

Shishir K. Biswas

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Objective: To establish a foundational knowledge of the genetic, molecular and cellular components of regenerative biology. Ultimately, I will integrate principles of regeneration and biomedical engineering to be a leading researcher in the field of regenerative medicine.

Education

University of Kentucky, Lexington, KY
PhD Candidate, Expected 2020
Major: Regeneration and Developmental Biology
GPA: 3.97 / 4.0

Purdue University, West Lafayette, IN
MS, August 2014 BS, May 2012
Major: Biomedical Engineering
GPA (graduate): 3.86 / 4.0

Research

Advisor: Ashley Seifert, PhD, Assistant Professor of Biology, University of Kentucky

PhD Research: Tissue Regeneration in African Spiny mouse, *Acomys cahirinus* August 2014 – Present

- Analyzed RNA-seq dataset to identify differential genetic programming that leads to regeneration in *Acomys* but fibrosis in *Mus*.
- Characterized development of the rodent ear pinna through histology, lineage tracing and immunohistochemistry.
- Investigated the molecular and cellular events governing blastema development and epimorphic regeneration in *Acomys cahirinus*.

Advisor: Eric Nauman, PhD, Professor of Biomedical/Mechanical Engineering, Purdue University

MS Thesis: Functional Characterization of Bio-Artificial Liver August 2012 – June 2014

- Investigated the capability of a naturally derived, porcine vertebra scaffold to serve as the base of a bio-artificial liver by providing a stable collage-based scaffold and inducing hepatic differentiation of stem cells *in vitro* through manipulation of the cellular microenvironment.

Advisor: Edith Tseng, MS, Research Scientist, Cook Biotech Inc.

Research Internship Project: Competitor Analysis

May 2011 – August 2011

- Conducted comparative assays between biomaterials, both natural and synthetic, to characterize fibroblast growth factor (FGF-2) content, induction of vascular endothelial growth factor (VEGF) secretion by human fibroblasts, cellular proliferation and differentiation, and mechanical properties to determine the efficacy of small intestinal sub-mucosa (SIS) in comparison to other wound care products.

Publications (* corresponding author, = equal contribution)

Contributions for co-authored manuscripts listed below citation

Gawriluk TR[±], Simkin J[±], Thompson KL[±], **Biswas SK**, Clare-Salzler Z, Kimani JM, Kiama SG, Smith JJ, Ezenwa VO, Seifert AW*. Comparative analysis of ear hole closure identifies epimorphic regeneration as a discrete trait in mammals. *Nat. Commun.* 7:11164 doi: 10.1038/ncomms11164.

Contribution: I performed all bioinformatics analyses and edited manuscript

Publications (continued)

Biswas SK, Hacker C, Seifert AW*. Neural crest gives rise to mesenchymal tissue in the adult ear pinna.
In revision.

Oral Presentations

Comparative transcriptomics between *Acomys cahirinus* and *Mus musculus* reveals insights into genetic control of mammalian regeneration. Keystone Symposia: Molecular and Cellular Basis of Growth and Regeneration (A3). 2016 Jan. 13; Breckenridge, CO.

Poster Presentations (* corresponding author)

Biswas SK*, Hacker CK, Seifert AW. Cellular analysis of ear pinna development in murid rodents. Poster #160 presented at Society for Developmental Biology 77th Annual Meeting. 2018 July 20-24; Portland, OR.

Biswas SK*, Gawriluk TR, Simkin JS, Smith JJ, Seifert AW. Mammalian blastema formation in the African Spiny mouse, *Acomys cahirinus*. Poster #2089 presented at Society for Developmental Biology 75th Annual Meeting. 2016 Aug. 4-8; Boston, MA.

Biswas SK*, Gawriluk TR, Simkin JS, Smith JJ, Seifert AW. Comparative RNA-seq between *Acomys cahirinus* (regenerator) and *Mus musculus* (non-regenerator) reveals insights into genetic control of mammalian regeneration. Poster #1007 presented at: Keystone Symposia: Molecular and Cellular Basis of Growth and Regeneration (A3). 2016 Jan. 10-14; Breckenridge, CO.

Tseng ES*, **Biswas SK**, Johnson CE. Evaluating. Tissue-Based Biomaterials Using Bioactivity Assays. Poster #110 presented at: Clinical Symposium on Advances in Skin and Wound Care. 28th Annual Conference for Prevention and Healing. 2013 Oct. 23-27; Orlando, FL.

Professional Activities

Ad hoc reviewer, *Advances in Wound Care*

Graduate student member, Society for Developmental Biology

Graduate student member, American Association for the Advancement of Science

Student Activities

President, UK Biology Graduate Student Association	2017
Treasurer, UK Biology Graduate Student Association	2016
Student Ambassador, Purdue Global Engineering	Aug. 2012 – May 2014
Midwest Regional Director, Beta Chi Theta Fraternity, Inc.	July 2012 – July 2013
Founder/Treasurer, Global Brigades Purdue Chapter	2010
President, Beta Chi Theta Fraternity Purdue Chapter	Jan. 2009 – Dec. 2009

Teaching

Graduate Teaching Assistant, UK Dept. of Biology August 2014 – Present

- Introductory Biology, BIO 155: Taught principles of scientific inquiry and writing, molecular and cell biology, phylogeny, and evolution.
- Microbiology Lab, BIO 209: Taught basic microbiology laboratory techniques such as bacterial plate streaking, gram staining, IMViC, and Kirby-Bauer assay among others.

Graduate Teaching Assistant, Purdue Biomedical Engineering Dept. August 2012 – May 2014

- Cell Biology, BIO 230: Held weekly office hours and guest-lectured during the course.
- Physiological Modeling, BME 256: Guided undergraduate group projects in which teams would create mathematical models physiological injuries and diseases using MATLAB.
- Biomolecules Laboratory, BME 205: Introduced undergraduate students to basic laboratory procedures and assays such as gel electrophoresis, chromatography, spectrophotometry, and ELISA.

Volunteer and Outreach

Judge, Kentucky American Water - Fayette County Science Fair	Feb. 2016, 2018
Booth Volunteer, Meadowthorpe Elementary Science Night	Nov. 2017
Booth Volunteer, Yates Elementary Science Night	Apr. 2017
Invasive Species Removal, UK Ecological Research and Education Center	Mar. 2017
Judge, Ashland Elementary Science Fair	Jan. 2017
Booth Volunteer, BioBonanza	Oct. 2016
Graduate Student Panel, Berea College Biology Club Informational	Mar. 2016
Booth Volunteer, 2013 Purdue Engineering EXPO	Oct. 2013

Awards and Honors

AAAS/Science Program for Excellence in Science	2017-2018
UK Arts & Sciences Certificate of Outstanding Teaching	Spring 2016
Cold Spring Harbor Scholarship, <i>Mouse Development, Stem Cells and Cancer</i>	Summer 2015
Kentucky Opportunity Fellowship	Fall 2016, Spring 2015
Golden Key Honor Society Invitation, Purdue (Top 15% of graduating class)	Fall 2013
Purdue University Semester Honors	Fall 2011, Spring 2012

References

Dr. Ashley Seifert (PhD Adviser)
Assistant Professor, Dept. of Biology
University of Kentucky
E-mail: awseifert@uky.edu

Dr. Eric Nauman (Master's Adviser)
Professor, Mechanical and Biomedical Engineering
Purdue University
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