ERIKA BACH

Erika Bach, Ph.D., is Associate Professor in the Department of Biochemistry and Molecular Pharmacology at New York University (NYU) School of Medicine in New York, NY, USA. She is also the Director of the Molecular Pharmacology PhD Training Program, the faculty mentor to the NYUrWIS (NYU Women in Science Club) and a member of the Postdoctoral Advisory Committee at NYU School of Medicine.

Dr. Bach has over 20 years of genetic, molecular and biochemical research experience focused on mechanisms that control tissue and organismic growth and cell competition using *Drosophila* as a model system. In particular, her lab was the first to report the critical role of the JAK/STAT pathway in cell competition. The Bach lab showed that cells in the *Drosophila* wing imaginal disc lacking the sole *Drosophila* STAT transcription factor become losers that are killed by neighboring wild-type cells. By contrast, cells with hyper-activated STAT become super-competitors which kill wild-type cells located several cell diameters away through induction of apoptosis. The Bach lab demonstrated that JAK/STAT-dependent cell competition does not require the known regulators of this process (Myc, Hippo (Hpo), Wingless (Wg)/Wnt signaling), strongly suggesting that these pathways are parallel regulators of cell competition which converge on common signals that non-autonomously kill losers.

Dr. Bach has also been a leader in stem cell competition. Her lab reported that somatic stem cells in the *Drosophila* testis with sustained Hedgehog (Hh), Hpo or MAP Kinase (MAPK) signaling take over the somatic lineage by out-competing wild-type somatic stem cells; these competitive cells also out-compete wild-type resident germ-line stem cells. These observations led her lab to dissect the population dynamics of somatic stem cells in the testis. They found that somatic stem cells conform to neutral competition dynamics, a conserved feature of stem cell homeostasis in which individual stem cells can be lost and replaced by their neighbors stochastically, resulting in chance dominance of a clone at the niche. They also showed that that clonal deregulation of the Hh, Hpo or MAPK pathway allows a single somatic stem cell and its descendants to colonize the niche. The Bach lab proved that the driving force behind such competitive behavior is accelerated proliferation. Thus, their results reveal that a single stem cell colonizes its niche through oncogenic mutation by co-opting an underlying homeostatic process.

Dr. Bach has published more than 40 research articles in top journals including *Developmental Cell*, *EMBO Journal*, *Current Biology*, *Development* and *PLoS Genetics*.