

2023 Buck Summer Scholar: Ronak Jaisalmeria



Hello! I am a rising sophomore at Rice University in Houston, TX, majoring in cellular and molecular neuroscience. At Rice, I work in Dr. Robert Krencik's lab, which is part of the Houston Methodist Research Institute. Our research focuses on understanding the connection between neurons, the cells that communicate in the nervous system, and the supportive cells called astrocytes. Under the guidance of MD-PhD candidate Megh Patel, my project investigates specific astrocyte-secreted factors and their impact on creating new connections between neurons.

My broader interest lies in comprehending the mechanisms behind learning and memory, especially in neurological diseases like Alzheimer's disease. I'm curious about targeting these mechanisms and molecules to develop treatments for such conditions. This led me to discover Dr. Tara Tracy's lab at the Buck Institute. There, under Dr. Grant Kauwe's mentorship, I worked on a research project studying how disruptions in neuron connections, known as synapses, contribute to cognitive and memory decline in Alzheimer's disease.

Neurons communicate across synapses using neurotransmitters that bind to specific receptors on the next neuron, triggering a response. When a particular synapse is frequently activated, the receiving neuron increases the number of receptor proteins. This process, known as synaptic strengthening, is crucial for memory formation and learning.

My work with Dr. Kauwe investigates the role of tau, a protein linked to Alzheimer's disease, in the disruption of synaptic strengthening, leading to memory and cognitive decline. To explore this, we use human patient-derived neurons and transgenic mice to study tau's effects on synaptic function.

Ultimately, our goal is to develop effective and potent therapies for tau-related diseases, particularly Alzheimer's disease.

