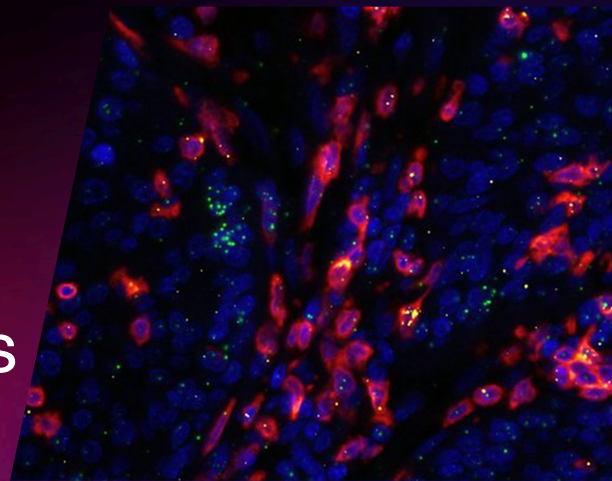


Pushing Spatial Boundaries for Cytokine Detection



Why RNAscope™ for cytokine detection

Cytokines and chemokines are secreted mediators for inflammatory/immune responses that govern cell-to-cell communication in response to disease, infection or injury.

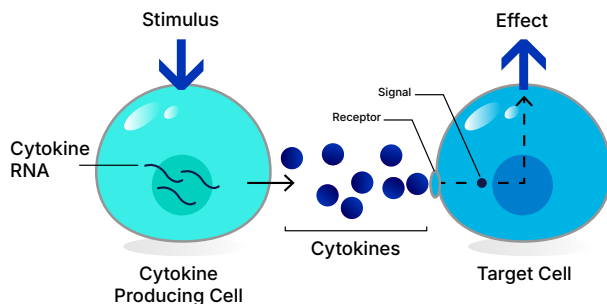
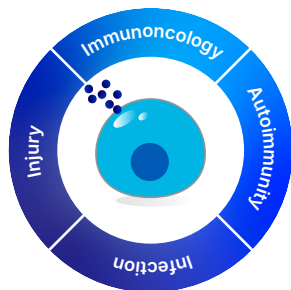


Figure 1: Mechanism of cytokine action.

Highlights

- Cytokine detection can be very challenging for spatial analysis due to lack of good antibodies and the secretory nature of these proteins.
- RNAscope™ ISH assays can enable spatial detection of cytokine/chemokine RNAs thereby identifying the cellular source for these secreted factors.



Applications for spatial visualization and assessment of cytokines using the RNAscope technology.

- Identify activation states of immune cells.
- Establish the function of immune cell subtypes.
- Measure pro-inflammatory /anti-inflammatory signatures.

Key cytokines implicated in healthy and disease tissue.

Pro-Inflammatory Cytokines	Chemokines	Chemokine Receptors	Anti-Inflammatory Cytokines	T Cell/B Cell Recruitment Chemokines	T Cell Activation
<i>IL1B</i>	<i>CCL22</i>	<i>CXCR3</i>	<i>IL10</i>	<i>CXCL13</i>	<i>IFNG</i>
<i>IL6</i>	<i>CCL18</i>	<i>CXCR4</i>	<i>IL12</i>	<i>CXCL9</i>	<i>GZMB</i>
<i>IL8</i>	<i>CCL5</i>	<i>CXCR2</i>	<i>IL122</i>	<i>CXCL10</i>	<i>TNFA</i>
<i>IL17</i>	<i>CCL4</i>	<i>CCR5</i>	<i>IL4</i>	<i>CXCL12</i>	
<i>IL18</i>	<i>CCL2</i>				
<i>TNFA</i>					
<i>TGFB</i>					

Profile Key Inflammatory Markers

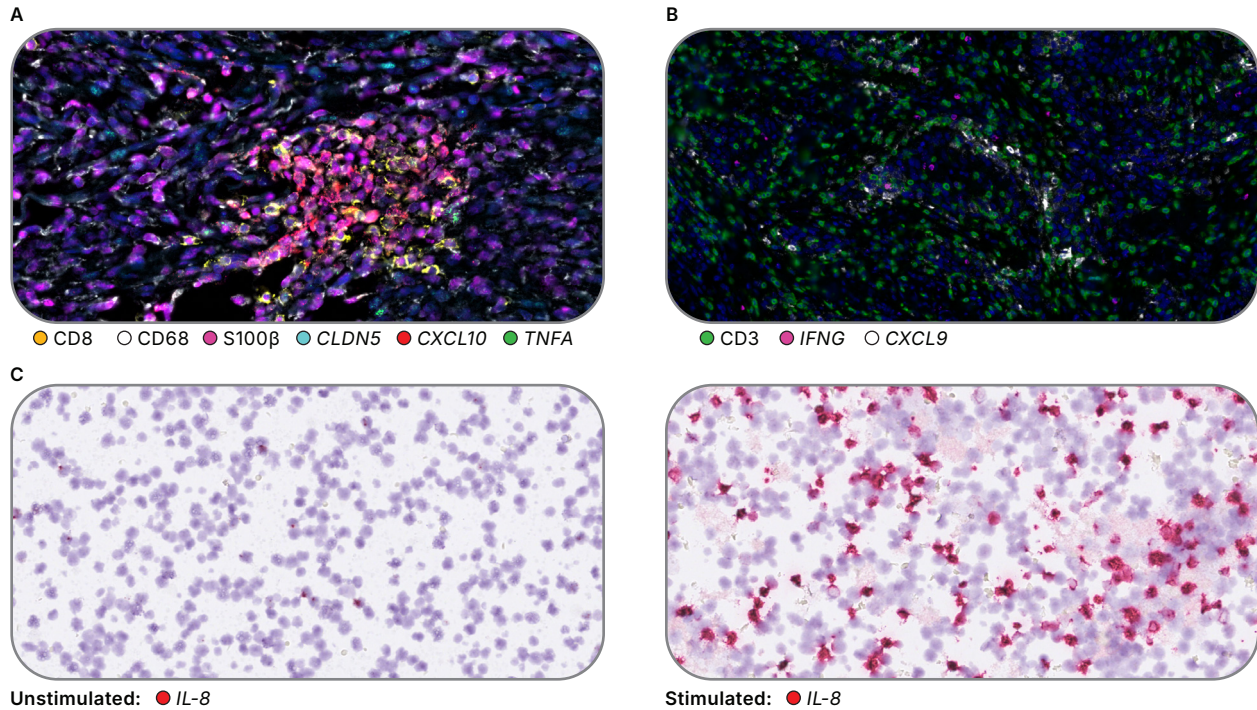


Figure 2: Detecting immune cells and secreted cytokines using multiplex assays. A. RNAscope Multiomic LS assay for evaluating neuroinflammation in mouse brain tissue. Cytokine expression for *TNFA* and *CXCL10*, and was evaluated using RNA as was epithelial marker *CLDN5* while cell marker proteins S100B, CD68 and CD8 were used to visualize glial cells, macrophages and T cells, respectively B. RNAscope Multiplex V2 assay for studying Cytotoxic T lymphocytes in cervical cancer tissue. T cells were identified using protein marker CD3 while cytokine markers *IFNG* and *CXCL9* were detected using RNA. C. RNAscope cytokine probe specificity indicated by strong *IL-8* positive staining in stimulated PBMCs compared to unstimulated PBMCs.

Visualize any Cytokine

Use pre-designed probes from our catalog or design a new probe for your cytokine study.

Cytokines, Chemokines and Growth factors											
<i>BDNF</i>	<i>CCL22</i>	<i>CCL8</i>	<i>CXCL12</i>	<i>FGF2</i>	<i>IFNG</i>	<i>IL23A</i>	<i>IL17A</i>	<i>IL34</i>	<i>MMP1</i>	<i>THPO</i>	<i>TSLP</i>
<i>CCL1</i>	<i>CCL23</i>	<i>CD274</i>	<i>CXCL13</i>	<i>FLT3LG</i>	<i>IFNL1</i>	<i>IL24</i>	<i>IL17F</i>	<i>IL4</i>	<i>NGF</i>	<i>TNF</i>	<i>VEGFA</i>
<i>CCL11</i>	<i>CCL24</i>	<i>CD40LG</i>	<i>CXCL2</i>	<i>GZMA</i>	<i>IFNL2</i>	<i>IL25</i>	<i>IL18</i>	<i>IL5</i>	<i>PDGFA</i>	<i>TNFRSF1B</i>	<i>VEGFD</i>
<i>CCL13</i>	<i>CCL25</i>	<i>CSF1</i>	<i>CXCL5</i>	<i>GZMB</i>	<i>IFNW1</i>	<i>IL217</i>	<i>IL1A</i>	<i>IL6</i>	<i>PDGFB</i>	<i>TNFRSF8</i>	
<i>CCL15</i>	<i>CCL26</i>	<i>CSF2</i>	<i>CXCL6</i>	<i>HGF</i>	<i>IL10</i>	<i>IL2RA</i>	<i>IL1B</i>	<i>IL7</i>	<i>PGF</i>	<i>TNFRSF9</i>	
<i>CCL17</i>	<i>CCL27</i>	<i>CSF3</i>	<i>CXCL8</i>	<i>HMGB1</i>	<i>IL11</i>	<i>IL12A</i>	<i>IL1RN</i>	<i>IL9</i>	<i>PRF1</i>	<i>TNFSF10</i>	
<i>CCL19</i>	<i>CCL3</i>	<i>CX3CL1</i>	<i>CXCL9</i>	<i>ICAM1</i>	<i>IL2</i>	<i>IL12B</i>	<i>IL3</i>	<i>KITLG</i>	<i>PTX3</i>	<i>TNFSF12</i>	
<i>CCL2</i>	<i>CCL4</i>	<i>CXCL1</i>	<i>EGF</i>	<i>IFNA1</i>	<i>IL20</i>	<i>IL13</i>	<i>IL31</i>	<i>LIF</i>	<i>SERPINE1</i>	<i>TNFSF13</i>	
<i>CCL20</i>	<i>CCL5</i>	<i>CXCL10</i>	<i>FAS</i>	<i>IFNA2</i>	<i>IL21</i>	<i>IL15</i>	<i>IL32</i>	<i>LTA</i>	<i>TGFA</i>	<i>TNFSF13B</i>	
<i>CCL21</i>	<i>CCL7</i>	<i>CXCL11</i>	<i>FASLG</i>	<i>IFNB1</i>	<i>IL22</i>	<i>IL16</i>	<i>IL33</i>	<i>MIF</i>	<i>TGFB1</i>	<i>TREM1</i>	

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