

Mitochondrial transporters and the control of cellular metabolism

By Dr. Nora Kory

Abstract:

Humans encounter over 200,000 metabolites through diet and modern living. Intricate mechanisms of cellular compartmentalization enable organisms to orchestrate such metabolic complexity. We explore how organelles control key metabolite concentrations and establish dynamic cellular environments, with a focus on solute carriers and other transport proteins.

One major research direction in our lab aims to define the functions of compartmentalization in metabolic regulation, particularly concerning nicotinamide adenine dinucleotide (NAD). Decreased NAD levels with aging are linked to mitochondrial dysfunction and other aging-related changes. We aim to determine how intracellular NAD compartmentalization affects key cellular processes and physiological outcomes. Notably, we have identified the mitochondrial NAD transporter SLC25A51 as a modulator of cellular senescence in pancreatic beta cells. We demonstrate that deleting the transporter prevents diabetes-associated beta cell senescence and improves glucose homeostasis and insulin resistance in mice.