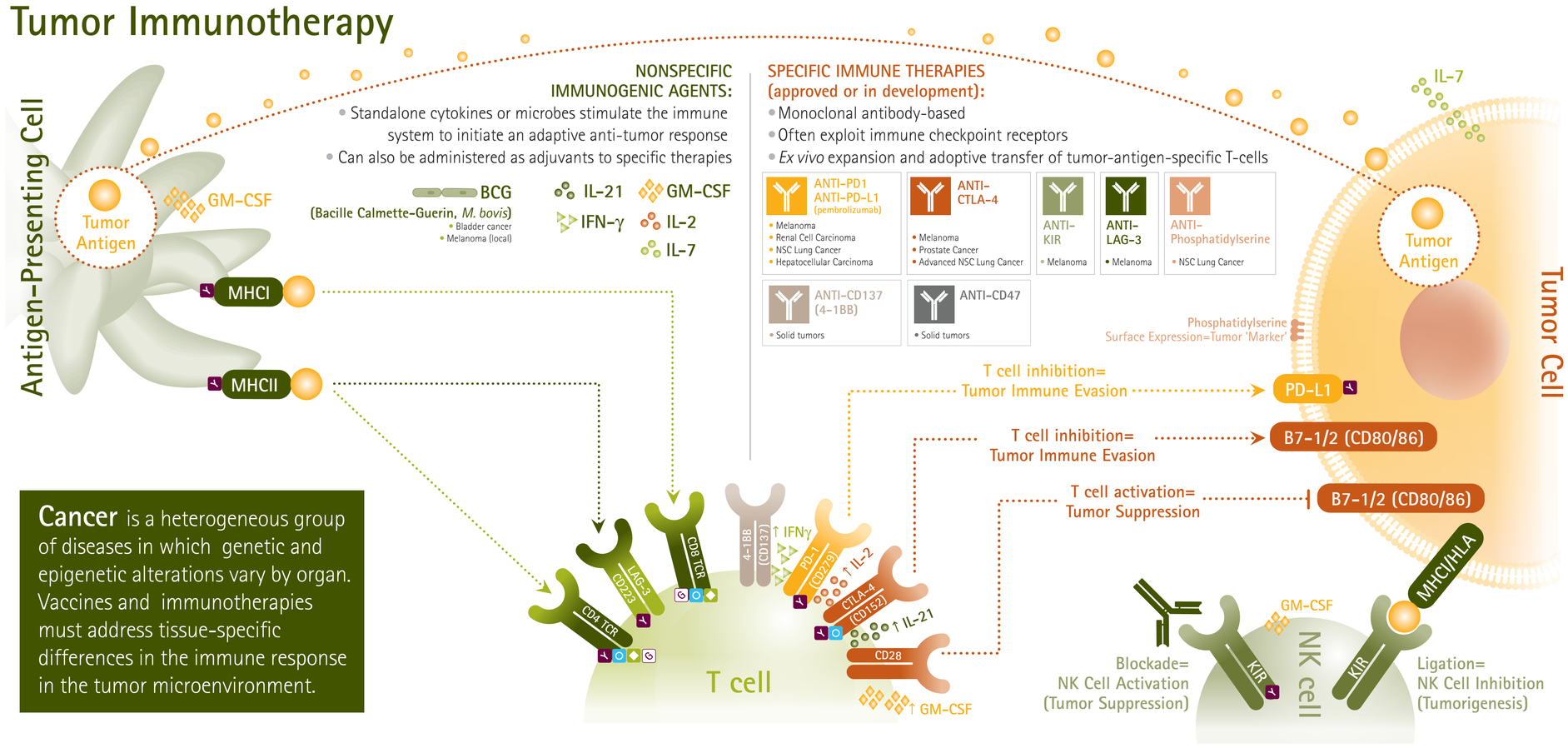
The Immunology of Cancer

Understanding interactions between the immune system and cancer cells has led to breakthroughs in cancer vaccines and other novel immunotherapies. Detection reagents and instrument platforms have become increasingly sophisticated and sensitive for detection of key tumor antigens and associated immunology targets.

Tumor Immunotherapy



Cancer is a heterogeneous group of diseases in which genetic and epigenetic alterations vary by organ. Vaccines and immunotherapies must address tissue-specific differences in the immune response in the tumor microenvironment.

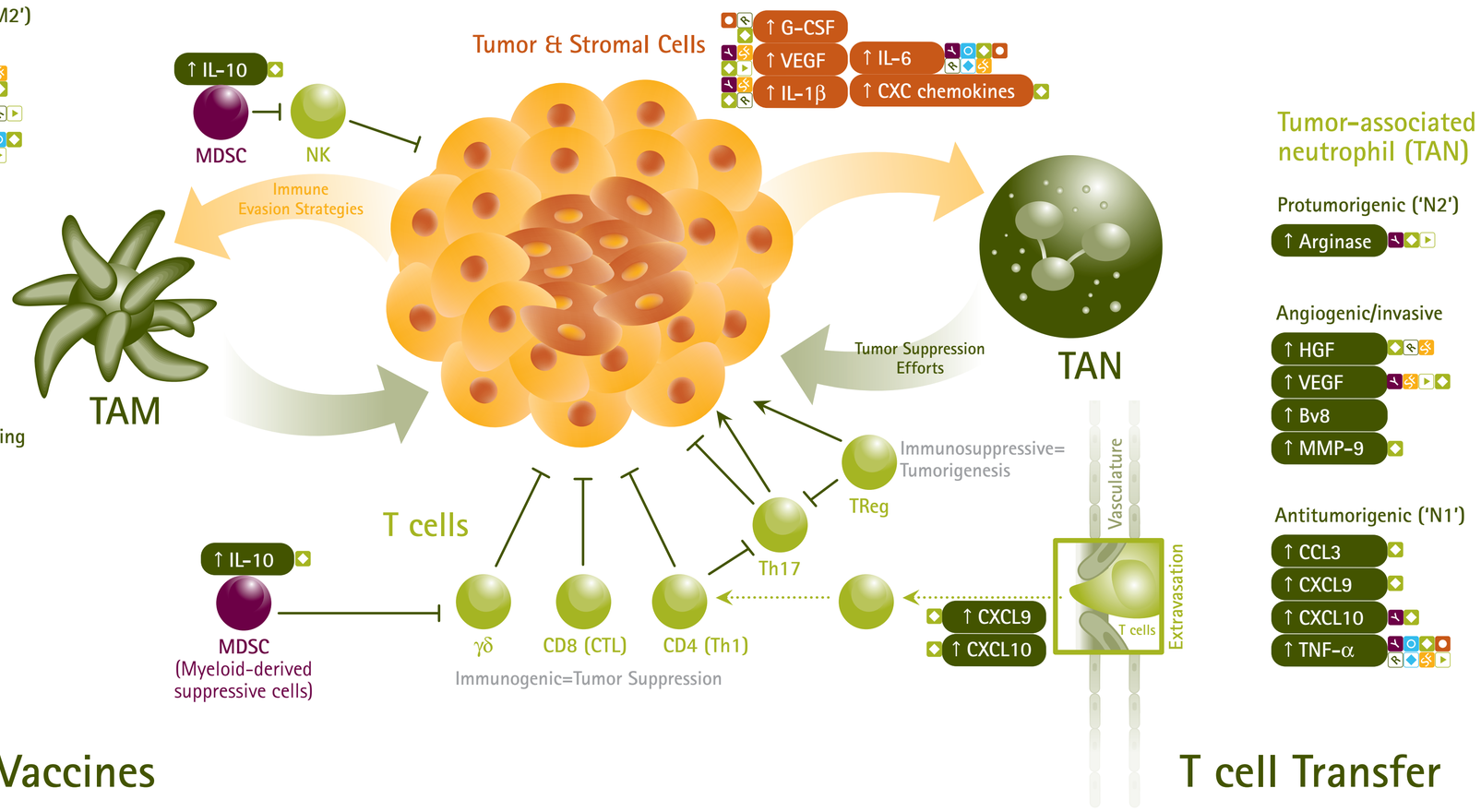
The Tumor Microenvironment

Tumor-associated macrophage (TAM)

Immunosuppressive tumorigenic ('M2')
- ↑ IL-10
- ↑ CCL22
- ↑ Arginase
- ↑ EGF
- ↑ bFGF (FGF-2)
- ↓ IL-12
- ↑ VEGF
- ↑ PDGF
- ↑ TGF-β

Angiogenic
- ↑ VEGF
- ↑ VEGFR1
- ↑ CXCR4
- ↑ MMP-9
- ↑ EST2
- ↑ CXCL8

Inflammatory ('M1') tumor supressing
- ↑ MHCII
- ↑ iNOS
- ↑ TNFα
- ↑ CD80/86
- ↑ IL-12
- ↑ IL-6
- ↓ IL-10



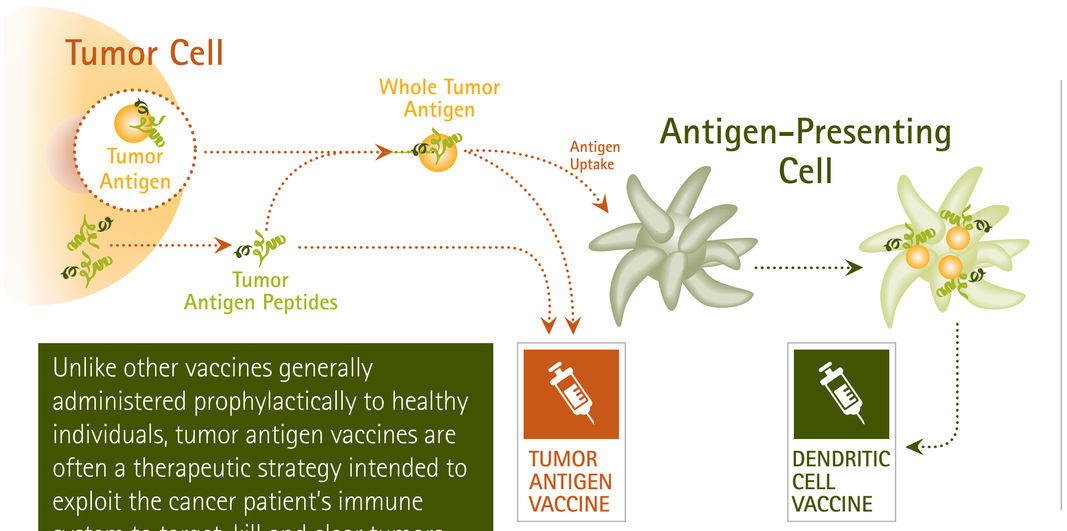
Tumor-associated neutrophil (TAN)

Protumorigenic ('N2')
- ↑ Arginase

Angiogenic/invasive
- ↑ HGF
- ↑ VEGF
- ↑ Bv8
- ↑ MMP-9

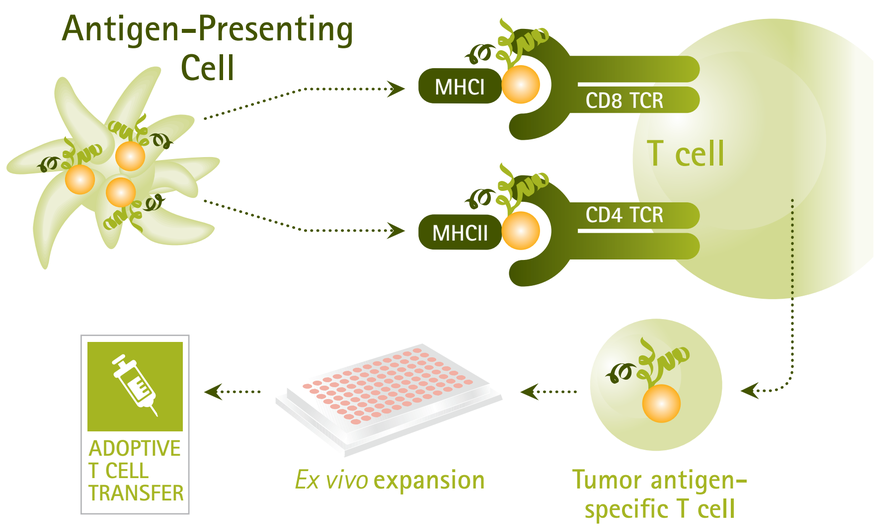
Antitumorigenic ('N1')
- ↑ CCL3
- ↑ CXCL9
- ↑ CXCL10
- ↑ TNF-α

Tumor Antigen Vaccines



Unlike other vaccines generally administered prophylactically to healthy individuals, tumor antigen vaccines are often a therapeutic strategy intended to exploit the cancer patient's immune system to target, kill and clear tumors.

T cell Transfer



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