BIOGRAPHICAL SKETCH

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NAME: Rose, Kevin

POSITION TITLE: Postdoctoral Scholar

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	END DATE	FIELD OF STUDY
University of Maryland, College Park, College Park, MD	BS	08/2018	Microbiology
National Institutes of Allergy and Infectious Diseases, Bethesda, MD	Fellow	08/2020	Intramural Research Training Award Fellow
University of California Berkeley, Berkeley, CA	PHD	05/2025	Molecular and Cell Biology

A. Personal Statement

Maintaining organelle homeostasis is essential for cell viability. A variety of native insults can cause damage to organelles such as lysosomes, leading to either their recycling or repair by distinct cellular machineries. This is especially important in the ageing brain where organelles become dysfunctional and protein aggregates, such as tau or amyloid beta, accumulate over time. Both pathological species need to be disposed of, but the natural accumulation of mutations we incur as we age effectively limits our ability to do so. Although it is widely recognized that lysosomes become dysfunctional as we age, there are current gaps in our understanding at the nanoscale level as to what impaired lysosomal function looks like and how the cell attempts to restore healthy function. Additionally, improving our understanding of organelle dysfunction may inform the rationale design of therapeutics that could potentially bolster the ageing brain against such insults. To gain insights into the ultrastructural details of organelle damage and host responses, we developed a pipeline for cryogenic native preservation of human cells. As a postdoctoral, I will adapt this pipeline to the study of neurons differentiated from patient-derived cells of various ages (tNeurons) and develop new tools for dissecting lysosome dysfunction at the molecular level using fluorescence-guided cryo-electron tomography. The observations generated through this pipeline will lay some of the groundwork for future studies to use for the improved rationale design of therapeutics to potentially mitigate some of the pathologies associated with ageing.

1. Rose K, Herrmann E, Kakudji E, Lizarrondo J, Celebi A.Y, Wilfling F, Lewis S.C, Hurley J. *In situ* cryo-ET visualization of mitochondrial depolarization and mitophagic engulfment. Proceedings of the National Academy of Sciences. 2025 July 31; 122(31):-. Available from: https://www.pnas.org/doi/10.1073/pnas.2511890122 DOI: 10.1073/pnas.2511890122
2. Rose K, Jepson T, Shukla S, Maya-Romero A, Kampmann M, Xu K, Hurley J. Tau fibrils induce nanoscale membrane damage and nucleate cytosolic tau at lysosomes. Proceedings of the National Academy of Sciences. 2024 May 23; 121(22):-. Available from: https://pnas.org/doi/10.1073/pnas.2315690121 DOI: 10.1073/pnas.2315690121

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2020 - 2025 Graduate Student, University of California Berkeley, Berkeley, CA
2018 - 2020 Research Fellow, National Institutes of Allergy and Infectious Diseases, Bethesda, MD
2014 - 2018 Undegraduate student, University of Maryland, College Park, MD

Honors

2020 - 2022 Molecular Biophysics Training Grant, University of California Berkeley
2018 - 2020 Intramural Research Training Award, National Institutes of Allergy and Infectious Diseases
2018 High Honors in Cell Biology and Molecular Genetics, University of Maryland