

INTRODUCING THE METABOLISM SPIKE-IN MODULE FOR IO60

Designed for PhenoCycler®-Fusion

Whether you are exploring tumor metabolism, immune cell energetics, or metabolic-immune interactions within the tumor microenvironment, the Metabolism Spike-In Module for IO60 enables you to spatially resolve core energy pathways that drive cellular function and immune regulation.

KEY FEATURES

- Expanded Metabolic Profiling – Extend the IO60 panel with 9 key biomarkers covering glycolysis, oxidative phosphorylation, and amino acid metabolism to map metabolic states across diverse cell populations.
- Mechanistic Insight into the Tumor Microenvironment – Visualize how metabolic reprogramming shapes immune activation, nutrient competition, and redox balance within distinct spatial niches.
- Optimized for PhenoCycler®-Fusion Workflows – Fully compatible with the PhenoCode™ IO60 Panel to deliver rapid, ultrahigh-plex spatial analysis in a single streamlined assay.

WHY CHOOSE THE METABOLISM SPIKE-IN MODULE FOR IO60?



INTEGRATED

Works seamlessly within the IO60 workflow for unified immune and metabolic phenotyping



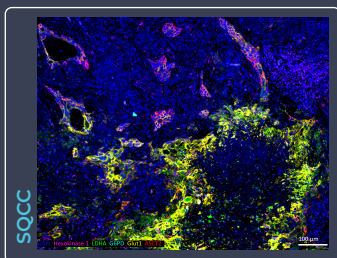
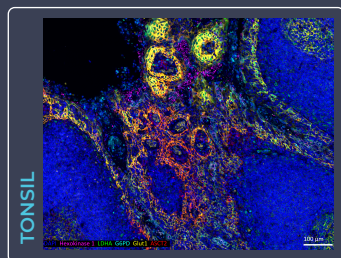
FULLY-OPTIMIZED

Ready-to-use spike-in module for easy implementation



SCALABLE

Expand the coverage with IO60 or add custom targets of your choice



The Metabolism Spike-In Module for IO60 reveals how metabolic programs shape immune and tumor cell function in tissue.

In human tonsil, glycolytic and amino acid markers highlight immune activation, while in squamous cell carcinoma (sqcc), they expose tumor metabolic reprogramming.

WHY CHOOSE THE METABOLISM SPIKE-IN MODULE FOR IO60?

Marker	Primary Function	Why It Matters
ASCT2	Transports glutamine to fuel anabolic metabolism	Reveals glutamine dependency in tumors and immune activation zones
ATP5A	Drives mitochondrial ATP synthesis	Indicates oxidative metabolism and mitochondrial activity
CS	Initiates the TCA cycle; marker of mitochondrial fitness	Highlights regions of high energy demand or metabolic integrity
G6PD	Generates NADPH for antioxidant defense	Identifies redox regulation and biosynthetic activity in proliferating cells
GLUT1	Imports glucose for glycolytic energy production	Maps hypoxic, glycolytic niches within the tumor microenvironment
HK1	Catalyzes the first step of glycolysis	Marks cells with high glycolytic flux and metabolic reprogramming
IDH2	Produces α -ketoglutarate and supports redox balance	Links mitochondrial metabolism to epigenetic and redox control
LDHA	Converts pyruvate to lactate under low oxygen	Detects immunosuppressive, lactate-rich tumor regions
SDHA	Links the TCA cycle to the electron transport chain	Reflects mitochondrial respiration and metabolic competence