Conducting the Neuronal Molecular Symphony: Unveiling the Interplay of NcRNA, Epigenetics, and Epitranscriptomics

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Abstract:

The focus of research in my laboratory is to elucidate how neurons establish individual identity in the developing nervous system and why only specific neuron subtypes are vulnerable to neurodegenerative diseases. We tackle these questions by studying **non-coding RNAs** and their roles during motor neuron (MN) generation and degeneration. My lab uses mouse and human embryonic stem cells, induced pluripotent stem cells, and mouse/chicken animal models to investigate MN development and disease. We have developed a series of stem cell lines and animal models to study the functions of microRNAs and lncRNAs by "gain-of-function" and "loss-of-function" approaches. Further, we perform single-cell multiomics on healthy and ALS iPSC-derived MNs to functionally characterize non-coding RNA pathologies in MNs. In this talk, I will illustrate several new topics, including how lncRNA form condensates to perpetuate neuronal fate and the progress of the miRNAs and their application in MN diseases.