nCounter® Metabolic Pathways Panel
Gene Expression Panel
Cancer Metabolism • Immunometabolism • Metabolic Disease

Quantify the expression of hundreds of genes involved in core metabolic processes and signaling pathways in the context of cancer and immunity. The underlying molecular mechanisms behind alterations in metabolic pathways, signaling pathways, and cell stress can now be fully elucidated, giving researchers a complementary tool to traditional metabolite assays for profiling metabolic checkpoints and discovering potential therapeutic targets.

Product Highlights
• Profile 768 genes in human and mouse across 34 annotated pathways involved in five important themes for metabolism research
  • Biosynthesis and Anabolic Pathways
  • Nutrient Capture and Catabolic Pathways
  • Cell Stress
  • Metabolic Signaling
  • Transcriptional Regulation
• Understand mechanisms of metabolic adaptation, metabolic switching and metabolic alterations
• Study changes in mitochondrial respiration and glycolysis
• Quantify the presence and relative abundance of 14 different immune cell types for immunometabolism studies
• Advance efforts towards novel therapeutic target

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Targets</td>
<td>768 (Human), 768 (Mouse), including internal reference genes</td>
</tr>
<tr>
<td>Standard Input Material</td>
<td>25 ng–300 ng</td>
</tr>
<tr>
<td>Sample Material - Low Input</td>
<td>As little as 1 ng with nCounter RNA Low Input Kit (sold separately)</td>
</tr>
<tr>
<td>Sample Type(s)</td>
<td>Cultured cells/cell lysates, sorted cells, FFPE-derived RNA, total RNA, fragmented RNA, PBMCs, and whole blood/plasma</td>
</tr>
<tr>
<td>Customizable</td>
<td>Add up to 55 unique genes with Panel Plus</td>
</tr>
<tr>
<td>Time to Results</td>
<td>Approximately 24 hours</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>nSolver™ Analysis Software (RUO) and the ROSALIND® Platform</td>
</tr>
</tbody>
</table>
Key Applications with the nCounter Metabolic Pathways Panel

**Cancer Metabolism**

How does cancer impact normal metabolic function?

- Study key pathways involved in reprogrammed metabolism
- Identify metabolic changes that can be exploited for therapeutic development

**Immunometabolism**

How does the immune response change as a result of alterations in metabolism?

- Profile immune cell types
- Link pathway activity to immune phenotype

**Metabolic Disease**

How is metabolism altered in disease?

- Understanding disease pathogenesis
- Identify potential therapeutic targets

### Theme

<table>
<thead>
<tr>
<th>Description</th>
<th>Pathways</th>
<th>Number of Human Genes</th>
<th>Number of Mouse Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biosynthesis and Anabolic Pathways</strong></td>
<td>Amino Acid Synthesis, Arginine Metabolism, Cell Cycle, Fatty Acid Synthesis, Glutamine Metabolism, Glycolysis, IDH1/2 Activity, Mitochondrial Respiration, Nucleotide Synthesis, Pentose Phosphate Pathway, Tryptophan/Kynurenine Metabolism</td>
<td>354</td>
<td>348</td>
</tr>
<tr>
<td><strong>Cell Stress</strong></td>
<td>DNA Damage Repair, Hypoxia, KEAP1/NRF2 Pathway, Reactive Oxygen Response</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td><strong>Nutrient Capture and Catabolic Pathways</strong></td>
<td>Amino Acid Transporters, Autophagy, Endocytosis, Fatty Acid Oxidation, Glucose Transport, Lysosomal Degradation, Nucleotide Salvage</td>
<td>161</td>
<td>159</td>
</tr>
<tr>
<td><strong>Metabolic Signaling</strong></td>
<td>AMPK, mTOR, MAPK, Myc, NF-kB, p53 Pathway, PI3K, TCR and Costimulatory Signaling, TLR Signaling</td>
<td>237</td>
<td>235</td>
</tr>
<tr>
<td><strong>Transcriptional Regulation</strong></td>
<td>Epigenetic Regulation, Transcriptional Regulation</td>
<td>77</td>
<td>69</td>
</tr>
</tbody>
</table>
Metabolic Pathways Panel Functional Annotations

Functional annotations for different pathways and processes were assigned to the genes in the Metabolic Pathways Panel. The pathways and processes that are included in this panel provide a comprehensive view of cell metabolism.

<table>
<thead>
<tr>
<th>Annotation</th>
<th>Number of Human Genes</th>
<th>Number of Mouse Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPK</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Amino Acid Synthesis</td>
<td>93</td>
<td>89</td>
</tr>
<tr>
<td>Amino Acid Transporters</td>
<td>9</td>
<td>9</td>
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<tr>
<td>Arginine Metabolism</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Autophagy</td>
<td>54</td>
<td>54</td>
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<tr>
<td>Cell Cycle</td>
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<td>65</td>
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<tr>
<td>DNA Damage Repair</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Endocytosis</td>
<td>39</td>
<td>41</td>
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<tr>
<td>Epigenetic Regulation</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Fatty Acid Oxidation</td>
<td>24</td>
<td>21</td>
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<tr>
<td>Fatty Acid Synthesis</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Glucose Transport</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Glutamine Metabolism</td>
<td>31</td>
<td>30</td>
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<tr>
<td>Glycolysis</td>
<td>40</td>
<td>37</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>IDH1/2 Activity</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>KEAP1/NRF2 Pathway</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Lysosomal Degradation</td>
<td>16</td>
<td>16</td>
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<tr>
<td>mTOR</td>
<td>57</td>
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<table>
<thead>
<tr>
<th>Annotation</th>
<th>Number of Human Genes</th>
<th>Number of Mouse Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAPK</td>
<td>52</td>
<td>52</td>
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<tr>
<td>Mitochondrial Respiration</td>
<td>73</td>
<td>72</td>
</tr>
<tr>
<td>Myc</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>NF-κB</td>
<td>27</td>
<td>27</td>
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<tr>
<td>Nucleotide Salvage</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Nucleotide Synthesis</td>
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<td>48</td>
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<tr>
<td>p53 Pathway</td>
<td>38</td>
<td>38</td>
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<tr>
<td>PI3K</td>
<td>82</td>
<td>82</td>
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<tr>
<td>Pentose Phosphate Pathway</td>
<td>19</td>
<td>19</td>
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<tr>
<td>Reactive Oxygen Response</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>TCR and Costimulatory Signaling</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>TLR Signaling</td>
<td>33</td>
<td>31</td>
</tr>
<tr>
<td>Transcriptional Regulation</td>
<td>59</td>
<td>51</td>
</tr>
<tr>
<td>Tryptophan/Kynurenine Metabolism</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Vitamin and Cofactor Metabolism</td>
<td>28</td>
<td>28</td>
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<tr>
<td>Internal Reference</td>
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</table>

Immune Cell Profiling Feature

Genes included in the Human Metabolic Pathways Panel provide unique cell profiling data to measure the relative abundance of 14 different human immune cell types. The table below summarizes each cell type represented by gene content in the panel, as qualified through biostatistical approaches and selected literature in the field of immunology.

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Associated Human Genes</th>
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<tbody>
<tr>
<td>B cells</td>
<td>9</td>
</tr>
<tr>
<td>CD45</td>
<td>1</td>
</tr>
<tr>
<td>CD8 T cells</td>
<td>2</td>
</tr>
<tr>
<td>Cytotoxic Cells</td>
<td>10</td>
</tr>
<tr>
<td>Dendritic Cells</td>
<td>3</td>
</tr>
<tr>
<td>Exhausted CD8</td>
<td>4</td>
</tr>
<tr>
<td>Macrophages</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Associated Human Genes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mast cells</td>
<td>4</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>7</td>
</tr>
<tr>
<td>NK CD56dim cells</td>
<td>4</td>
</tr>
<tr>
<td>NK Cells</td>
<td>2</td>
</tr>
<tr>
<td>T cells</td>
<td>6</td>
</tr>
<tr>
<td>Th1 Cells</td>
<td>1</td>
</tr>
<tr>
<td>Treg</td>
<td>1</td>
</tr>
</tbody>
</table>
nSolver™ Analysis Software

NanoString offers advanced software tools that address the continuous demands of data analysis and the need to get simple answers to specific biological questions easily. Genes included in the Metabolic Pathways panel are organized and linked to various advanced analysis modules to allow for efficient analysis of the 34 pathways involved in cellular metabolism.

ROSALIND® Platform

ROSALIND is a cloud-based platform that enables scientists to analyze and interpret differential gene expression data without the need for bioinformatics or programming skills. ROSALIND makes analysis of nCounter data easy, with guided modules for:

- Normalization
- Quality Control
- Individual Pathway Analysis
- Differential Expression
- Gene Set Analysis

nCounter customers can access ROSALIND at: rosalind.bio/nanostring

Ordering Information

Gene Expression Panel CodeSets arrive ready-to-use and generally ship within 24-hours following purchase.

<table>
<thead>
<tr>
<th>Product</th>
<th>Product Description</th>
<th>Quantity</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>nCounter Human Metabolic Pathways Panel</td>
<td>Includes 768 genes; 20 internal reference genes for data normalization</td>
<td>12 Reactions</td>
<td>XT-CSO-HMP1-12</td>
</tr>
<tr>
<td>nCounter Mouse Metabolic Pathways Panel</td>
<td>Includes 768 genes; 20 internal reference genes for data normalization</td>
<td>12 Reactions</td>
<td>XT-CSO-MMPI-12</td>
</tr>
<tr>
<td>nCounter Analysis System Master Kit Reagents and Cartridges</td>
<td>Reagents, cartridges, and consumables necessary for sample processing on the nCounter Analysis System</td>
<td>12 Reactions</td>
<td>NAA-AKIT-012</td>
</tr>
<tr>
<td>nCounter SPRINT Cartridge 1 Cartridge, 12 lanes</td>
<td>Sample Cartridge for nCounter SPRINT System</td>
<td>12 Reactions</td>
<td>SPRINT-CAR-1.0</td>
</tr>
<tr>
<td>nCounter SPRINT Reagent Pack</td>
<td>nCounter SPRINT Reagent Pack containing Reagents A, B, C, and Hybridization Buffer</td>
<td>192 Reactions</td>
<td>SPRINT-REAG-KIT</td>
</tr>
</tbody>
</table>

Selected Panel References


For more information, please visit nanostring.com/metabolic-pathways