

CASY^{VIVO} Cell Counter & Analyzer - Powering Breakthroughs in Cell Research

Quantifying Critical Cell Volume Dynamics: A Key to T-cell Activation

O'May et al. (2025). WNK1-dependent water influx is required for CD4+ T cell activation; **Nature Communications**, 16:1857. DOI: 10.1038/s41467-025-56123-y.

Immunology; T-cell; T-cell activation	
Index	IM3
Standardization	
Counting	X
Viability	
Volume	X

The Challenge:

Researchers aimed to understand the fundamental role of WNK1 kinase in CD4+ T-cell activation, specifically focusing on the subtle, but crucial, cell volume changes driven by ion and water influx. Quantifying these small volume changes precisely was essential.

CASY's Contribution:

The CASY system provided the exact, quantitative cell size and concentration measurements needed to precisely track and quantify these subtle T-cell volume changes. CASY clearly demonstrated that T-cells swell upon activation and that WNK1 inhibition leads to smaller, blunted-swelling T-cells, directly supporting the hypothesized mechanism of WNK1-driven osmotic water influx.

Key Benefits to Researchers:

- **Precise Volume Quantitation:** Obtain exact, quantitative measurements of subtle cell volume changes, crucial for understanding complex cellular mechanisms.
- **Mechanistic Validation:** Directly support and validate hypotheses about ion and water influx, providing strong evidence for biological pathways.
- **Key Phenotypic Link:** Establish cell volume change as a vital indicator of pathway activity, offering new insights into cell activation processes.
- **Elevate Immunology Research:** Leverage CASY's precision, reliability, and efficiency to unlock new insights into cellular mechanisms and drive discoveries forward.

