

Justin J. Crowder

Assistant Lecturer of Life Science

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Educational Background

Masters of Science, Certificate in Biotechnology

Department of Biology, Ball State University, Muncie IN, 2012-2015

Concentrations: Biology and Biotechnology

Thesis: Regulation of Non-stop Protein Abundance by Cytosolic and Endoplasmic-Reticulum Localized Ubiquitin Ligases in *S. cerevisiae*

Advisor: Dr. Eric (V.J.) Rubenstein

Licensure in Secondary Life Science

Department of Education, Indiana University of South Bend, South Bend IN, 2004-2007

Bachelors of Science

Department of Biology, Ball State University, Muncie IN, 1998-1999, 2001-2004

Concentrations: Biology and Zoology

Technical Expertise

Education

Proficient in course protocol and experimental design, small and large group organization and monitoring, interdisciplinary project design, intervention strategies, and reagent and material ordering

Biological Research

Proficient in mouse husbandry, mouse islet isolation and culture, mammalian and bacterial cell culture, confocal fluorescence microscopy, metabolite assays, western blotting, immunoprecipitation, PCR, bioinformatics, molecular cloning, yeast gene deletion, sequence analysis
Laboratory training in flow cytometry and bacterial identification

Education Experience

Instructor of Secondary Science, Burriss Laboratory School, Muncie IN, 2023 - 2024

Principal: Dr. Abigail Comber

Courses Taught: Physics, Chemistry, Integrated Chemistry and Physics

Primary Responsibilities: Design and implement laboratory and classroom curriculum appropriately for existing and newly reinstated physical science courses, participate in interdisciplinary learning communities to pursue admin-identified growth goals, serve as Freshman class faculty sponsor to facilitate extracurricular and fund-raising events, design and conduct engaging co-curricular content for middle school recess and May Term courses.

Additional Responsibilities: Facilitate progress meetings between parents and students to promote communication within each family and provide connections to faculty and administrators, coordinate with special education staff to identify efficient modifications for individual students, collaborate with administrators to develop dual-credit curriculum for the 2024-25 school year.

Instructor, Biotechnology, Ball State University, Muncie IN, 2017 to 2019

Faculty Supervisor: Dr. Susan McDowell

Courses Taught: Protein Isolation and Analysis, Bioinformatics

Primary Responsibilities: Design and implement laboratory and classroom curriculum, design protocols and perform experimental optimization, order materials and reagents, organize collaborative student research projects, facilitate regular student group meetings to evaluate research progress, assess comprehension of undergraduate and graduate students and provide intervention as needed.

Additional Responsibilities: Collaborate with faculty to monitor course budgets and student progress, collaborate with faculty supervisor to monitor course redesign.

Graduate Teaching Assistant, Ball State University, Muncie IN, 2012 to 2013

Supervisor: Dr. John McKillip

Course Taught: Microbiology for Health Professionals

Primary Responsibilities: Cooperatively plan and independently instruct two lab sections of undergraduate microbiology, grade and record student submissions, maintain online databases of curricular resources and student-instructor communications.

Teacher, Life Sciences, Penn High School, Mishawaka IN, 2007-2011

Principal: Steven Hope

Courses Taught: Biology, Honors Biology, Environmental Science

Additional Assignments: Biology Content Leader, Freshman House Leader, Response to Intervention Specialist

Primary Responsibilities: Design and implement laboratory and classroom curriculum in accordance with grant-funded educational strategies, modify curricular design in alignment with state standards and communicate changes to biology teachers, organize and implement intervention strategies for at-risk students, facilitate interdisciplinary strategies between core subjects for a group of shared students.

Additional Responsibilities: Organize and lead field trips to in-town and out-of-state educational facilities, present updates to the school board regarding state-funded faculty development strategies.

Research Experience

Research Analyst / Lab Manager, Indiana University School of Medicine, Center for Diabetes and Metabolic Diseases, Indianapolis IN, 2019 to 2023

Principal Investigator: Dr. Amelia Linnemann

Area of Interest: Mechanisms of adaptive stress response associated with beta cell homeostasis.

Primary Project: **Cytoprotective Effects of Cytokine Signaling During Lipotoxic Stress in Beta Cells.** Islet beta cells have been shown to exhibit altered autophagy when treated with pro-inflammatory cytokines or excess free fatty acids. Recently, an emphasis has been placed on lipid metabolism in the context of beta cell inflammation. Phenotypic analysis was conducted on high fat diet-fed knockout mice lacking a cytokine receptor. Reactive oxygen species and autophagy activation were investigated in mouse pancreas and INS-1 cells. Data collected from these studies may contribute to a role for cytokine activation during beta cell stress and type 2 diabetes.

Techniques: PCR, immunofluorescence histology, confocal microscopy, image analysis, mammalian cell culture, mouse islet isolation, intraperitoneal injection, mouse tissue harvesting and sectioning.

Additional Responsibilities: Draft amendments for biosafety protocols, conduct reagent ordering, maintain DEA controlled substance documentation, facilitate communication with university facilities, conduct training of new students and employees, assist lab members with husbandry needs, maintain an online vivarium database, contribute to publications and presentations.

Research Technician, Indiana University School of Medicine, Muncie IN, 2015 to 2019

Principal Investigator: Dr. Bartholomew Pederson

Area of Interest: Potential roles of brain glycogen in neuroprotection, learning, and memory.

Primary Project: **Neuroprotective Roles of Brain Glycogen During Events of Stress in Mice.** Brain glycogen may play a neuroprotective role during stressful events, but the molecular mechanisms are poorly understood. Neural stress biomarkers were identified through bioinformatics and scientific literature and evaluated via biochemical analyses on genetically modified mice. Glycogen utilization was investigated in mice following exposure to hypoxic conditions. Data from these investigations may contribute to therapies for neurological disorders.

Techniques: Immunofluorescence histology, confocal microscopy, western blotting, intraperitoneal injection, mouse tissue harvesting and sectioning, metabolite assays.

Additional Responsibilities: Cooperatively design investigations, coordinate use of university equipment, train student researchers, maintain an online vivarium, contribute to publications.

Research Assistant, Ball State University, Muncie IN, 2013 to 2015

Principal Investigator: Dr. Eric (V.J.) Rubenstein

Area of Interest: Quality control mechanisms of ER-localized ubiquitin ligases in *S. cerevisiae*.

Primary Project: **Regulation of Non-stop Protein Abundance by Cytosolic and ER-Localized Ubiquitin Ligases.** Faulty transcription and translation result in abnormal proteins that are degraded by ER-resident and cytosolic ubiquitin ligases. Failure to degrade such proteins can contribute to neurodegenerative and other diseases. Data collected via genetic and biochemical methods indicated an increased abundance of aberrant proteins in yeast strains that lacked one or more ubiquitin ligase. The results support the roles of the ubiquitin ligases in protein quality control t.

Techniques: Yeast cell culturing, western blotting, molecular cloning, PCR, yeast strain construction, genetic sequence analysis.

Additional Responsibilities: Applied for grants to fund research, conducted oral and poster presentations, trained graduate and undergraduate student researchers.

Additional Employment Experience

Courier, FedEx Express, South Bend IN, 2011 to 2012

Manager: Jeff Finkler

Responsibilities: Organize and execute multiple delivery routes that change daily, operate commercial vehicles on a strict schedule to deliver priority packages.

Supervisor, Package Handler, United Parcel Service, South Bend IN, Muncie IN, 1999-2007

Manager: Larry Dietl

Responsibilities: Conduct various organizational and disciplinary functions including monitoring of employee progress and conflict resolution.

Publications

Crowder JJ, Zeng Z, Novak AN, Alves NJ, Linnemann AK. [Stabilization protects islet integrity during respirometry in the Oroboros Oxygraph-2K analyzer](#). *Islets*. 2022 Dec 31;14(1):128-138. doi: 10.1080/19382014.2022.2054251. PubMed PMID: 35331085; PubMed Central PMCID: PMC8959522.

Muralidharan C, Conteh AM, Marasco MR, Crowder JJ, Kuipers J, de Boer P, Linnemann AK. [Pancreatic beta cell autophagy is impaired in type 1 diabetes](#). *Diabetologia*. 2021 Apr;64(4):865-877. doi: 10.1007/s00125-021-05387-6. Epub 2021 Jan 30. PubMed PMID: 33515072; PubMed Central PMCID: PMC7940272.

Chown EE, Wang P, Zhao X, Crowder JJ, Strober JW, Sullivan MA, Xue Y, Bennett CS, Perri AM, Evers BM, Roach PJ, Depaoli-Roach AA, Akman HO, Pederson BA, Minassian BA. [GYS1 or PPP1R3C deficiency rescues murine adult polyglucosan body disease](#). *Ann Clin Transl Neurol*. 2020 Nov;7(11):2186-2198. doi: 10.1002/acn3.51211. Epub 2020 Oct 9. PubMed PMID: 33034425; PubMed Central PMCID: PMC7664254.

Engle SM, Crowder JJ, Watts SG, Indovina CJ, Coffey SZ, Rubenstein EM. [Acetylation of N-terminus and two internal amino acids is dispensable for degradation of a protein that aberrantly engages the endoplasmic reticulum translocon](#). *PeerJ*. 2017;5:e3728. doi: 10.7717/peerj.3728. eCollection 2017. PubMed PMID: 28848693; PubMed Central PMCID: PMC5571791.

Crowder JJ, Geigges M, Gibson RT, Fults ES, Buchanan BW, Sachs N, Schink A, Kreft SG, Rubenstein EM. [Rkr1/Ltn1 Ubiquitin Ligase-mediated Degradation of Translationally Stalled Endoplasmic Reticulum Proteins](#). *J Biol Chem*. 2015 Jul 24;290(30):18454-66. doi: 10.1074/jbc.M115.663559. Epub 2015 Jun 8. PubMed PMID: 26055716; PubMed Central PMCID: PMC4513105.

Watts SG, Crowder JJ, Coffey SZ, Rubenstein EM. [Growth-based determination and biochemical confirmation of genetic requirements for protein degradation in *Saccharomyces cerevisiae*](#). *J Vis Exp*. 2015 Feb 16;(96):e52428. doi: 10.3791/52428. PubMed PMID: 25742191; PubMed Central PMCID: PMC4354639.

Awards and Presentations

Center for Diabetes and Metabolic Diseases Annual Symposium Poster Presentation,

Indianapolis IN, August 2022

Poster Title: *IL-6 Regulates Beta Cell Metabolism Associated with High Fat Diet and Obesity*

Metabolism and Islet Biology Oral Presentation, Indianapolis IN, April 2021

Presentation Title: *Islet Respirometry using Oroboros Oxygraph O2K*

Outstanding Graduate Student in Laboratory Science Award, Ball State University, April 2015

Student Achievement Award, Ball State University, April 2015

Indiana Academy of Science Annual Meeting Oral Presentation, Indianapolis IN, March 2015

Poster Title: *Regulation of Non-stop Protein Abundance by Cytosolic and Endoplasmic Reticulum-localized Ubiquitin Ligases in Saccharomyces cerevisiae*

Ball State Student Symposium Poster Presentation, Ball State University, April 2014

Poster Title: *Border Patrol: Cellular Regulation of Abnormal Proteins*

Indiana Academy of Science Annual Meeting Poster Presentation, Indianapolis IN, March 2014

Poster Title: *Border Patrol: Cellular Regulation of Abnormal Proteins*

ASPiRE Grant, Ball State University, November, 2013

Project Title: *Directing Traffic: Cellular Detection and Destruction of Faulty Proteins*

Award Amount: \$500

References Available Upon Request