Department of Biochemistry and Molecular Biophysics Seminar

Wednesday, April 29 at 4:00 p.m. in Ackert 120

Coffee and cookies at 3:45 p.m. in Chalmers 168

Dr. Adam Yokom, Assistant Professor

Division of Biochemistry
University of Missouri

Structural Basis for TECPR1 Dependent Autophagy

Autophagy is a conserved and essential eukaryotic pathway which maintains cellular health by responding to stress, organelle damage, and defending against infection. While initiation of canonical autophagy has been studied extensively, newer noncanonical pathways are increasingly recognized as essential for rapid and effective responses to membrane damage. One such pathway involves the protein Tectonin beta-propeller repeat-containing protein 1 (TECPR1), which helps cells detect damaged membranes and triggers a protective response. Despite its importance, how TECPR1 is organized and how it becomes activated has been largely unknown.

Our group has structural characterized TECPR1 alone and in complex with autophagy initiation machinery. We find that TECPR1 adopts an extended architecture that pre-organizes its domains for membrane engagement. Importantly, interaction with core autophagy proteins ATG5 and ATG12 induces a structural rearrangement. This effectively switches TECPR1 into an active state that couples membrane damage recognition to autophagy activation. Together, these findings provide a framework for how TECPR1 functions in noncanonical autophagy and highlights how membrane damage is connected to protective autophagic responses. More broadly, this work advances our understanding of autophagy initiation an essential process for cellular defense and human health.