**Immune Checkpoint Blockade**

Investigate co-stimulatory and co-inhibitory molecules with high-quality, multi-application validated antibodies. Co-inhibitory and co-stimulatory molecules play a critical role in T cell activation and tumor cell recognition and killing. Along with MHC/TCR engagement, co-signaling molecules direct the outcome of T cell activation. In the context of cancer, tumor cells exploit the upregulation of co-inhibitory molecules to promote their own survival and avoid immune recognition.

<table>
<thead>
<tr>
<th>T cell</th>
<th>APC</th>
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<tbody>
<tr>
<td>OX40</td>
<td>OX40L</td>
</tr>
<tr>
<td>CD27</td>
<td>CD27L</td>
</tr>
<tr>
<td>CD137</td>
<td>CD137L</td>
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<tr>
<td>CD28</td>
<td>CD80/CD86</td>
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<tr>
<td>TCR</td>
<td>MHC</td>
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<tr>
<td>CTLA-4</td>
<td>CD80/CD86</td>
</tr>
<tr>
<td>PD1</td>
<td>PD-L1/PD-L2</td>
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<tr>
<td>CD80</td>
<td>PD-L1</td>
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<tr>
<td>TIM3</td>
<td>GAL9</td>
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</tbody>
</table>

**Costimulatory**

**Coinhibitory**

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**STING Pathway**

Interrogate the STING Pathway by Western blot, IHC, or Flow. STING (Stimulator of Interferon Genes) is a detector of intracellular viral molecules and double stranded DNA. Activation of STING triggers phosphorylation of downstream NAK/TBK1 and IRF3 to activate immunity and a type I interferon response. The ability of STING agonists to activate a potent anti-tumor immune response has driven increased interest in the pathway for cancer immunotherapy.

**STING Antibody**

NBP2-24683

IHC: STING staining of human breast tumor.

**IRF3 Antibody (2G3)**

NBP1-47812

IHC: IRF3 staining of adenosarcoma of colon tissue.

**PD-L1 Antibody**

MAB1561

IHC: PD-L1 staining of human colon cancer.

(2 Publications)

**LAG-3 Antibody**

NBP1-97657

IHC: LAG-3 staining in resting and PHA activated lymphocytes.

(9 Publications)

**IRF3 Antibody (2G3)**

NBP1-47812

IHC: IRF3 staining of human breast tumor.

(12 Publications)

**PD-1 Antibody**

AF1086

IHC: PD-1 staining of human lymph node.

(10 Publications)

**RelA/NFkB p65 Antibody**

NB100-2176

IHC: RelA staining of human DLBCL showing nuclear expression in the tumor cells.

(19 Publications)

**VISTA/PD-1H Antibody**

NBP1-88967

IHC: VISTA staining of human tonsil.

**NAK/TBK1 Antibody**

NB100-56705

IHC: NAK/TBK1 on human testis.

(12 Publications)

**PD-L1 Antibody**

MAB1561

IHC: PD-L1 staining of human breast tumor.

(12 Publications)

**LAG-3 Antibody**

NBP1-97657

IHC: LAG-3 staining in resting and PHA activated lymphocytes.

(9 Publications)

**IRF3 Antibody (2G3)**

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**RelA/NFkB p65 Antibody**

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IHC: RelA staining of human DLBCL showing nuclear expression in the tumor cells.

(19 Publications)
Purinergic Signaling

Quantify ATP levels and Probe Purinergic Signaling.
Similar to inhibitory members of the B7 family, adenosine signaling dampens anti-tumor immunity. The purine nucleotide, ATP, is converted by extracellular receptors to adenosine. This molecule signals through G-protein coupled receptors, including the A2A receptor, to mediate immunosuppressive responses. It has been demonstrated that adenosine receptor blockade enhances anti-tumor immunity. Because of its potential to regulate immunity, adenosine signaling is considered next generation immune checkpoint blockade.

Myeloid Cell Biology and The Tumor Microenvironment

Understand the tumor microenvironment and myeloid cell biology with Novus antibodies.
Suppressive myeloid cells in the tumor microenvironment inhibit anti-tumor immunity. By secreting suppressive and angiogenic molecules, tumor-associated macrophages and myeloid-derived suppressor cells promote tumor growth and survival. Understanding myeloid cell biology is key to developing improved immunotherapies.

**Monocytic**

**Mouse monocytic:** CD11b+ Gr-1/Ly-6Glo Ly-6Cint
**Human monocytic:** Lin- CD14+ CD15- CD66b- HLA-DR-

**Granulocytic**

**Mouse granulocytic:** CD11b+ Gr-1/Ly-6Ghi Ly-6Cint
**Human granulocytic:** Lin- CD11b+ CD14+ CD15+ CD66b+ HLA-DR-

Stimulatory vs. Suppressive Myeloid Cells

**Stimulatory**

- IL-12hi IL-10lo
- ROS
- RNI

**Suppressive**

- IL-12lo IL-10hi
- TGF-B
- Arginase

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**Adenosine A2a Receptor Antibody**

**NB300-597**

ICC/IF: Adenosine A2a receptor antibody staining in the cytoplasm of U251 cells.

(1 Publication)

**CD39 Antibody**

**NBP1-90071**

ICC/IF: CD39 antibody staining in human aortic valve endothelial cells.

(4 Publications)

**CD11b Antibody**

**NB110-40766**

Flow: Detection of CD11 b/c in fixed Hela cells.

(16 Publications)

**CD11b Antibody**

**NB100-40766**

Flow: HLA-DR expression in BDCM cells.

(26 Publications)

**CD73 Antibody**

**NBP1-85740**

IHC: CD73 staining of human endometrium.

(5 Publications)

**HIF-1 alpha Antibody**

**NB100-105**

WB: HIF-1 alpha analysis of COS-7 nuclear extracts.

(666 Publications)

**CD68 Antibody**

**NB100-683**

IHC staining of CD68 in human spleen.

(33 Publications)

**iNOS Antibody**

**NB300-605**

WB: iNOS staining in stimulated astrocytes.

(20 Publications)