BioFrontiers - Biology Seminar

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Zoom Meeting: https://unt.zoom.us/j/98067606539

Dr. Rachel M. Brewster

Associate Professor, Department of Biological Sciences, University of Maryland Baltimore County

No oxygen, no problem: role of Ndrg signaling in hypoxia tolerance

Oxygen deprivation is observed in many human diseases and conditions, including stroke, and can cause severe depletion of ATP, which is irreversibly damaging to living tissues. Some organisms, such as the zebrafish embryo, have adaptive mechanisms that prevent them from completely expending ATP under low oxygen conditions. These processes are not well understood, but a prevailing idea is that hypoxia-tolerant organisms sense low oxygen and enter into a hypometabolic state by arresting ATP-demanding processes.

Our research explores the role of members of the N-myc Downstream Regulated Gene (Ndrg) family in this adaptive response, using the zebrafish embryo as a model organism. We have found that *ndrg1a* mutants, while homozygous viable and morphologically normal, have dramatically reduced viability following prolonged hypoxia relative to wild type controls. This phenotype is linked to the role of *ndrg1a* in downregulating the ATP-demanding sodium-potassium ATPase pump in the kidney. Understanding signaling mechanisms that underlie hypoxia-tolerance has significant implications for the prevention of hypoxic injury.