Yuna Ayala, Ph.D.
Assistant Professor
Department of Biochemistry and Molecular Biology
Saint Louis University School of Medicine

Biography

Dr. Yuna Ayala received her A.B. in Biology and Latin American Studies from Washington University in 1994 and her Ph.D. in Molecular Microbiology and Microbial Pathogenesis from Washington University in 2001. She completed her postdoctoral training in the laboratory of Francisco E. Baralle, at the International Center for Genetic Engineering and Biotechnology in Trieste, Italy. In 2011, Dr. Ayala joined the Department of Biochemistry and Molecular Biology at St. Louis University School of Medicine.

Abstract

“Regulation of RNA binding protein function via phosphorylation”

In recent years the role of RNA binding proteins in neurodegenerative disorders, particularly amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD) has become the focus of intense research. However, we still poorly understand how neurodegeneration is linked to structural and functional alterations in these proteins. Our lab studies the regulation of the RNA binding protein TDP-43 whose aggregation is a hallmark of ALS and FTD and mutations are associated with disease. We found that activation of the heat shock response dramatically increases dual phosphorylation of TDP-43 by MEK. These results highlight a new mechanism regulating TDP-43 function and homeostasis through the proteotoxic stress response via these novel phosphorylation sites. Moreover, our data strongly suggest that phosphorylation regulates TDP-43 activity in splicing regulation and controls cellular localization, in particular nucleolar recruitment. Our goal is to determine how this modification alters TDP-43 structure and protein/RNA interactions to identify mechanisms that govern TDP-43 assembly and control protein function. These findings will contribute in our understanding of pathogenesis and help develop new therapeutic strategies to block protein aggregation and dysfunction.