



Gianna Slusher

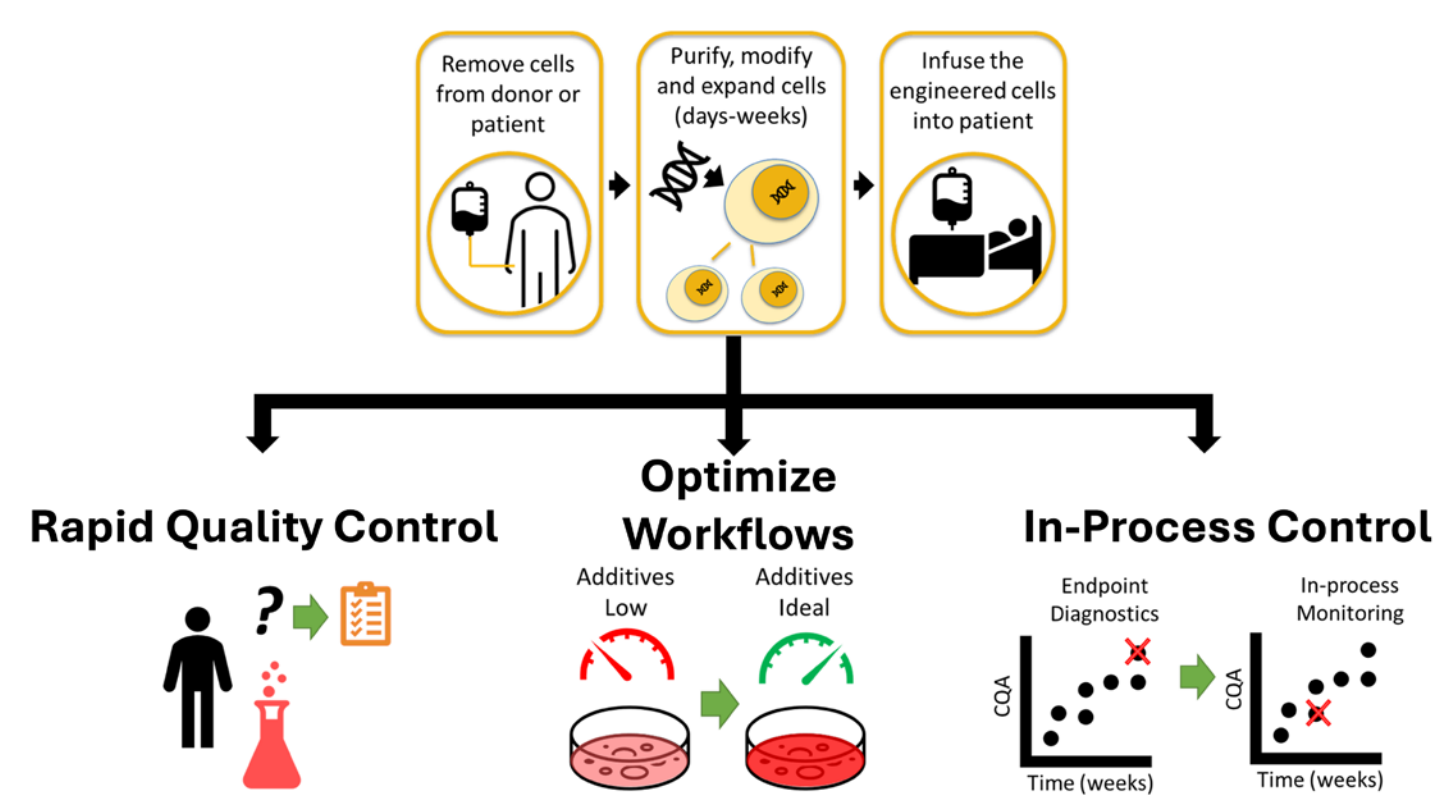
Swenson/ARCS Atlanta Award
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Advancing Cell-Based Therapies with Rapid Intracellular Metabolite Analysis and Precise Exosome Isolation

The complexity of cell-based therapies highlight limitations of existing process analytical technologies. Our motivation and objective is to develop and apply a new process analytical technology to increase therapeutic potency, improve product yield, and reduce treatment cost.

Cell-Based Therapy Manufacturing and Monitoring



Rapid Processing/Analysis of Intra + Extracellular Biochemicals

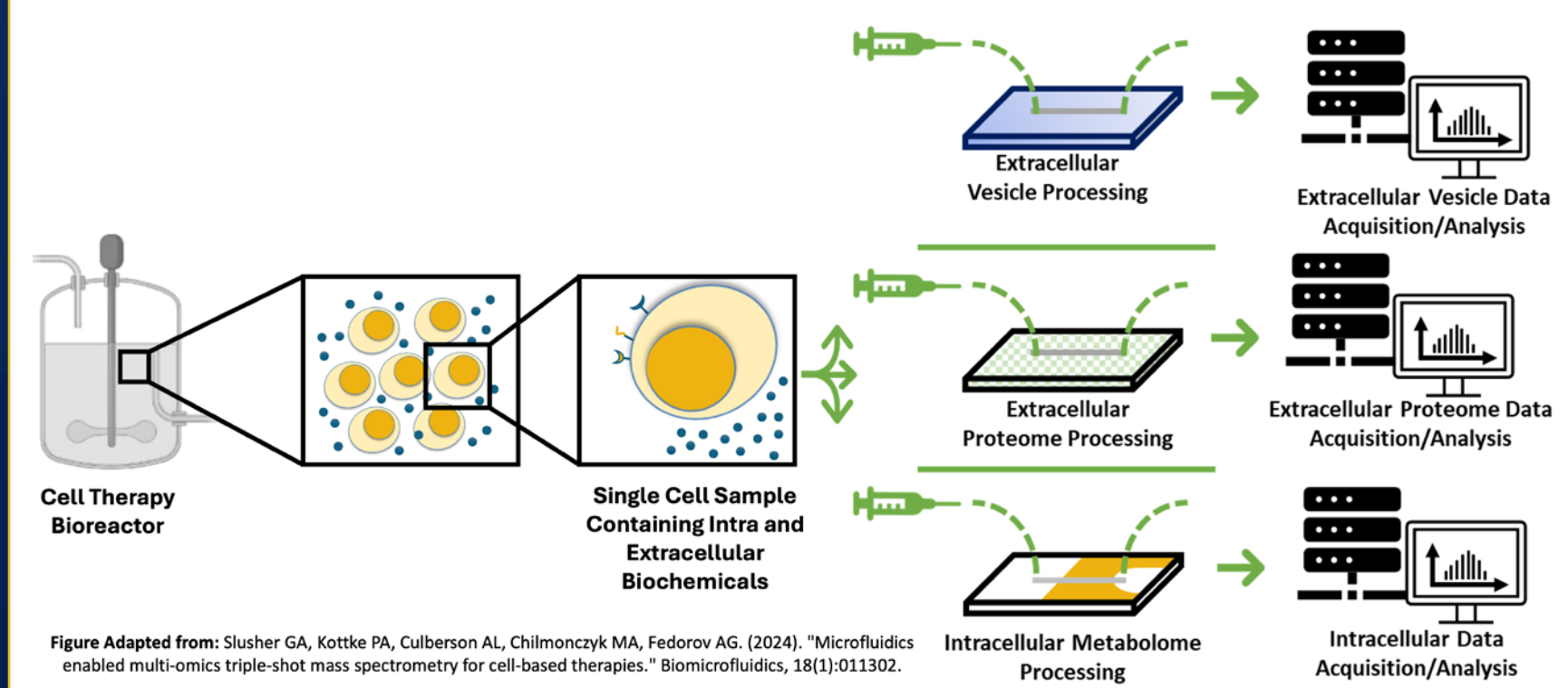


Figure Adapted from: Slusher GA, Kottke PA, Culberson AL, Chilmanczyk MA, Fedorov AG. (2024). "Microfluidics enabled multi-omics triple-shot mass spectrometry for cell-based therapies." *Biomicrofluidics*, 18(1):011302.

Intracellular Metabolome Processing Device

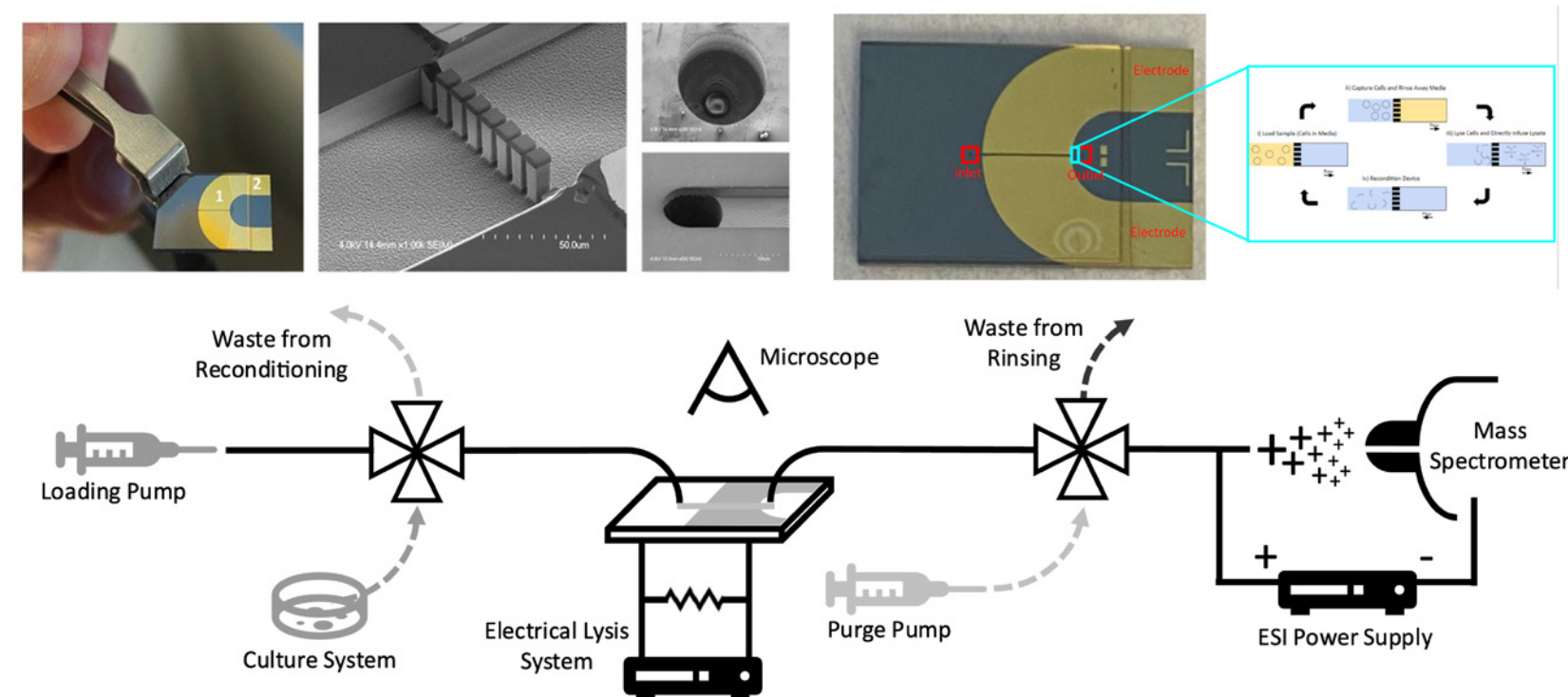
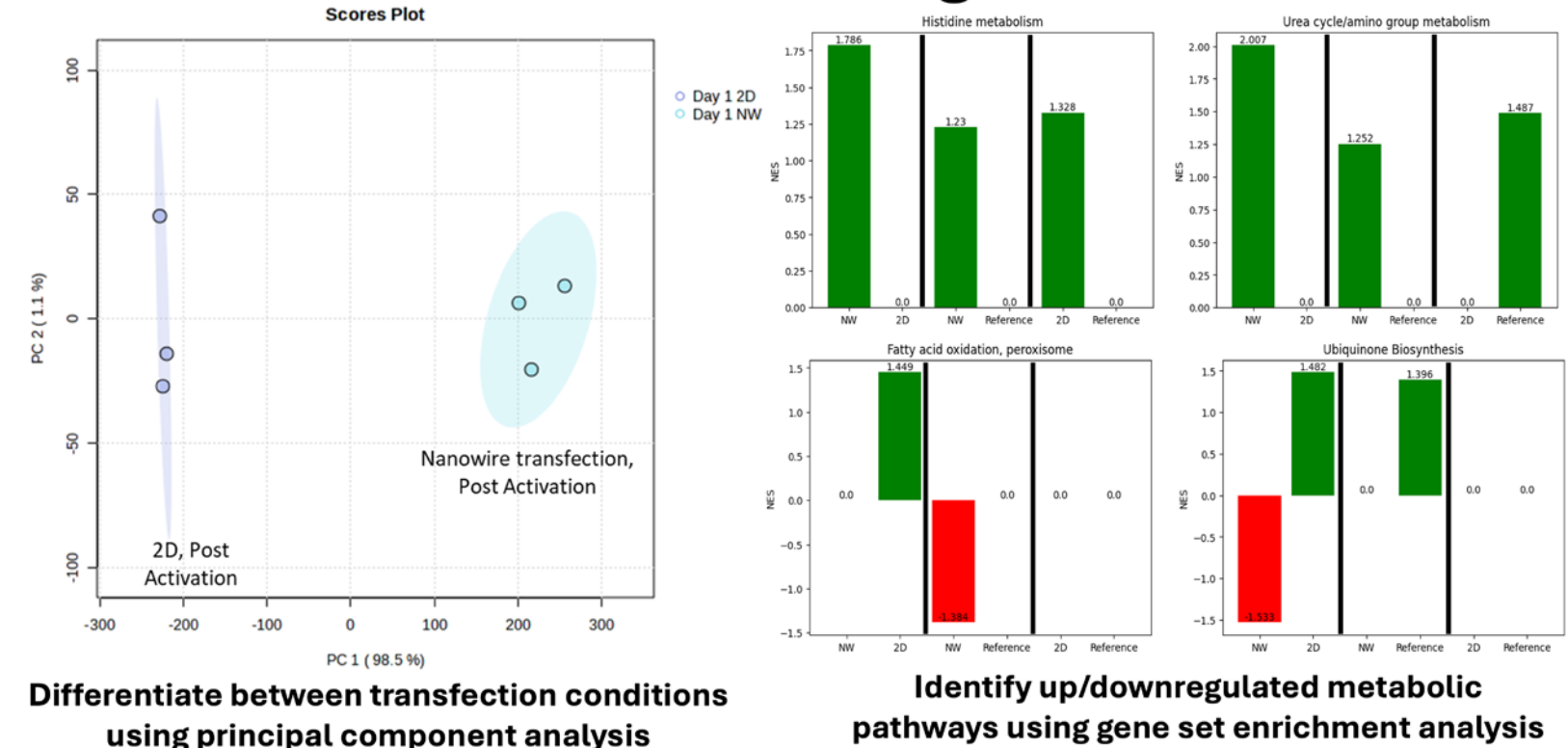


Figure Adapted from: Culberson AL, et al. (2021). "Sample-to-analysis platform for rapid intracellular mass spectrometry from small numbers of cells." *Lab on a Chip*, 21(23): 4696-4706.

Intracellular Metabolome Monitoring Improves Process and Understanding of Transfection



Differentiate between transfection conditions using principal component analysis

Identify up/downregulated metabolic pathways using gene set enrichment analysis

Exosomes

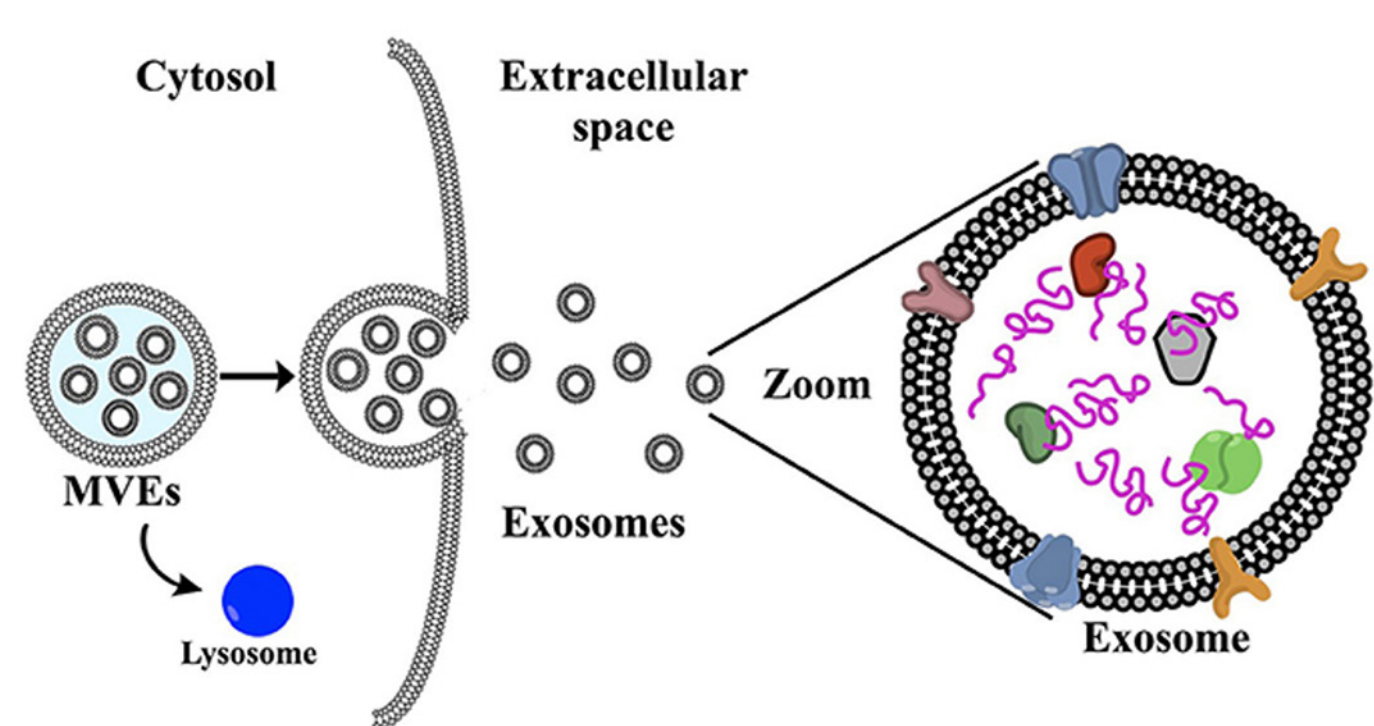


Figure source: de la Torre Gomez C, Goreham RV, Bech Serra JJ, Nann T, Kussmann M. (2018). "Exosomes—A Review of Biophysics, Biology and Biochemistry of Exosomes With a Focus on Human Breast Milk." *Frontiers in Genetics*, 9:92.

Precise Exosome Isolation, Sorting, and Analysis

