Cancer Immunoediting

BioLegend®

The 3 E's of Cancer Immunoediting

Elimination (Cancer Immunosurveillance)

Cancer Recognition/Elimination

Rae 1 (Mouse) MICA/B (Human)
NKG2D
TCR
??
γ δ T Cell
Dendritic Cell
NK Cell
NKT Cell
CD4+ T Cell
γ δ T Cell
CD8+ T Cell
M1 Macrophage
Proliferating Cancer Cells
IFN-γ
TNF-α (Cytostatic)
Angiogenesis
Th1
IL-12
IFN-γ IL-2
CD4+ T Cell Differentiation
Th2
IL-4 IL-5 IL-6 IL-10 IL-13
Tumor Infiltrating B Cell
Tumor-Reactive Antibodies (β-actin, HSP, Cytokeratin)
Effector Cell (NK Cell, Monocyte, Macrophage)
Oxidative Burst Release of IL-1, TNF-α, Cytotoxicity
FcR
ADCC
Killing
Opsonization, Complement, ADCC
Killing
Tumor Antigen
TRAIL
TRAILR
IFN-γ
IFN-γR
IL-12R
IL-12
NKT Cell
TCR
CD1d
Fas
FasL
Partial Tumor Destruction
Dendritic Cell
Phagocytosis
CD8α+ Dendritic Cell
Polyploid Tumor Cell
Other "Eat Me" Signals
Calreticulin
LDL Receptor related protein
CD36L
CD36
αvβ5L
αvβ5
NKG2DLs
NKG2D
Dendritic Cell
Tumor Antigen Presentation
Tumor Antigen Cross-Presentation
Dendritic Cell
MHCII
MHCI
TCR
TCR
CD4+ T-Cell
CD28
CD8+ Effector T Cell
CD137
OX40
GITR
Help
IFN-γ
CD8+ T Cell
Granulocyte
Perforin Granzyme
Killing
TRAIL
FasL
TRAILR
Fas
NOS ROS IL-1 TNF-α
M1 Macrophage
Tumor Destruction (Host Protection)

Immunotherapy

Cancer Therapies
Adaptive T Cell Transfer
Monoclonal Antibodies
Antibody Drug Conjugates
DCs/Peptide Vaccines
CD8+ T Cell
IL-12
IFN-γ
Dendritic Cell
CD4+ T Cell

Immunoediting

Necrotic Tumor
Dormant Tumor Cell
PDL1 (Molecular Shield)
PD-1
PDL1
B7-1
CTLA-4
B7-1
T Effector Apoptosis
Genetic Instability and /or Immune Selection
Effector Cell Elimination, Anergy, Apoptosis
Antigen Presentation
HSP-Peptide Complex
Immunosuppression
CD91
Macrophage, Dendritic Cell Engulfing HSP-Peptide Complex Via CD91

Equilibrium (Cancer Persistence)

CD8+ T Cell
IFN-γ
Immunosuppression
PDL1
B7-1
Immune Exhaustion or Inhibition
Tumor-Cell Variants
Genetic and Epigenetic Changes
Resistance to Immune Detection
Tumor Maintained Chronically

Immune Editors
IFN-α/β
IFN-γ
IL-12
TNF-α
Perforin
TRAIL
Chemokines

Carcinogens
Inherited Defects
Radiation
Viruses
Chronic Inflammation

Normal Cell
Danger Signals
Uric Acid
ECM Products
Heat Shock Proteins
Type 1 IFNs
Tumor Cell
Normal Cell

Escape (Cancer Progression: Poorly Immunogenic Tumors)

MHC Class I Molecule
IFN-γ Response
CCL27 (Cutaneous Tumors)
CD80
PDL1

MDSC
Galectin
CD8+ T Cell
Treg
IDO
Tumor-Derived Soluble Factors
NK Cell
CD8+ T Cell
Fas Ligand
Apoptosis of Tumor-Specific Effectors
Soluble PDL1
Impair T Cell Effectors
HLA-G,E
Impair NK, CD8 T Cell Response
CD39
ATP
CD73
AMP
Adenosine
Adenosine Receptor
Enhanced Treg Activity
Immunosuppression

Shedding of Tumor Recognition Antigens

Epigenetic Silencing
Loss of IFN-γR Signaling
Soluble CD83
MICA/B
VEGF, M-CSF, IL-1β, IL-6
Impair NK, CD8+ T Cell, γ/δ T Cell Response
Reduce T Cell Proliferation
Tumor Sculpting
Angiogenesis

Tregs in Tumor Escape Checkpoints

Adenosine Receptor
IDO
CCL22
FOXP3
CD4+ CD25+ CTLA4+ GITR+
Treg
IL-13 TGF-β
VEGF LXR-L
APC
pSTAT3
IDO SOCS1 Arginase
Gangliosides
Galectin1 9
PGE2
IL-10
TGF-β
Antigen Uptake
Macrophage, Dendritic Cell (Tolerogenic)
GM-CSF CSF-1 IL-6 VEGF
COX2 PGE2
MDSC
Tumor Cell
VISTA
MDSC
M2 Macrophage
Arg1 NOS2 NO RNOS
IL-4 IL-13
Arg1 IL-4 IL-10 IL-13 TGF-β
T Cell Deletion or Anergy, Apoptosis
IL-12 MHC CD80 CD86
IL-10 TGF-β
Effector T Cell
APC Dysfunction/ T-Cell Anergy
pDC
CD80 CD86
IDO
Tryptophan
APC
CD80/CD86
CTLA4
Treg
IDO
Metabolized Tryptophan
T Cell Apoptosis and Anergy
IL-10 TGF-β IDO COX2 PGE2 Immunosuppressive Molecule
CD4+ CD25 T Cell
Th3 /Tr1
CD8+ Treg
T Effector
Immunosuppression
Treg
Tumor Escape
Tumor Microenvironment
Tumor-Derived Factors IL-6 VEGF M-CSF IL-1β PGE2
MDSC-Induced Immunosuppression
Immature DC
CCL2 CCL12 CXCL5 (Tumor Derived)
MDSC
Recruitment
T Cell Deletion or Anergy, Apoptosis
NOS2 NO RNOS
Arg1 R-NOS L-Arginine
Lymph Nodes
IL-4 IL-13 GM-CSF TGF-β
Recruitment
MDSC
NOS2 ROS RNOS Arg1
MDSC
Dendritic Cell
TGF-β IL-10
Release of MDSC into Peripheral Blood
MDSC Maturation
HPC
CMP
MDSC
Bone Marrow
Differentiation
iDC (Immature DC)
pDC (Plasmacytoid DC)
IL-2 IL-10 IFN-α
pSTAT3 FOXP3
Treg
IL-4 IL-13 GM-CSF
Immunosuppression

Dendritic Cell: CD11b CD11c CD80 CD83 CD86 CD205 CD209 CD273 MHC Class II
Natural Killer Cell: CD49b CD56 CD122 CD314 (NKG2D) CD335 (NKp46)
Th1 Cell: CD4 CD183 Tim-3 T-bet
Th2 Cell: CD4 CD193 CD194 CD294 Tim-1
Treg Cell: CD4 CD25 FOXP3 $CD127^{low}$ *Activation:* GARP LAP (TGF-β)
MDSC: *Human:* CD33 CD11b $CD14^{neg}$ *Mouse:* CD11b GR-1

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Interactive Poster: biolegend.com/cancerimmunoediting

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Immunosuppression
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