

# The Misfolding of Tau in Relation to Neurodegenerative Diseases: Exploring Tau's Effect on Keap1/Nrf2 and Oxidative Stress

Deanna Garcia and Elliana Castagnola  
San Marcos High School

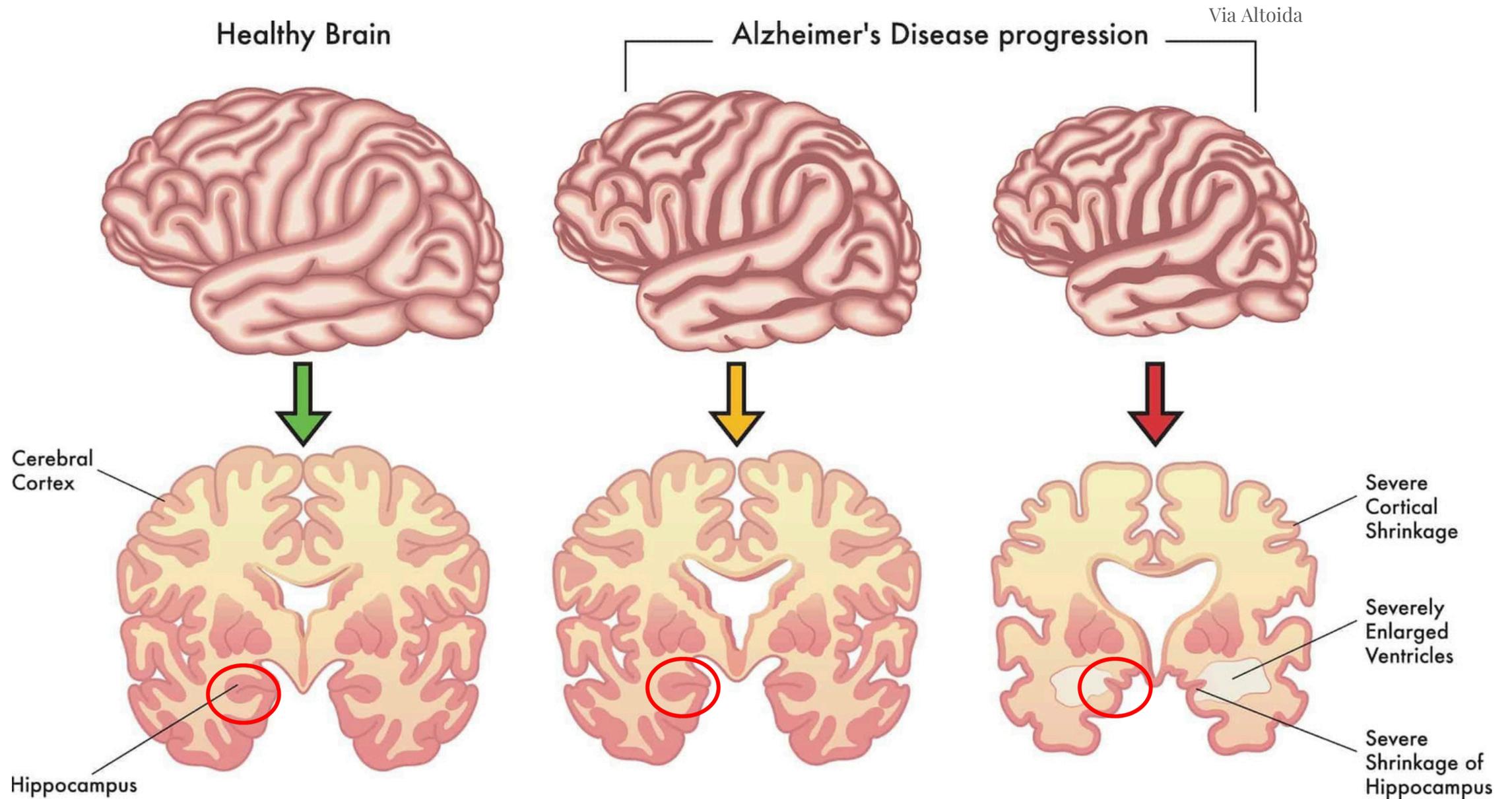
Mentor: Andrew Longhini, Ph.D.

Advisor: Kenneth S. Kosik, M.D.

Dept: Neuroscience Research Institute

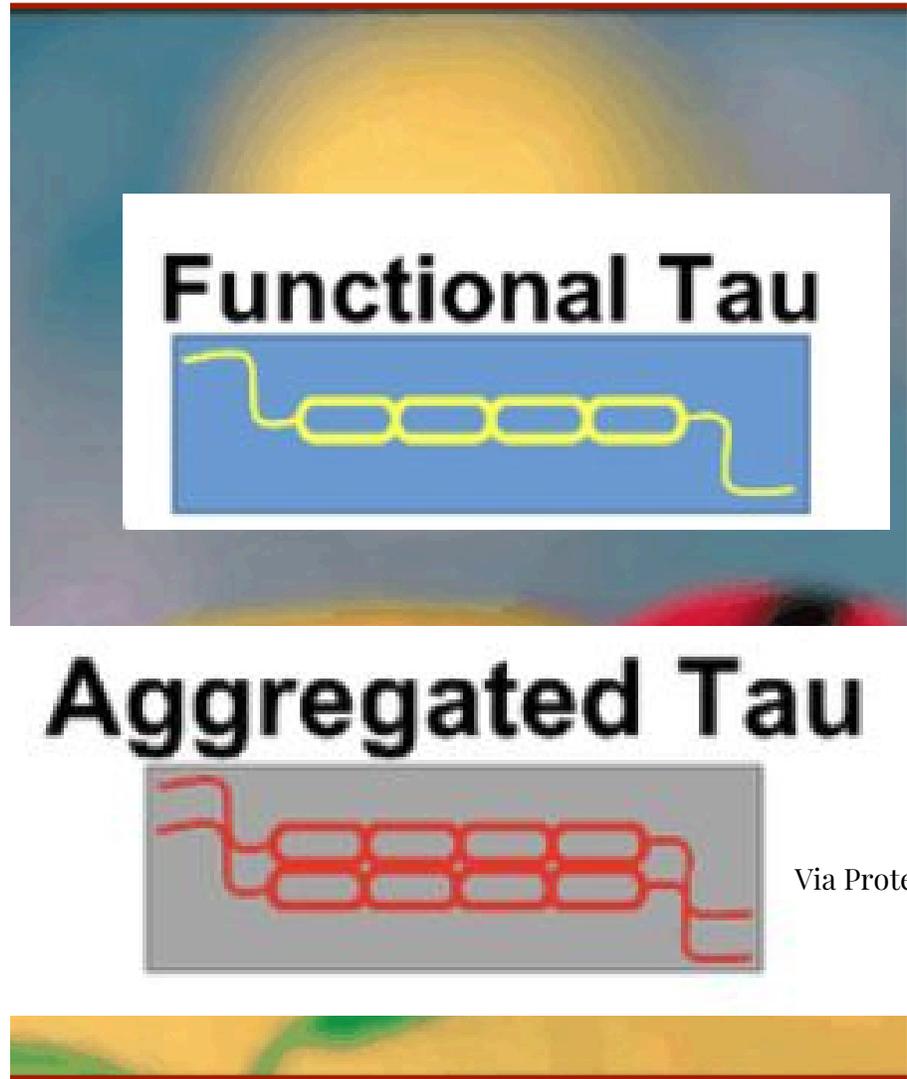
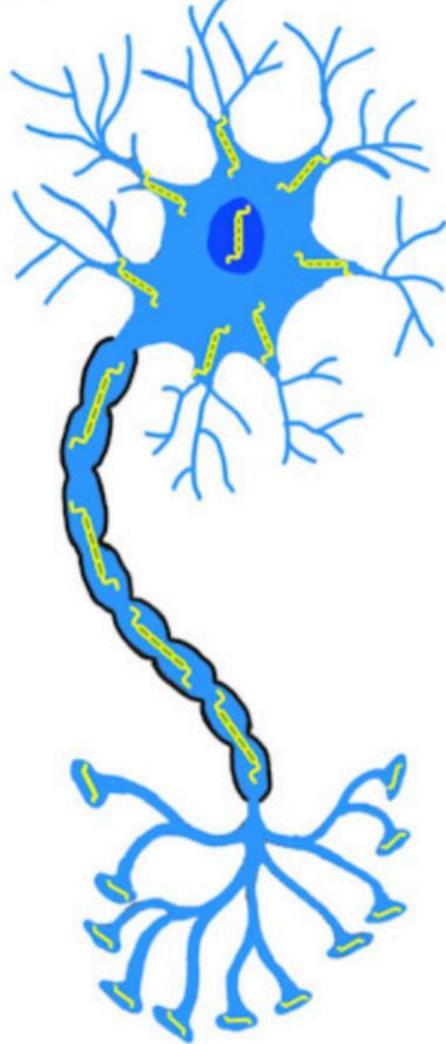


# Neurodegeneration



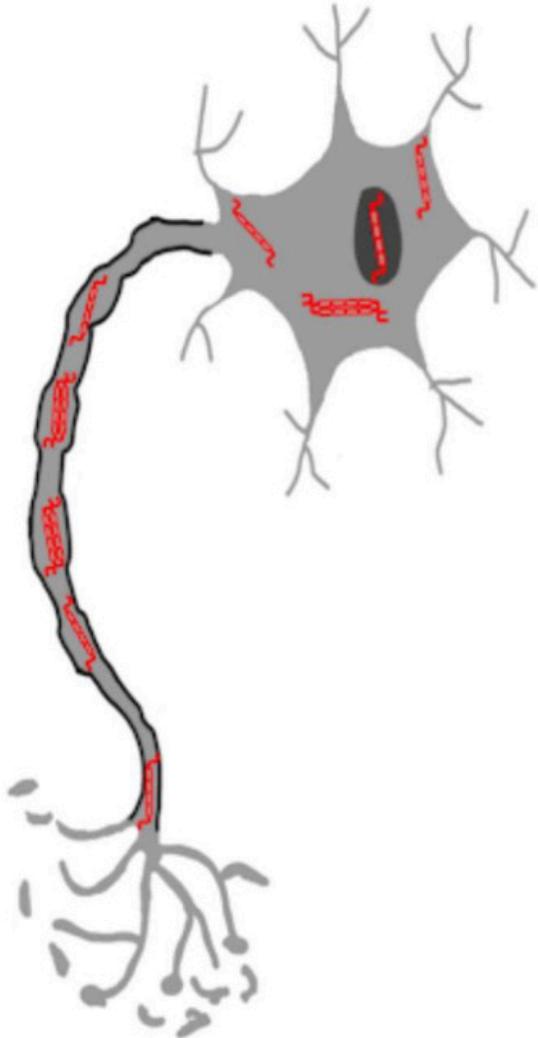
# Understanding Tau

**A** Healthy neuron

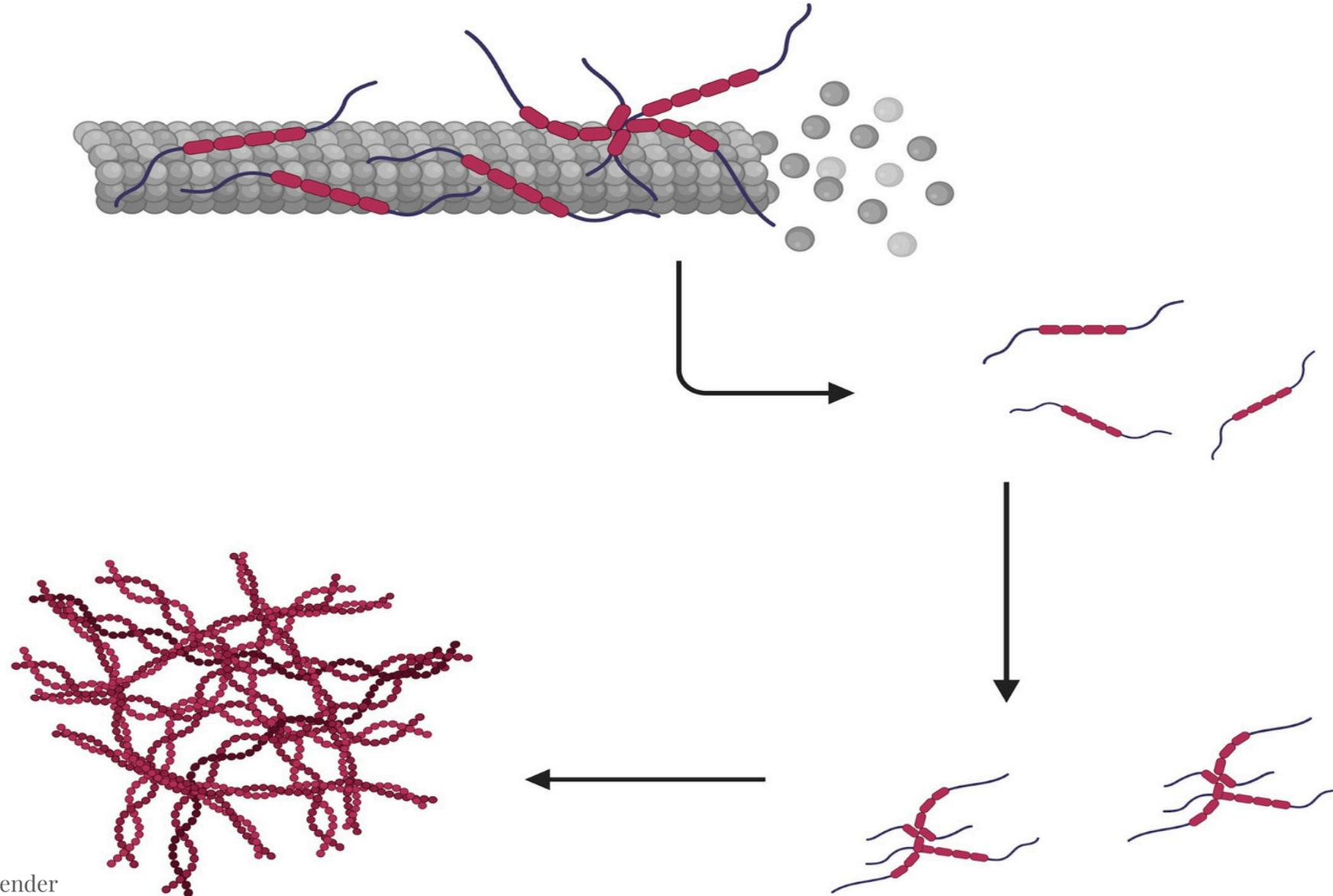


Via Protepedia

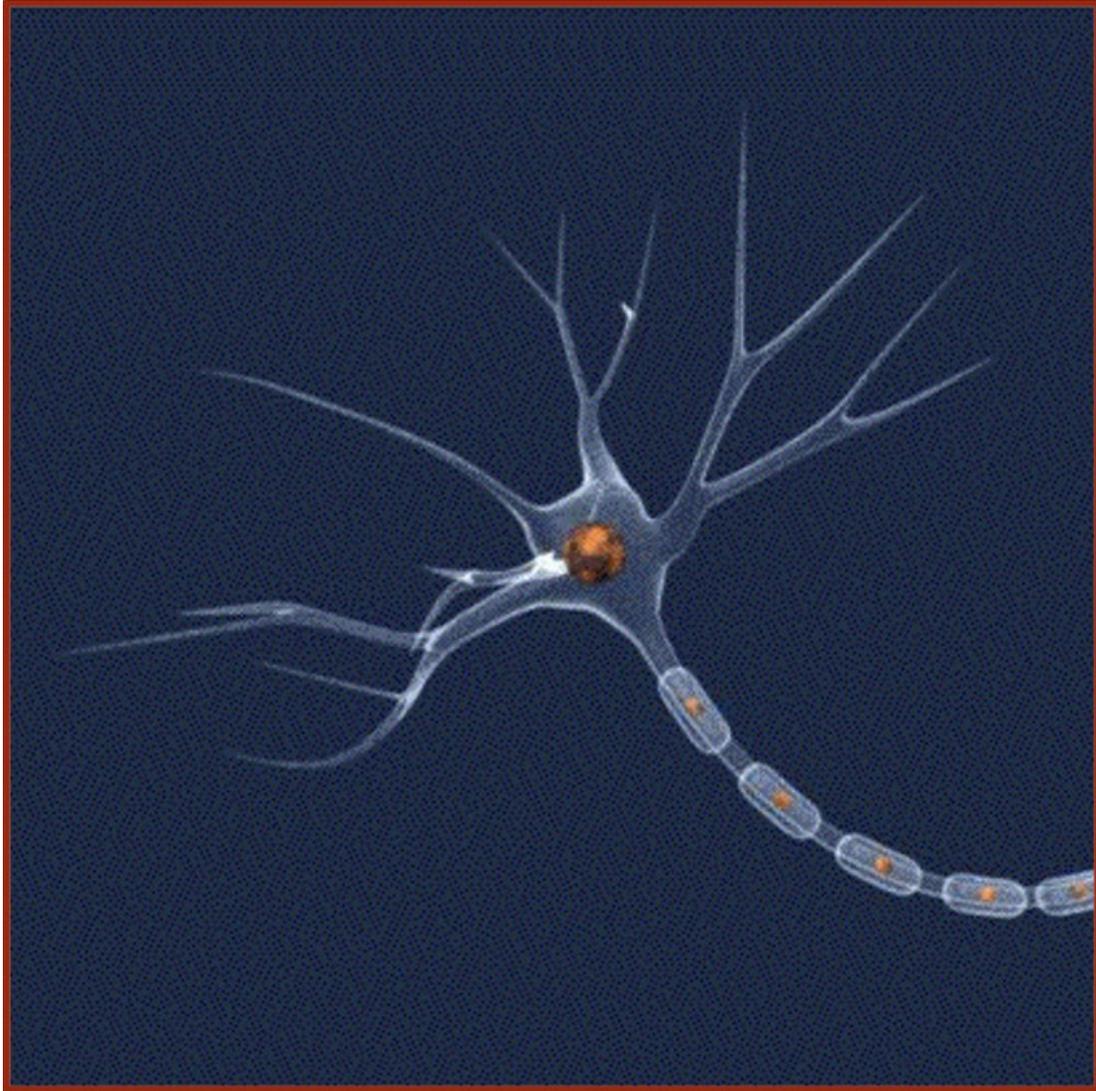
**B** Disease neuron



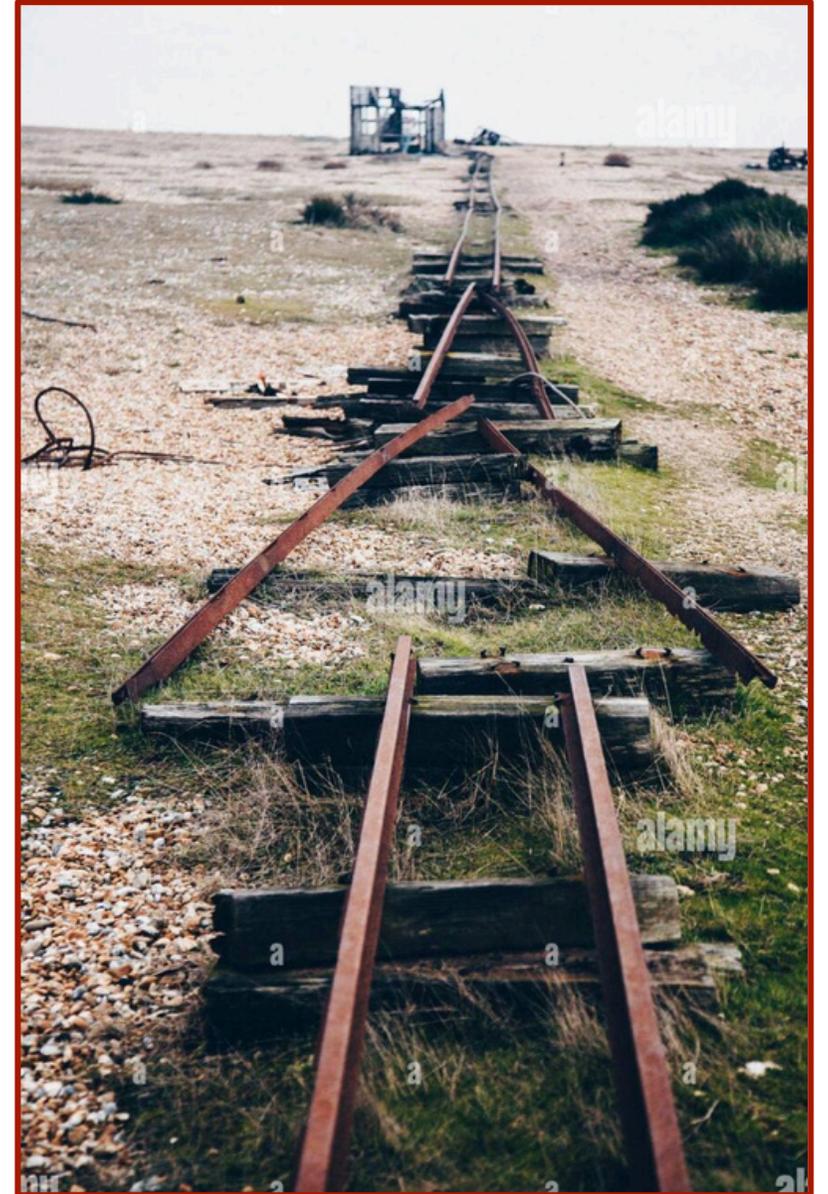
# Neurofibrillary Tangles



# Analogy



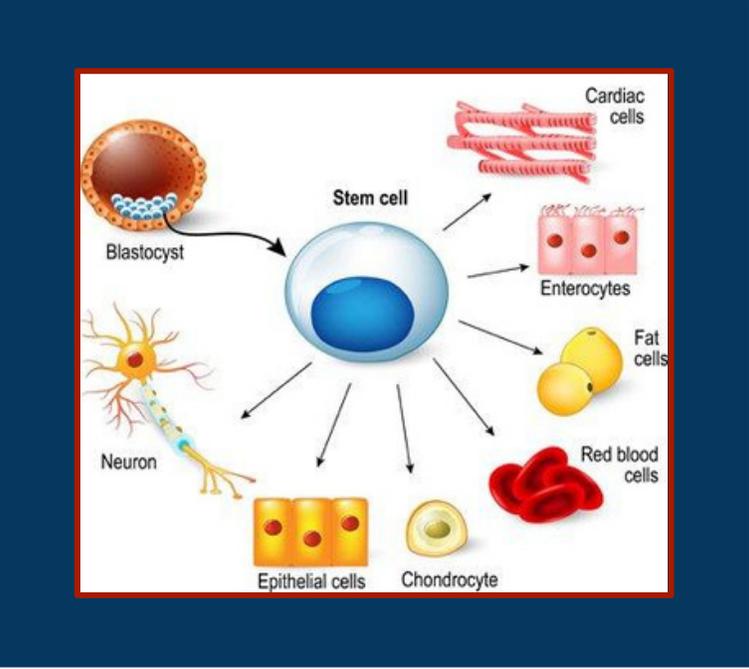
Via NIH



Via Alamy

# The Kosik Lab

Via News-Medical

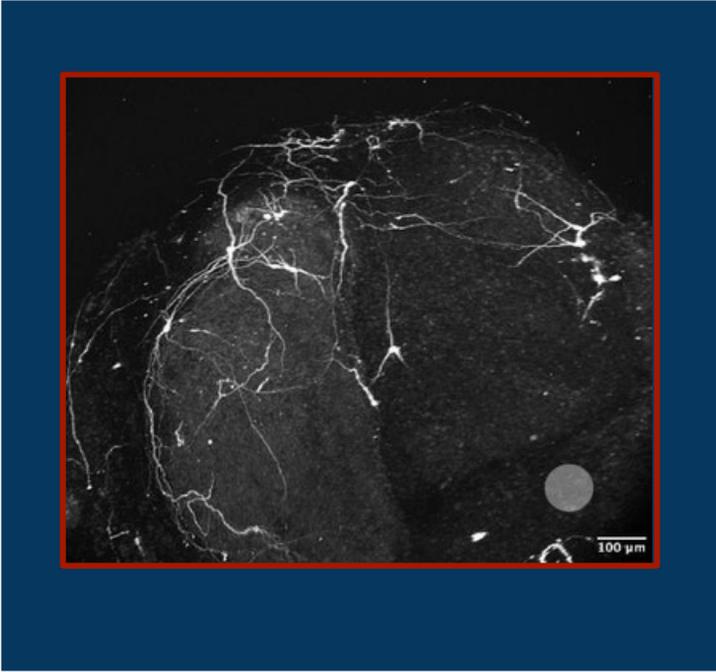


**Stem Cell Research**

Created in BioRender

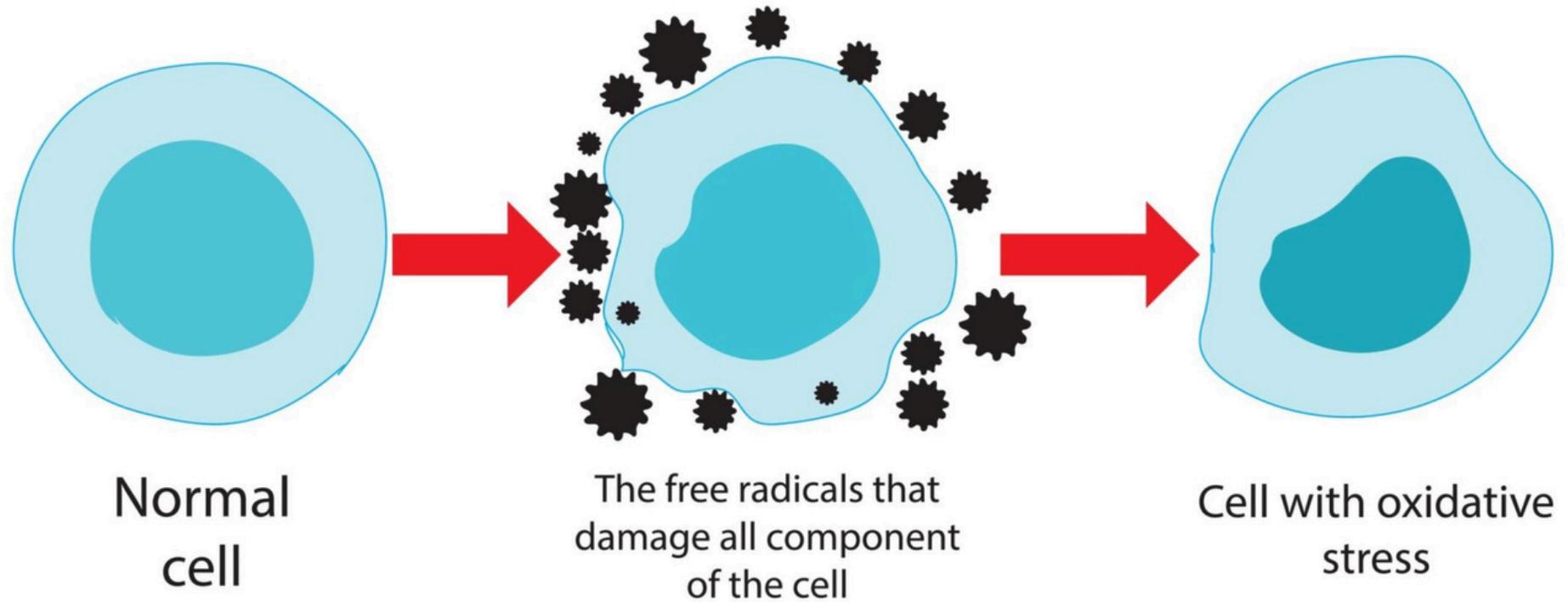


**In vivo Models**



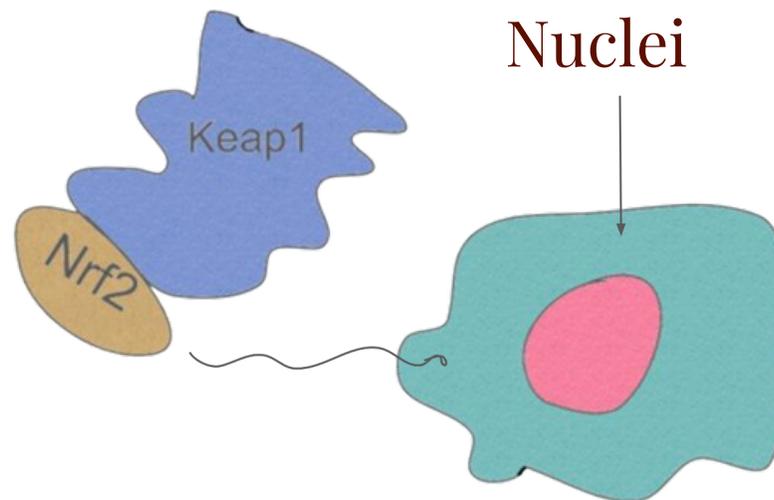
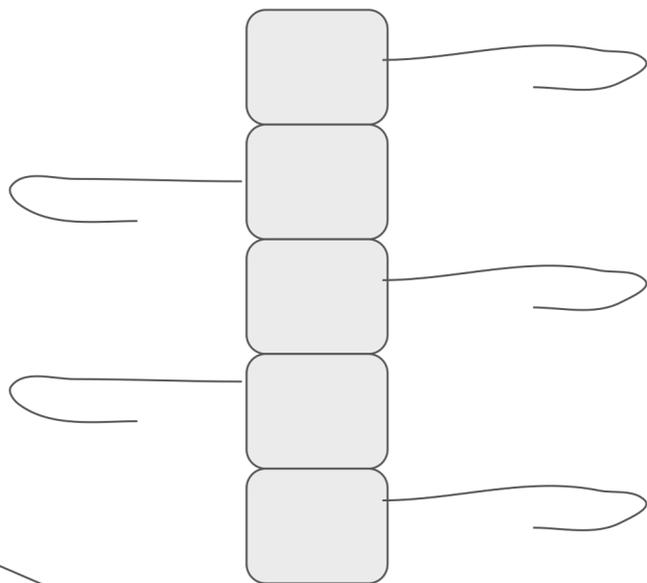
**Organoids**

# Oxidative Stress



# The Keap1/Nrf2 pathway

PLP  
(Protein-Like Polymer)



# Fluorescence Staining

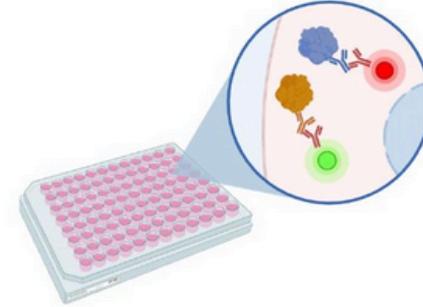
① Check cell density of wells



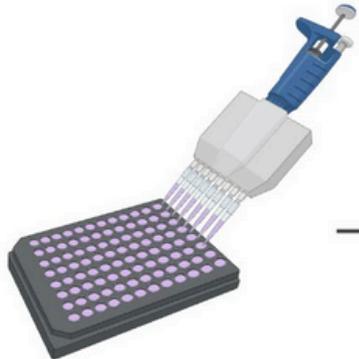
② Wash 1-3 times in PBS



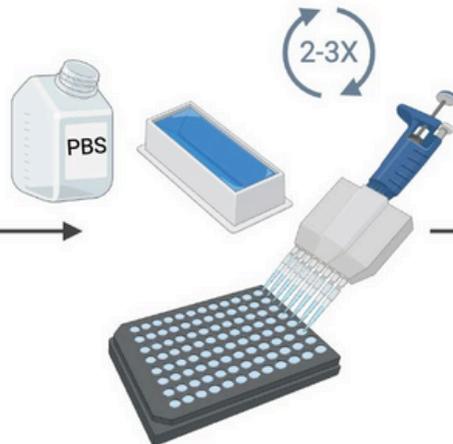
③ Stain cells with fluorescence, then incubate for 1-5 mins in the dark



④ Remove the stain solution

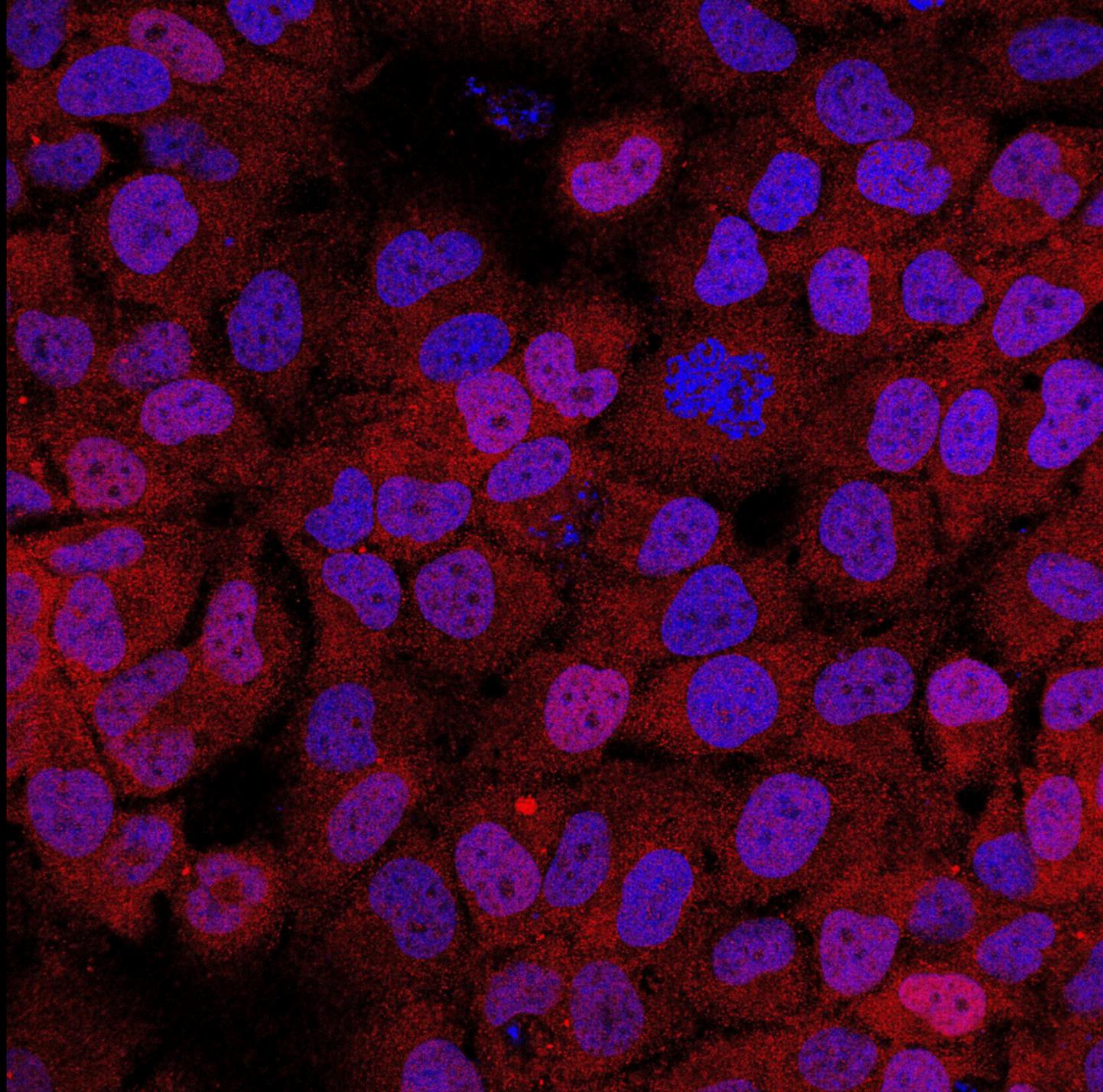


⑤ Wash 2-3 times in PBS



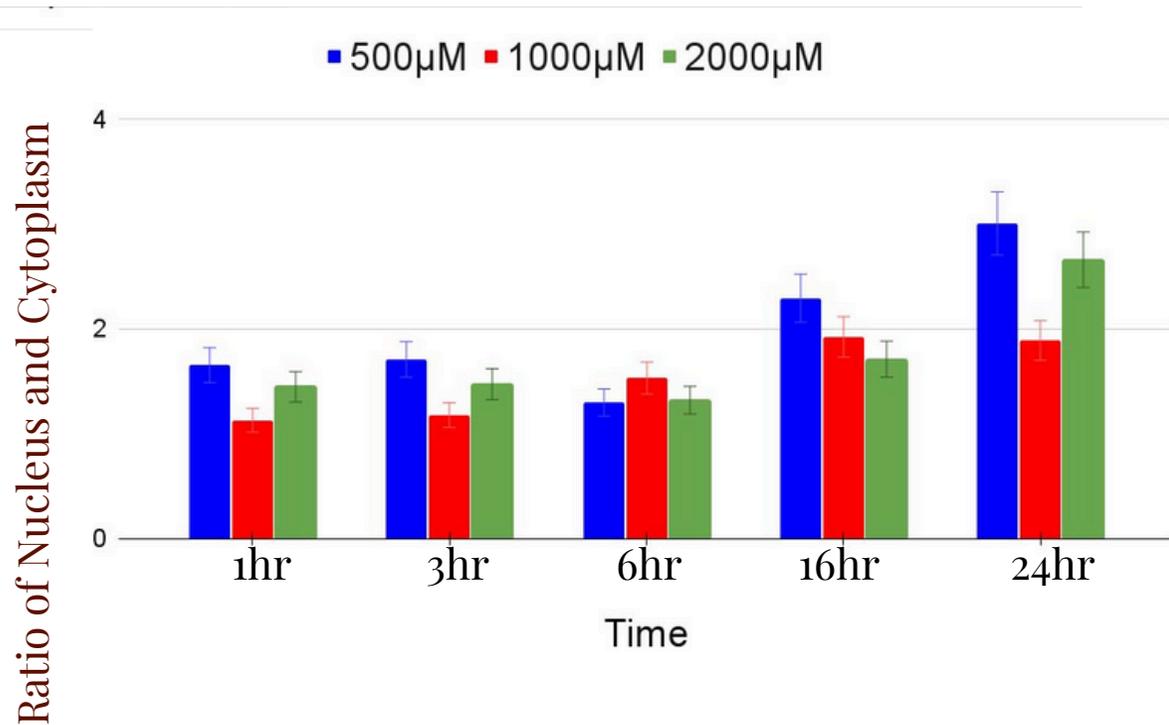
⑥ Image the cells



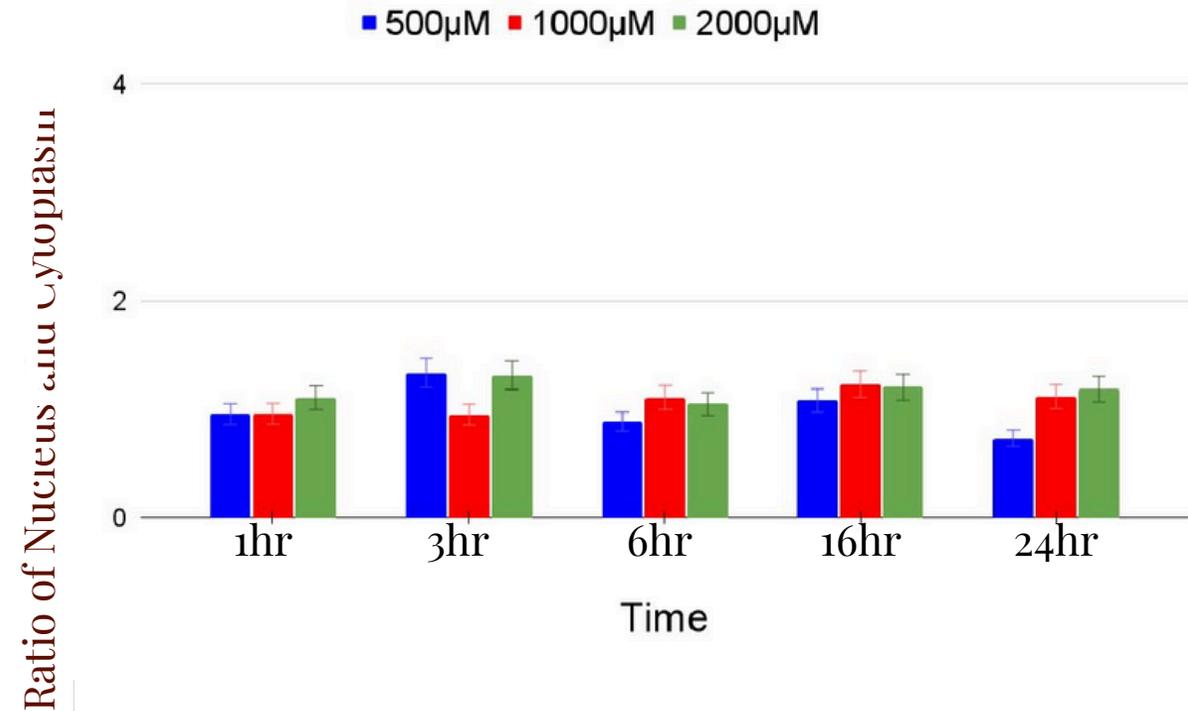


# The connection between Nrf2 and tau

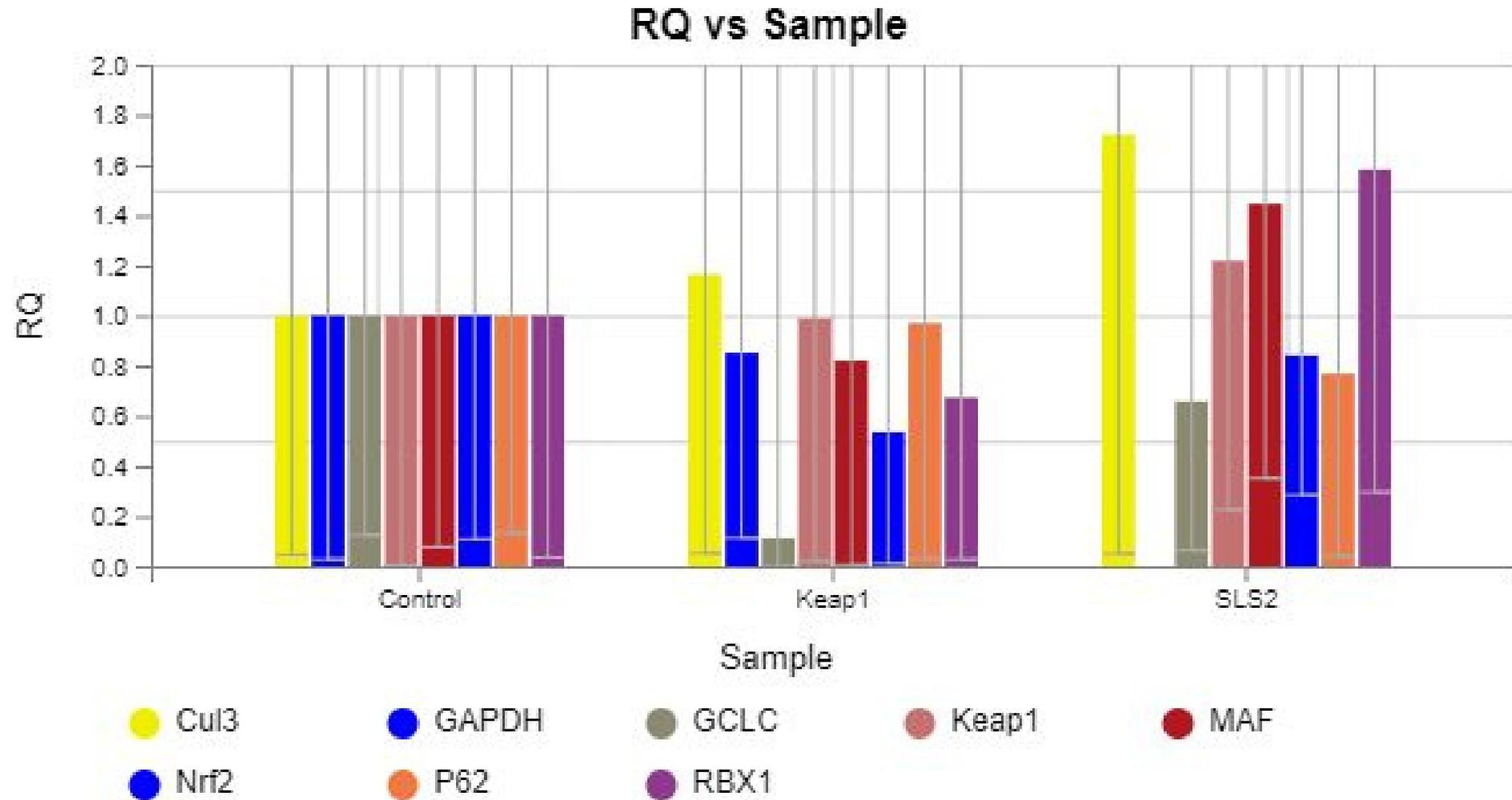
Keap1 PLP without tau expression



Keap1 PLP with tau expression

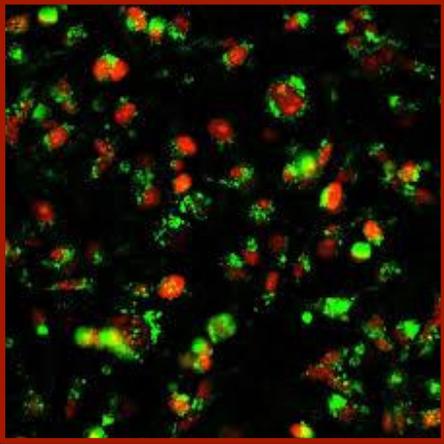


# Connection of related genes with Keap1 Pathway

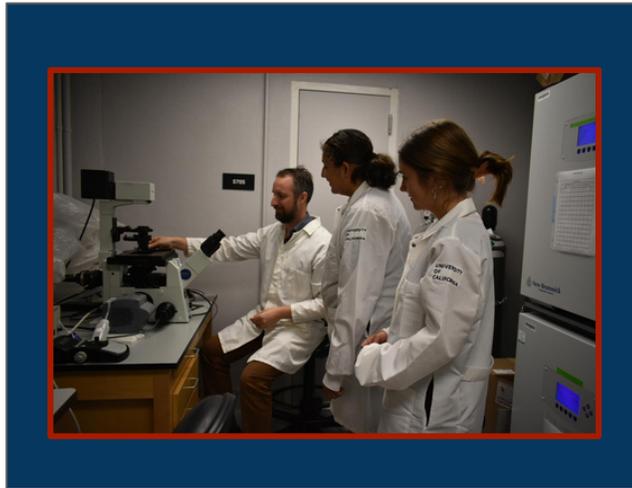


# Additional Procedures

Via Sartorius



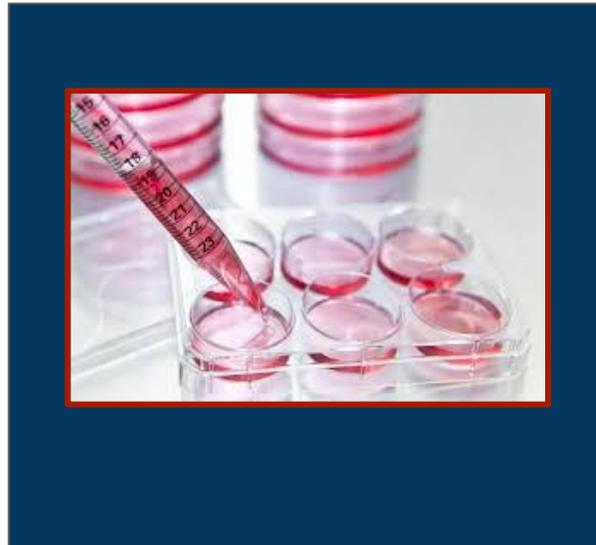
Immunocytochemistry



Microscopy



Making Buffers



Cell Culturing

Via Pharmaceutical Technology



Pipetting

Via Gilson

# Acknowledgements



Ali Muller  
Kara Chatterton  
Wendy Ibsen  
Marilyn Garza



Dr. Andrew Longhini



Lab Puppy Jake!