

Molecular Principles of Macropinocytosis in Health and Disease

Macropinocytosis represents an evolutionary ancient and conserved process for the uptake of extracellular fluid ('cell drinking'). Despite its observation already in the early 1930s, research on macropinocytosis did not take center stage as it was largely viewed as an unspecific mechanism for the bulk uptake of extracellular fluid. However, during the recent years macropinocytosis has been increasingly realized to be broadly important in physiology and disease, ranging from direct roles in immunity and neurodegeneration to tumorigenesis.

Immune cells represent a fascinating model to elucidate the molecular principles of macropinocytosis, as immune cells are most efficient in macropinocytosis to engulf antigens. I aim to translate my expertise on interstitial immune cell motility to understand macropinocytosis by system-wide (CRISPR screening), single cell (microscopy, microfluidics) and in vivo (mouse) approaches. I envision the identification of fundamental molecular principles of macropinocytosis, its physiological importance in dermatology (skin immunity) and its misregulation in disease.