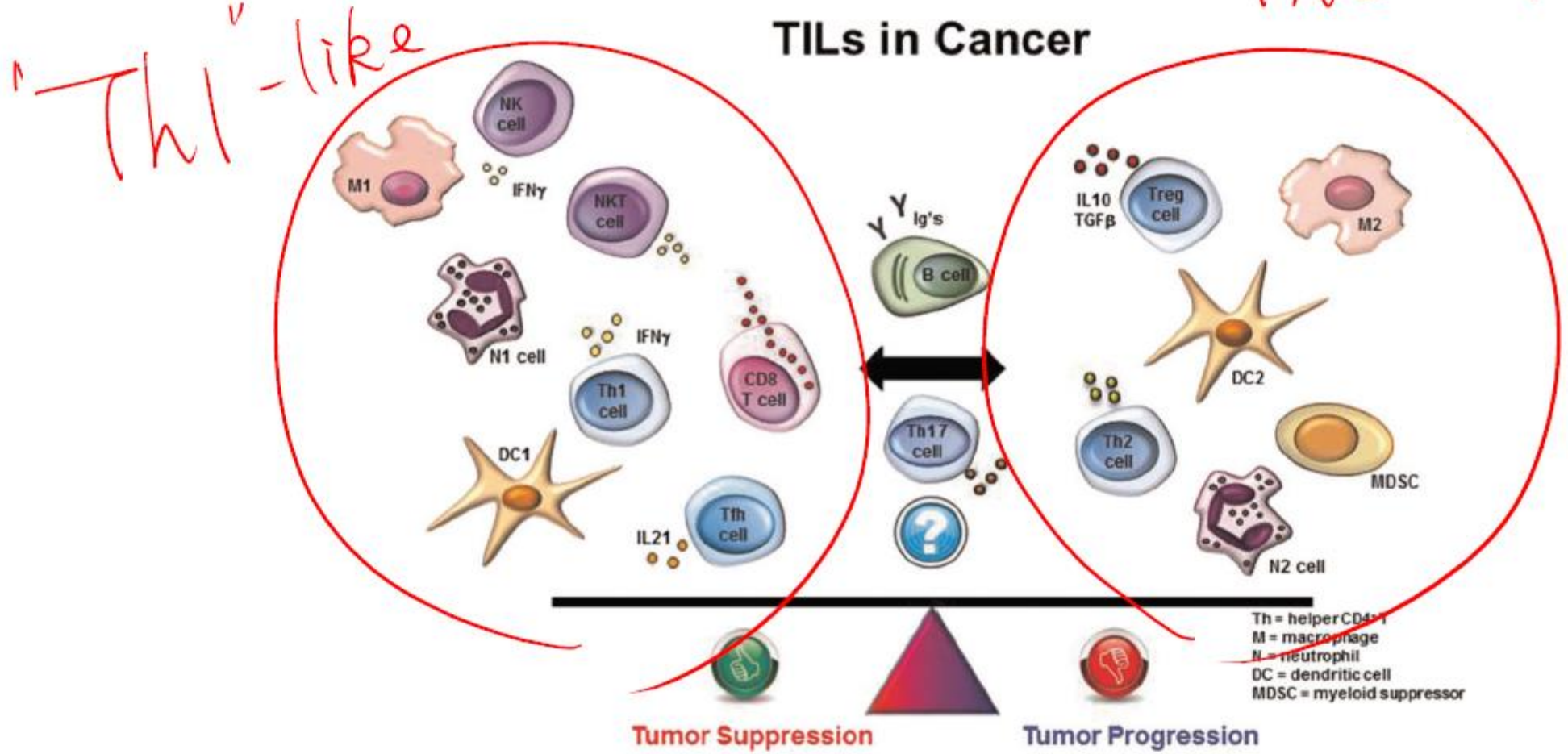
A. Regulatory T cells (Treg cells)
B. Type 1 helper cells (Th1)
C. M1 macrophage
D. Th2
E. M2 macrophage
F. CD8+ T cells
G. Myeloid-derived suppressor cells (MDSC)
H. NK cells




antigen
precursor
CD4 T cell
Th1
pro-inflammatory
cytokines:
IFN-γ
IL-2
LT
macrophages↑
cellular immunity
immunopathology:
autoimmune
diseases
Th2
anti-inflammatory
cytokines:
IL-4
IL-5
macrophages↓
humoral immunity
immunopathology:
atopic diseases
effector cell
Arthritis Research & Therapy


M1 Macrophage
IFN-γ, LPS,
GMCSF, etc.
Macrophage
IL4, IL13, IL10,
MCSF, TGF-β, etc.
M2 Macrophage
Functions
• Pro-inflammatory
• Microbicidal
• Tumoricidal
• T_H 1 response
• Antigen presentation capacity
• Killing of intracellular pathogens
• Tissue damage, etc.
Functions
• Anti-inflammatory
• Clearance of parasites
• Tumor promotion
• T_H 2 response
• Immunoregulation
• Tissue remodelling
• Angiogenesis
• Matrix deposition, etc.

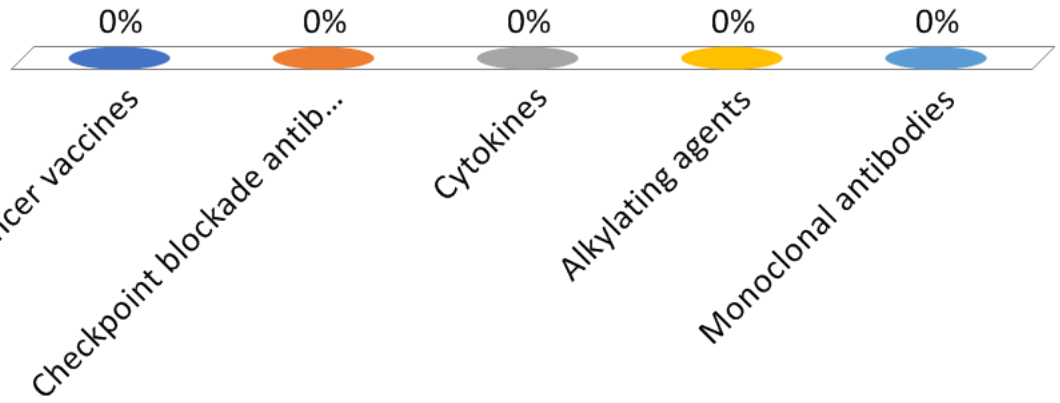
Immune cells can be protagonists or antagonists of growing tumors



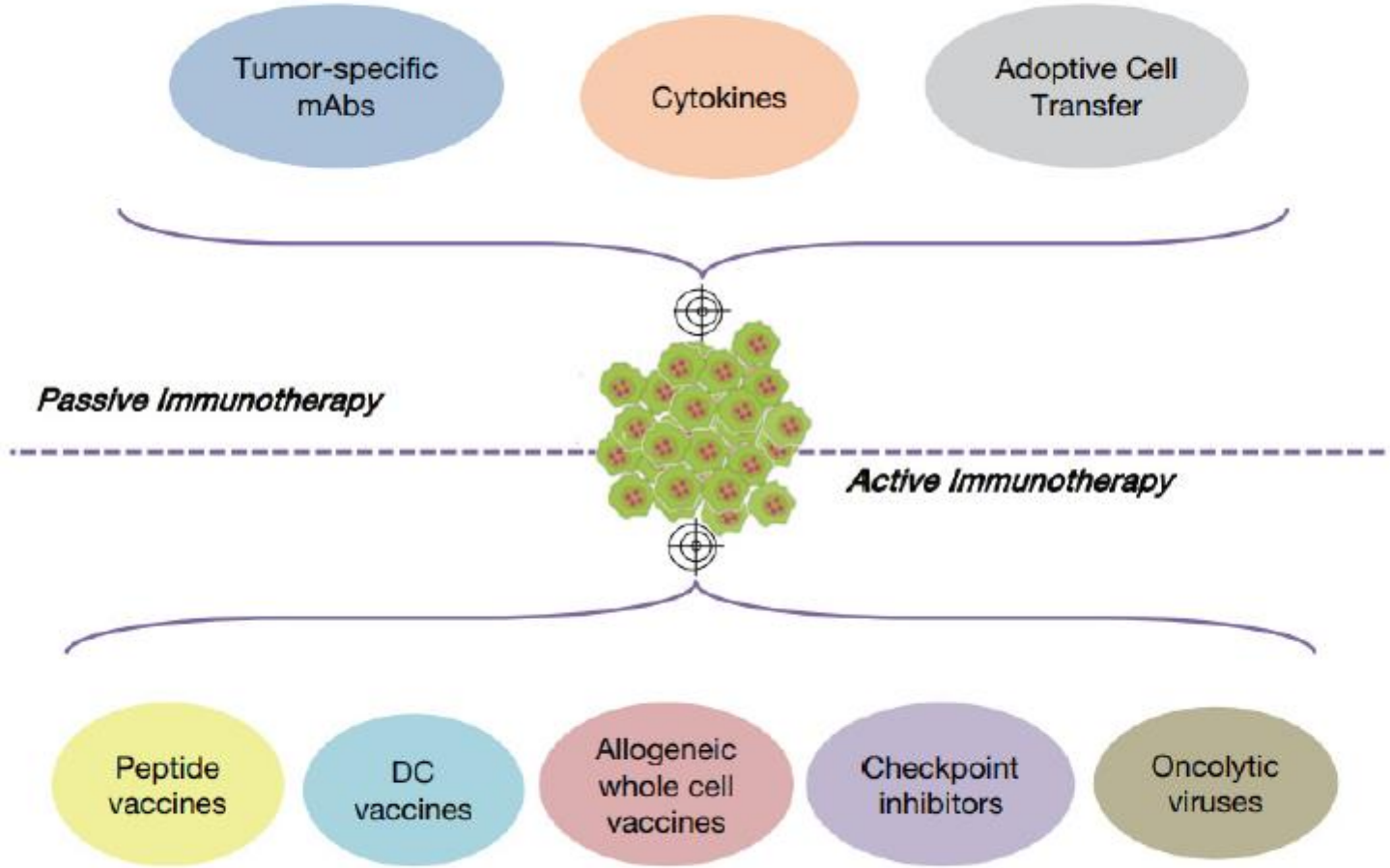
Salgado, R., Denkert, C., Demaria, S., Sirtaine, N., Klauschen, F., Pruneri, G., et al. (2015). *Annals of Oncology*. Oxford University Press.

5. Which one of the following treatments is NOT a type of cancer immunotherapy?

A. Therapeutic cancer vaccines
B. Checkpoint blockade antibodies
C. Cytokines
D. Alkylating agents
E. Monoclonal antibodies



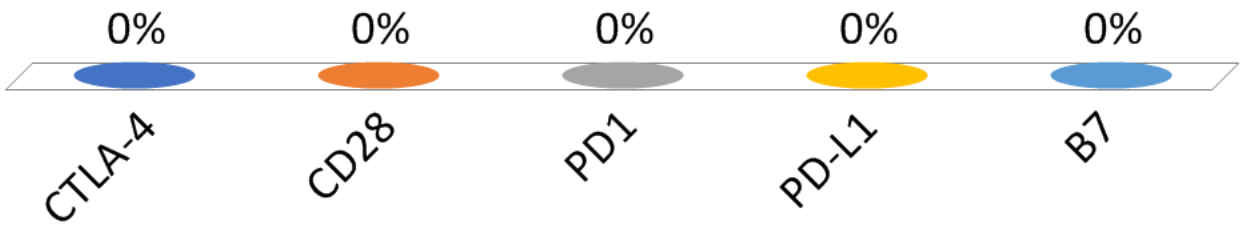
Different types of cancer immunotherapy



Papaioannou NE et al. *Ann Transl Med* 2016

6. Which of the following receptors will NOT be expressed on the surface of T cells?

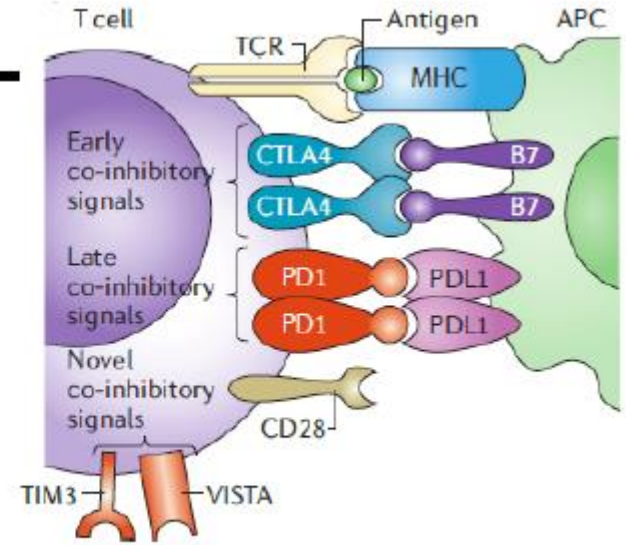
A. CTLA-4
B. CD28
C. PD1
D. PD-L1
E. B7

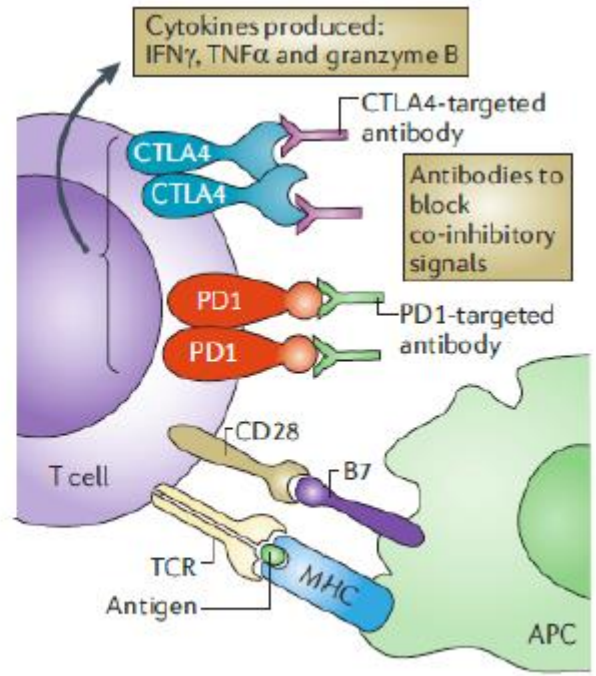


Checkpoint Inhibitors

Checkpoint Inhibitor inhibits tumor-induced suppression of T-cell activation or function

- **Mechanism of action**
  - Antibodies target immune checkpoints to enhance antitumor response
- **Examples**
  - Anti-CTLA-4
  - Anti-PD1 or anti-PD-L1





CTLA-4, cytotoxic T lymphocyte-associated antigen 4;

PD1, programmed death 1

Sharma P, Allison JP, et al. Nat Rev Cancer. 2011;11(11):805-812.