# **SUMMARY:**

A PhD molecular biologist with excellent written and verbal communication skills, including funded grant applications, peer reviewed publications, and award-winning presentations, over 10 years’ experience in reagent and assay development/validation and a history of collaborative and independent work in large and small laboratories in academic and industry R&D environments.

**Online at:** <http://showcase.bdbllc.us/resumeAndCV/BrianDBowerPhD_CV.docx>

**PDF at:** <http://showcase.bdbllc.us/resumeAndCV/BrianDBowerPhD_CV.pdf>

# CONTACT INFORMATION:

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Carrboro, North Carolina 27510-1559

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## WEBSITES:

**Business Website:** <http://www.BDBLLC.us>

**Business Showcase:** <http://www.showcase.BDBLLC.us>

**Business LinkedIn:**  <http://www.LinkedIn.com/company/Brian-David-Bower-LLC>

**Personal LinkedIn:**  <http://www.LinkedIn.com/in/BrianBowerPhD/>

**ResearchGate:** <http://www.ResearchGate.net/profile/Brian_Bower>

# TRAINING AND EDUCATION:

## PROFESSIONAL CERTIFICATES:

### Certiport Information Technology Specialist Certifications:

#### JavaScript **December 2021**

**Expiration:** Never / Not Applicable

**Credential ID:**  82f510b4-a2c9-413e-98aa-cb20fb88605b

**Verification Link:** <https://www.credly.com/badges/82f510b4-a2c9-413e-98aa-cb20fb88605b>

**Description:** Earners of this badge demonstrate that they can recognize, write, and debug JavaScript code that will logically solve a problem.

### Microsoft Technology Associate (MTA) Certifications:

#### **98-361:** Software Development Fundamentals **May 2021**

**Expiration:** Never / Not Applicable

**Credential ID:**  6285f342-21e4-4fd5-b041-2cfc8ee62cb9

**Verification Link:** <https://www.credly.com/badges/6285f342-21e4-4fd5-b041-2cfc8ee62cb9/linked_in_profile>

**Description:** Earners of the MTA: Software Development Fundamentals certification have demonstrated core software development skills. The MTA program provides an appropriate entry point to a future career in technology.

#### **98-388**: Introduction to Programming Using Java **December 2020**

**Expiration:** Never / Not Applicable

**Credential ID:**  f9beaa72-b560-48a6-bc6d-e801efbc6e61

**Verification Link:** <https://www.youracclaim.com/badges/f9beaa72-b560-48a6-bc6d-e801efbc6e61?source=linked_in_profile>

**Description:** Introduction to Programming Using Java validates the skills and knowledge to write, debug and maintain well-formed, well documented Java code. The MTA program provides an appropriate entry point to a future career in technology.

#### **98-383:** Introduction to Programming Using HTML & CSS **December 2020**

**Expiration:** Never / Not Applicable

**Credential ID:**  90f1edd9-95b9-40f3-bd85-7b6ea5821f2b

**Verification Link:** <https://www.youracclaim.com/badges/90f1edd9-95b9-40f3-bd85-7b6ea5821f2b?source=linked_in_profile>

**Description:** Introduction to Programming Using HTML and CSS validates the skills and knowledge to recognize and write syntactically correct HTML and CSS, structure data using HTML elements, and create and apply styles using CSS. Earners are expected to have at least 100 hours of instruction or hands-on experience with HTML and CSS, be familiar with their features and capabilities, and understand how to write, debug, and maintain well-formed HTML and CSS code.

### The Council for Six Sigma Certification (CSSC) Certifications:

#### Lean Six Sigma White Belt Certification **December 2020**

**Expiration:** Never / Not Applicable

**Credential ID:**  6NaXNE9nTY

**Verification Link:** <https://www.sixsigmacouncil.org/six-sigma-certification-verification/>

[GROUP 2, LEAN SIX SIGMA WHITE BELT]

**Description:** A Council for Six Sigma Certification (CSSC) Certified Lean Six Sigma White Belt is an individual that has been provided, and has demonstrated an understanding of the most basic level of the Six Sigma Methodology. The White Belt Certification designation also reflects knowledge by the individual of the basic definition, history, and structure of the discipline. This understanding provides a solid awareness of who is involved in the actual Six Sigma implementation, and their roles within an organization.

## DURHAM TECHNICAL COMMUNITY COLLEGE:

### DEGREES, DIPLOMAS, AND CREDENTIALS:

#### Associate of Applied Science (A.A.S), Software Development **December 2021**

Click to view Degree

##### Description:

The Information Technology (IT) curriculum prepares graduates for employment in the technology sector as designers, testers, support technicians, system administrators, developers, or programmers who use computer software and\or hardware to design, process, implement and manage information systems in specialties such as database services, security, business intelligence, healthcare informatics and others depending on the technical path selected within this curriculum.

#### Academic Information Technology Certificates

##### IT Foundations Certificate **May 2021**

Click to view Certificate

##### Microsoft Developer Certificate **May 2021**

Click to view Certificate

##### Database Programming Certificate **December 2020**

Click to view Certificate

##### Java Developer Certificate **December 2020**

Click to view Certificate

##### Software Development Fundamentals **December 2020**

Click to view Certificate

### DTCC COURSEWORK DETAILS:

Click to open DTCC Transcript

#### Computer Science / Information Technology Courses:

##### Web, Programming, and Database, Foundation

**Abbreviation**: CTI-110 **Grade**: A
**Description**: This course covers the introduction of the tools and resources available to students in programming, mark-up language and services on the Internet. Topics include standard mark-up language Internet services, creating web pages, using search engines, file transfer programs; and database design and creation with DBMS products. Upon completion students should be able to demonstrate knowledge of programming tools, deploy a website with mark-up tools, and create a simple database table.

##### Network and Security Foundation

**Abbreviation**: CTI-120 **Grade**: B**Description**: This course introduces students to the Network concepts, including networking terminology and protocols, local and wide area networks, and network standards. Emphasis is placed on securing information systems and the various implementation policies. Upon completion, students should be able to perform basic tasks related to networking mathematics, terminology, media and protocols.

##### Python Programming

**Abbreviation**: CSC-121 **Grade**: A
**Description**: This course introduces computer programming using the Python programming language. Emphasis is placed on common algorithms and programming principles utilizing the standard library distributed with Python. Upon completion, students should be able to design, code, test, and debug Python language programs.

##### JAVA Programming

**Abbreviation**: CSC-151 **Grade**: A
**Description**: This course introduces computer programming using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion students should be able to design, code, test, debug JAVA language programs.

##### SAS

**Abbreviation**: CSC-152 **Grade***:* A
**Description**: This course introduces the fundamentals of SAS programming. Emphasis is placed on learning basic SAS commands and statements for solving a variety of data processing applications. Upon completion, students should be able to use SAS data and procedure steps to create SAS data sets, do statistical analysis, and general customized reports.

##### C# Programming

**Abbreviation**: CSC-153 **Grade**: A**Description**: This course introduces computer programming using the C# programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test, debug, and implement objects using the appropriate environment at the beginning level.

##### Advanced JAVA Programming

**Abbreviation**: CSC-251 **Grade**: A**Description**: This course is a continuation of CSC 151 using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test, debug, and implement objects using the appropriate environment.

##### Advanced C# Programming

**Abbreviation**: CSC-253 **Grade**: A**Description**: This course is a continuation of CSC 153 using the C# programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger. Upon completion, students should be able to design, code, test, debug, and implement objects using the appropriate environment.

##### Information Systems Business Concepts

**Abbreviation**: CTS-115 **Grade**: A**Description**: The course introduces the role of IT in managing business processes and the need for business process and IT alignment. Emphasis is placed on industry need for understanding business challenges and developing/managing information systems to contribute to the decision-making process based on these challenges. Upon completion, students should be able to demonstrate knowledge of the 'hybrid business manager' and the potential offered by new technology and systems.

##### Database Concepts

**Abbreviation**: DBA-110 **Grade**: A
**Description**: This course introduces database design and creation using a DBMS product. Emphasis is placed on data dictionaries, normalization, data integrity, data modeling, and creation of simple tables, queries, reports, and forms. Upon completion, students should be able to design and implement normalized database structures by creating simple database tables, queries, reports, and forms.

##### Database Programming I

**Abbreviation**: DBA-120 **Grade**: A**Description**: This course is designed to develop SQL programming proficiency. Emphasis is placed on data definition, data manipulation, and data control statements as well as on report generation. Upon completion, students should be able to write programs which create, update, and produce reports.

##### Internet/Web Fundamentals

**Abbreviation**: WEB-110 **Grade**: A
**Description**: This course introduces World Wide Web Consortium (W3C) standard markup language and services of the Internet. Topics include creating web pages, search engines, FTP, and other related topics. Upon completion, students should be able to deploy a hand-coded website created with mark-up language, and effectively use and understand the function of search engines.

## UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL: University of North Carolina Logo.

### DEGREES, DIPLOMAS, AND CREDENTIALS:

#### Doctor of Philosophy (Ph.D.) in Genetics & Molecular Biology **December 2014**

Click to view Degree

##### Description:

The Curriculum in Genetics and Molecular Biology (GMB) is an interdepartmental PhD program whose mission is (1) to train students from diverse backgrounds to earn a PhD in the fields of genetics, genomics, and molecular biology by guiding them through the acquisition of essential elements of the PhD, including responsible achievement of significant original research; and (2) to provide opportunities for learning about the breadth of careers in research and research-related fields and acquiring the skills and experiences that will facilitate the transition into such careers.

#### Graduate Certificate in Bioinformatics & Computational Biology **December 2014**

##### Description:

A certificate of specialization in BCB is also available for students seeking some formal training in bioinformatics and computational biology, but who wish to pursue their degree in a related discipline.

### UNC-CH COURSEWORK DETAILS:

Click to open UNC Transcript

#### Bioinformatics / Computational Biology Courses:

##### Applications of Information Theory, Genetic Programming, and Neural Networks to Sequence analysis

**Abbreviation**: BCB-711 **Grade**: Pass
**Description**: Course covers applications of several commonly used methods to understand sequence structure and function at the DNA and RNA level.

##### Databases, Metadata, Ontologies, and Digital Libraries for Biological Sciences

**Abbreviation**: BCB-712 **Grade**: Pass
**Description**: Course introduces the basic information-science methods for storage and retrieval of biological information.

##### Modeling Signaling Pathways

**Abbreviation**: BCB-715 **Grade**: Pass
**Description**: The course will provide an introduction to the basic mathematical techniques used to develop and analyze models of signaling pathways and regulatory networks. Both deterministic and stochastic models will be discussed. The numerical techniques covered in the class will include methods for solving ordinary differential equations and Monte Carlo methods. If time permits, the diffusion equation also will be considered. Homework assignments will be completed using MATLAB. No experience using MATLAB is assumed. Particular emphasis will be placed on feedback and feed-forward control mechanism used to regulate biochemical pathways. The course will be self-contained, with all the necessary biology and mathematics covered in class. However, students are expected to have taken undergraduate calculus.

##### Structural Bioinformatics

**Abbreviation**: BCB-715 **Grade**: Pass
**Description**: Course introduces methods and techniques for protein modeling.

#### Genetics and Molecular Biology Courses:

##### Principles of Genetic Analysis

**Abbreviation**: GNET-621 **Grade**: Pass
**Description**: Intended to provide an intensive introduction to modern genetic analysis based on classical and contemporary paradigms, drawing on examples from a wide range of model organisms. There are two lectures per week; the material covered in lectures is reinforced through problem sets and readings of research and review articles. There is also a weekly recitation at which students lead discussion of assigned articles.

##### Advanced Molecular Biology I

**Abbreviation**: GNET-631 **Grade**: Pass
**Description**: This course focuses on DNA, the molecule most fundamental to life: organization of DNA into genomes, genome replication, recombination, repair, and cellular responses to DNA damage.

##### Advanced Molecular Biology II

**Abbreviation**: GNET-632 **Grade**: Pass
**Description**: The purpose of this course is to provide historical, basic and current information about the flow and regulation of genetic information from DNA to RNA in a variety of biological systems. Topics include mechanisms of gene regulation, transcription, histone modifications, protein translation and transport, and RNA structure, function, processing, and transport

#### Pharmacology Courses:

##### Target-Based Drug Discovery and Cancer Treatment

**Abbreviation**: PHCO-737 **Grade**: High Pass
**Description**: A lecture/discussion course that emphasizes preclinical and clinical studies for the development of anti-cancer drugs that target signal transduction. Topics include: target identification and validation, drug discovery, the process of government approval for clinical trials, design of clinical trials, and new genetic-based technologies to foster drug development.

## **OHIO UNIVERSITY**: Ohio University Logo

### DEGREES, DIPLOMAS, AND CREDENTIALS:

#### Bachelor of Science (B.S. / B.Sc.) Biological Sciences: **June 2008**

Click to view Degree

##### *Description:*

The B.S. degree program in Biological Sciences is designed for students who seek flexibility and breadth in their programs. This track is particularly well-suited for students who plan to enter a biological sciences graduate program or professional school.

* Preparation for biology graduate programs or professional school, including Physician Assistant programs
* Specializations in clinical laboratory science/medical technology, exercise physiology, or neuroscience
* Careers in state and federal government, higher education settings, the health industry, research laboratories, environmental organizations, Centers for Disease Control and Prevention, nature centers, museums, etc.

#### Cellular and Molecular Biology Degree Specialization:

##### *Description:*

Cellular and molecular biology are two of the most rapidly growing and exciting areas of modern biology. Progress in these areas is driven by the ongoing revolution in genetics and genomics, and it has profound and wide-ranging implications for medicine and for our understanding of the mechanisms of life. This specialization prepares students for graduate or professional school, and career paths in biotechnology, biomedical research, and related areas. These are fields that are experiencing tremendous growth in employment opportunities both in academia and in the private sector.

#### Chemistry Minor: **June 2008**

##### *Description:*

A chemistry minor will prepare students with an understanding of the fundamentals of chemistry as well as giving them experience with organic, inorganic, physical, and biochemistry. A minor could help prepare studies for graduate school in the natural sciences or medicine.

Graduates will gain a basic understanding in chemistry that could complement their major area of study and enable students to think in a more interdisciplinary manner. Examples of careers that could benefit from a minor in chemistry include medicine, pharmacy, biomedical research, law (especially patent law in the sciences) and chemical, civil and biomedical engineering.

#### History Minor: **June 2008**

##### *Description:*

A history minor is an excellent choice for students looking to supplement their primary fields of study with historical context or who just have a passion for history. The History Department has students from all colleges and departments and a flexible program that nicely complements Ohio University’s General Education requirements.

### OU COURSEWORK DETAILS:

Click to open OU Transcript

#### Biology / Biological Sciences Courses:

##### Introduction to Zoology I

**Abbreviation**: BIOS170 **Grade**: A-
**Description**: Designed for science majors and preprofessional students. Introduction to the chemistry of life, cell structure and function, and the principles of inheritance. Laboratories enhance lecture coverage of major topics with emphasis on experimental design and critical analysis.

##### Introduction to Zoology II

**Abbreviation**: BIOS171 **Grade**: A
**Description**: Designed for science majors and preprofessional students. Introduction to multicellular life, organ systems, anatomy, physiology, and animal development; emphasis is on comparative strategies with the animal kingdom. Laboratories enhance lecture coverage of major topics with dissections and microscopy.

##### Introduction to Zoology III

**Abbreviation**: BIOS172 **Grade**: A
**Description:** Designed for science majors and preprofessional students. Introduction to the principles of evolution, ecology, and behavior.

##### Introduction to Zoology Lab

**Abbreviation**: BIOS173 **Grade**: B
**Description**: Laboratory survey of the major phyla of the animal kingdom to reveal evolutionary relationships and structural and functional characteristics. Laboratory includes microscopy and dissection.

##### Anatomy and Histology

**Abbreviation**: BIOS300 **Grade**: A-
**Description**: Gross and microscopic structure of the basic tissues and organ systems of the human body. Lab incorporates microscopy and dissection.

##### Fundamentals of Animal Cell Biology

**Abbreviation**: BIOS320 **Grade**: A
**Description**: Comprehensive introduction to the structure and function of animal cells, emphasizing fundamental principles and concepts of modern cell biology and the dynamic nature of cells and their components.

##### General Microbiology

**Abbreviation**: BIOS321 **Grade**: A
**Description**: Overview of bacteria, protista, viruses and their relationship to us and our environment. Lab training in common microbiological methods.

##### General Genetics

**Abbreviation**: BIOS325 **Grade**: A
**Description**: Principles and concepts of genetics as revealed by classical and modern investigation.

##### Lab Genetics

**Abbreviation**: BIOS326 **Grade**: A-
**Description**: Experiments include site-directed mutagenesis, yeast 2-hybrid analysis, and transposon mutagenesis in Drosophila. Recombinant DNA techniques designed to familiarize the student with current laboratory procedures in molecular genetics.

##### Principles of Evolution

**Abbreviation**: BIOS330 **Grade**: A-
**Description**: Study of the microevolutionary and macro-evolutionary processes and patterns that explain and characterize the history and diversity of life on earth.

##### Principles of Physiology I

**Abbreviation**: BIOS342 **Grade**: B
**Description**: Function of animal cells and organs emphasizing the physical and chemical principles underlying physiological processes. Focus on chemical messengers, metabolite processes, membrane properties of excitable an non-excitable cells, and muscle function.

##### Principles of Physiology II

**Abbreviation**: BIOS343 **Grade**: B+
**Description**: Physiological processes underlying circulation, gas exchange, water ad solute balance, and temperature relations.

##### Principles of Physiology I Lab

**Abbreviation**: BIOS354 **Grade**: B+
**Description**: Laboratory exercises designed to illustrate the experimental basis of principles covered in 343.

##### Computer Simulation Biology

**Abbreviation**: BIOS419 **Grade**: A
**Description**: Introduction to computer modeling and simulation in biological research. Designed to illustrate the power and limitations of computer simulation by having students code (in software simulation programs like Berkeley Madonna or MATLAB) simulation programs for a number of different biological phenomena. Quantitative models used include those of enzyme kinetics, population biology, population genetics, epidemics, diffusion, and compartmental models in physiology and system biology.

##### Pathogenic Bacteriology Lab

**Abbreviation**: BIOS423B **Grade**: B+
**Description**: Pathogenic and clinical diagnostic bacteriological techniques. Complements lecture material in 423A.

##### Molecular Genetics

**Abbreviation**: BIOS426 **Grade**: B+
**Description**: Topics will emphasize the interaction of microbial genetics with molecular biology and biotechnology. Genetics of selected bacteria, their bacteriophages, and yeast are covered. Topics include the genetic elements of bacteria, bacteriophage, and yeast; mutations and mutagenesis, mitochondrial genetics and prions, mechanisms of gene transfer and recombination, regulation of gene expression, and recombinant DNA.

##### Gene Regulation

**Abbreviation**: BIOS427 **Grade**: B+
**Description**: Class is intended for upper-level undergraduates and graduate students. An in-depth discussion of the molecular events that regulate eukaryotic gene expression. Topics also include gene regulation during differentiation and development, aberrant transcription and disease, generation and utility of transgenic animals, and genomics-based analysis of gene expression.

#### Chemistry & Physics Courses:

##### Fundamentals of Chemistry I

**Abbreviation**: CHEM151 **Grade**: B
**Description**: General course in fundamental chemical principles. Atomic structure, periodic classification, bonding, mole concept, stoichiometry with problem solving, thermochemistry, equilibrium, and gases. Recommended for majors in chemistry, engineering, biological sciences, plant biology, clinical laboratory science, geological sciences, secondary education (B.S.Ed. in biological sciences, chemistry, physics, and integrated science), and preprofessional (biological science) areas.

##### Fundamentals of Chemistry II

**Abbreviation**: CHEM152 **Grade**: C
**Description**: States of matter, solutions, kinetics, acids, bases, and chemical equilibrium acid, bases and salts with problem solving.

##### Fundamentals of Chemistry III

**Abbreviation**: CHEM153 **Grade**: C+
**Description**: Introduction to solubility equilibration, thermodynamics and redox. Study of the chemistry of transition metals, selected representative elements, and molecular orbital theory. Introduction to nuclear and radiochemistry. Lab includes quantitative analysis.

##### Quantitative Analysis

**Abbreviation**: CHEM241 **Grade**: B
**Description**: Introduction to quantitative technologies that include volumetric, gravimetric methods of analysis, and spreadsheet calculations. MS Excel for modeling and problem solving

##### Quantitative Analysis Lab

**Abbreviation**: CHEM242 **Grade**: A
**Description**: Laboratory work to accompany 241.

##### Organic Chemistry Lab

**Abbreviation**: CHEM303 **Grade**: A
**Description**: Lab work to accompany 305.

##### Organic Chemistry Lab

**Abbreviation**: CHEM304 **Grade**: A
**Description**: Lab work to accompany 307.

##### Organic Chemistry I

**Abbreviation**: CHEM305 **Grade**: C+
**Description**: Organic chemistry for chemistry majors and other students wishing to acquire sound knowledge of classical and modern organic chemistry.

##### Organic Chemistry II

**Abbreviation**: CHEM306 **Grade**: C+
**Description**: Continuation of 305.

##### Organic Chemistry III

**Abbreviation**: CHEM307 **Grade**: B
**Description**: Continuation of 306.

##### Fundamentals of Inorganic Chemistry

**Abbreviation**: CHEM376 **Grade**: C
**Description**: Inorganic topics related to structure, bonding, redox, HSAB, and descriptive main group/transition metal chemistry, including complexes/organometallics.

##### General Biochemistry I

**Abbreviation**: CHEM490 **Grade**: B-
**Description**: Macromolecular structure of biomolecules.

##### General Biochemistry II

**Abbreviation**: CHEM491 **Grade**: B
**Description**: Bioenergetics, metabolism and metabolic control systems.

##### Introduction to Physics I

**Abbreviation**: PHYS201 **Grade**: Advanced Placement Transfer
**Description**: First course in physics; open to students from all areas. Students should have a background in algebra, trigonometry and geometry, but no calculus required. Recommended for students in liberal arts, architecture, industrial technology, geological sciences, and premedicine. Mechanics of solids and liquids.

##### Introduction to Physics II

**Abbreviation**: PHYS202 **Grade**: Advanced Placement Transfer
**Description**: Continuation of 201. Includes electricity, magnetism, heat, thermodynamics, waves, and sound.

##### Introduction to Physics III

**Abbreviation**: PHYS203 **Grade**: Advanced Placement Transfer
**Description**: Continuation of 202. Includes light, relativity, quantum, atomic, and nuclear physics.

#### Math / Mathematics Courses:

##### Pre-Calculus

**Abbreviation**: MATH115 **Grade**: A
**Description**: Graphs, inverses, and operations of functions. Study of polynomial, rational, exponential, and radical expressions, quadratic equations, exponential and logarithmic functions, and inequalities. Graphing calculators are employed.

##### Calculus I

**Abbreviation**: MATH263A **Grade**: B+
**Description**: Limits and differentiation, including trigonometric functions. Applications of the derivative.

##### Calculus II

**Abbreviation**: MATH263B **Grade**: B
**Description**: Integration, logarithmic, exponential, exponential, and other transcendental functions; indeterminate forms, improper integrals, and techniques for integration.

#### Computer Science / Information Technology Courses:

##### Computer Literacy

**Abbreviation**: C S 120 **Grade**: A
**Description**: Basic computer course for students from different disciplines who are expected to use computer in an academic environment. Lecture emphasis is on concepts--what the student needs to know about computer systems, essential applications, internet options, and computer security and ethical concerns in an information age. Lab emphasis is on skills--what the student needs to practice to be proficient with word processing, spreadsheets, database management systems, presentation graphics and web pages as problem solving tools.

##### Computer Programming I

**Abbreviation**: C S 230 **Grade**: A
**Description**: Intended as a stand-alone class for students who want to learn about computer programming for their use in various fields. Basic programming and program structure. Primitive data types. Structured programming and control structures. Object oriented programming and classes. Command line and graphical user interfaces. Computer solution to a variety of problems using the Java programming language.

#### English / Writing Courses:

##### Writing and Rhetoric I

**Abbreviation**: ENG 151 **Grade**: B+
**Description**: Practice in composing and revising expository essays that are well organized, logically coherent, and effective for their purpose and audience. Topics from personal experience, nonfiction reading, and research material.

##### Introduction to Literature

**Abbreviation**: ENG 200 Grade: A
**Description**: Approaches to reading and interpreting fiction, poetry, and drama using skills, techniques, and language of interpretation.

##### Writing and Rhetoric II

**Abbreviation**: ENG 308J **Grade**: B+
**Description**: Focuses on skills in writing a variety of genres (i.e., rhetorical analysis, research-based argument, report, etc.). Coursework includes learning to read rhetorically and using effective strategies for searching academic databases and evaluating sources. Also focuses on using correct documentation and mechanics.

##### Writing in the Sciences

**Abbreviation**: ENG 309J **Grade**: A
**Description**: Provides students in the sciences with an opportunity to practice writing within their majors. Focuses on how to review prior research, how to propose research projects, how to incorporate research results into final reports, and how to write clearly and concisely.

#### Foreign Languages Courses:

##### Beginning Latin I

**Abbreviation**: LAT 111 **Grade**: High School Transfer
**Description**: Grammar, vocabulary and reading. First of a three-part series.

##### Beginning Latin II

**Abbreviation**: LAT 112 **Grade**: High School Transfer
**Description**: Continuation of 111.

##### Beginning Latin III

**Abbreviation**: LAT 113 **Grade**: High School Transfer
**Description**: Continuation of 112.

##### Elementary Spanish I

**Abbreviation**: SPAN111 **Grade**: B-
**Description**: Developing proficiency in listening, reading, speaking, and writing essential to interactive language learning. First of a three-part series.

##### Elementary Spanish II

**Abbreviation**: SPAN112 **Grade**: B
**Description**: Continuation of 111.

##### Elementary Spanish III

**Abbreviation**: SPAN113 **Grade**: A
**Description**: Continuation of 112.

#### Psychology, Philosophy & Anthropology Courses:

##### General Psychology

**Abbreviation**: PSY 101 **Grade**: A
**Description**: Introduction to psychology. Survey of topics in experimental and clinical psychology including physiological bases of behavior, sensation, perception, learning, memory, human development, social processes, personality, and abnormal behavior.

##### Stats for Behavioral Psychology

**Abbreviation**: PSY 221 **Grade**: A-
**Description**: Introduction to descriptive and inferential statistics with emphasis on inferential statistics.

##### Psychology of Personality

**Abbreviation**: PSY 233 **Grade**: A
**Description**: Development, organization, and assessment of personality, with evaluation of major theoretical perspectives and research on personality.

##### Comparative Psychology

**Abbreviation**: PSY 314 **Grade**: A
**Description**: Behavior of animals across phylo-genetic scale. Interaction of genetics, hormones, learning, etc., in development of behavior. Lecture, lab, field trips, and naturalistic movies.

##### Philosophy Fundamentals

**Abbreviation**: PHIL101 **Grade**: B-
**Description**: Survey of selected basic problems, concepts, and methods in philosophy.

##### Introduction to Cultural Anthropology

**Abbreviation**: ANTH101 **Grade**: A
**Description**: Students learn about the core concepts used in cultural anthropology and how anthropologists study human cultures and societies. Consideration is given to the relevance of anthropological theories, methods, and ethics in the context of contemporary culture change, taking into account processes of colonialism, globalization, and development. Students gain an appreciation of the broader goals of cultural anthropology to record cultural patterns and behaviors, represent a variety of voices and perceptions, explain cultural processes, and develop a fundamental understanding of human diversity.

#### History & Political Science Courses:

##### Western Heritage: Classical Age

**Abbreviation**: HIST121 **Grade**: C+
**Description**: Origins of Western heritage from antiquity to 1500. Included are such topics as religion, philosophy, literature, and visual arts, as well as major political events and developments.

##### Western Heritage: Medieval Legacy

**Abbreviation**: HIST122 **Grade**: B+
**Description**: What is the West? Is there indeed a coherent, identifiable Western heritage? If so, what is distinctive about the West's heritage? And what, further, is distinctive about the West's modern heritage? Addresses these questions by way of an examination of major intellectual, cultural, and political developments from 1500 until the present. Topics to be considered include the Renaissance; the religious Reformations of the 16th- century; absolutism, constitutional monarchy, and enlightened despotism; the Scientific Revolution and the Enlightenment; the American and French Revolutions; industrialization and nation building; modernism; imperialism and the World Wars; and the rise and fall of totalitarian regimes in the 20th- century.

##### Western Heritage: Modernity

**Abbreviation**: HIST123 **Grade**: A
**Description**: Major intellectual currents and cultural results from time of Renaissance to present examines in humanistic perspective. Included are such topics as origins of modern philosophy, languages, revolutions, political ideologies, and cultural pluralism.

##### US in World War II

**Abbreviation**: HIST303 **Grade**: B+
**Description**: Military and diplomatic role of U.S. in WWII; war's political, economic, and social impact on the nation.

##### Latin American History

**Abbreviation**: HIST323C **Grade**: B+
**Description**: Examines Latin American history in the 19th- and 20th- centuries, focusing on causes and consequences of Independence; the political, social and economic challenges of nation-state formation; competing political/ideological responses to structural crisis in the 20th- century (social revolution, authoritarianism, democratic change); and ongoing search for viable formulas of economic development.

##### History Through Film

**Abbreviation**: HIST330 **Grade**: B-
**Description**: Examination of selected topics in the United States, European, or Third World history through films and readings accompanied by lectures and discussion.

##### Oil & World Power

**Abbreviation**: HIST333 **Grade**: A-
**Description**: Examines the international politics of oil from a historical perspective, emphasizing the importance of the Persian Gulf. Topics include the roots and guiding principles behind oil policy; oil in the two world wars; postwar changes in global oil production, culminating in the oil crisis of the 1970s; the pattern and end of the British dominance in the Gulf; the subsequent expansion of the United States commitments in the region since the 1970s; the role of local nation-states, in particular Iran, Iraq, and Saudi Arabia; oil today, and prospects for the future.

##### American National Government

**Abbreviation**: POLS101 **Grade**: A
**Description**: Constitutional basis and development, political processes, institutions, and organization of American national government.

## STANDARDIZED TESTING:

### Medical College Admissions Test (MCAT): 32P

**Date:** 09/2007

Click to open scanned MCAT Scores

**Score Percentile**

**Scores**: **Verbal** **Reasoning** 11 82.6-94.14

**Physical Sciences** 09 54.6-67.4

**Writing Sample** P 57.3-70.1

**Biological Sciences** 12 88-94.5

**Total Score** 32P 83.4-87.2

### Graduate Record Examination (GRE): 1370

**Date:** 08/2007

Click to open scanned GRE Scores

|  |
| --- |
| **GENERAL TEST** |
| TEST DATE | VERBAL | QUANTITATIVE | ANALYTICAL WRITING |
| MMYY | SCORE | % BELOW | SCORE | % BELOW | SCORE | % BELOW |
| 07-08 | 640 | 91 | 730 | 79 | 4.5 | 58 |

### ACT Assessment (ACT): 30

**Date:** 02/2002

Click to open scanned ACT Scores

 **KNOWLEDGE AND SCORES** **RANK** (% Of College Bound Student at Or Below Score)

0.

 **SKILLS AREAS (**1-36)(1-18) **10 25 50 75 90 99**

ENGLISH **28** **----92----**

Usage/Mechanics 15 --------91--------

Rhetorical Skills 14 --------89--------

MATHEMATICS **29** **----94----**

Pre-Algebra/Elem. Alg. 14 --------84--------

Alg./Coord. Geometry 15 --------96--------

Plane Geometry/Trig. 16 --------99--

READING **34** **----98----**

Soc. Studies/Sciences 17 --------99--

Arts/Literature 18 --------99--

SCIENCE REASONING **29** **----96----**

COMPOSITE (Average) 30 \*\***97\*\***

### SAT Assessment (SAT): 1210

**Date:** 11/2000

Click to open scanned SAT Scores

|  |  |  |  |
| --- | --- | --- | --- |
| **SAT I: Reasoning Test** | **Score** | **ScoreRange** | **PercentilesCollege-Bound Seniors** |
| **National** | **State** |
| **Verbal** | R 640 | 610-670 | 88 | 84 |
| **Math** | R 570 | 540-600 | 67 | 59 |

# WORK AND EMPLOYMENT:

## BDB LLC BDB LLC Logo.

**Carrboro, NC Scientific Consultant 7/2017-to-Present**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Founded and registered a North Carolina Limited Liability Corporation (LLC) and filed annual reports to market scientific and technical consulting and contracting services to clients around Raleigh-Durham & Research Triangle Park, NC.

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Registered, set up, and maintained a company website via Name.com using a combination of What You See Is What You Get (WYSIWYG) web building tools, HTML, CSS and PHP: <https://www.BDBLLC.US>
* Managed business banking and retirement plans including setup of 401(k) and Roth 401(k) plans, arranging employer matching, rollovers, and plan termination.
* Filed and managed business taxes and tax compliance at state and federal level.
* Established relationships with major vendor, supplier, and outsourcing management services and clients with a focus on Raleigh-Durham-Chapel Hill and RTP areas of NC.
* Bid upon, won and satisfied contracts netting over $100,000.00 in profits.

### CLIENTS:

Go to Chaperone Therapeutics Inc.

* **Chaperone Therapeutics, Inc.:** 3/2018-8/2020

### LOCATION INFORMATION:

**Address:** 104-R NC Highway 54 West, Suite # 245

Carrboro, NC 27510-1559 USA

**Point/s of Contact:** Brian Bower, PhD

**Website/s:** <https://www.BDBLLC.US>

## IQVIA Laboratories *(formerly Q2 Solutions)*

**Durham, NC Associate Principal Scientist 11/2023-to-11/2024**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Performed clerical, administrative and scientific duties of an Associate Principal Scientist in the Assay Development portion of the Biosciences team (aka the ‘BioA’ team), and performed other duties as assigned.

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Obtained a Q2 Solutions Lean Six Sigma (6σ) Yellow Belt.
* Served on both the Site Safety Committee and the Employee Engagement Committee.
* Identified process inefficiencies with a potential cost of $150K/year, and documented, proposed, and implemented solutions to mitigate this avoidable cost.
* Designed, prototyped, tested, and deployed process improvements for BioTek/Agilent Plate Washers including the [405 TS](https://www.agilent.com/en/product/cell-analysis/microplate-automation-detection/microplate-washers-dispensers/biotek-405-ts-washer-1623265) and the [405 Select](https://www.agilent.com/en/product/microplate-instrumentation/automated-liquid-dispensing-handling/automated-microplate-washers-dispensers/biotek-elx405-select-deep-well-washer-1623269) including reagent supply line splitters and Bag-in-Box and Cubitainer based reagent containers.
* Prototyped and tested esoteric process improvements including Freezer (-20 °C) and Ultra-Cold Freezer (-80 °C) desiccant/dehydration systems to mitigate frost/ice buildup, and Ultra-High Frequency (UHF) Radio Frequency Identification (RFID) tag based asset tracking/location systems – including tag tracking within sealed freezers and packed freezer racks.
* Assisted with laboratory system validation processes (LSVP) and system development lifecycle (SDLC) for regulated systems including the Advanced Instruments Artel [Multichannel Verification System (MVS)](https://www.aicompanies.com/artel-liquid-handling/mvs-multichannel-verification-system/) and the Hamilton Company [Microlab Prep](https://www.hamiltoncompany.com/automated-liquid-handling/platforms/microlab-prep).
* Developed and oversaw portions of a quarterly skills testing curriculum using the Artel MVS and Data Manager to evaluate analyst’s forward & reverse pipetting competency.
* Developed [Smartsheet](https://www.smartsheet.com/) products that automated and streamlined portions of contracted method development and LSVP project management for both end-users and management.

### LOCATION INFORMATION:

**Address:** 2400 Ellis Road

Durham, NC 27703

**Point/s of Contact:** Chris Dishinger, Manager I

**Website/s:** <https://www.iqvia.com/>

<https://www.q2labsolutions.com/>

<https://www.q2labsolutions.com/bioanalytical/>

## BioAgilytix Labs, LLC

**Durham, NC Scientist III 4/2022-to-11/2023**

**Durham, NC Scientist II 3/2021-to-4/2022**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Performed all clerical, administrative and scientific duties of a Scientist II and III in the Gene and Cell Therapy team (aka the ‘Molecular Team’) in a fast-paced contract research organization (CRO), to include acting as lead-scientist on contracted projects, SOP author, system owner and subject matter expert for regulated analytical equipment.

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Simultaneously managed a portfolio of active projects related to chimeric antigen receptor (CAR) T cell (CAR T) and natural killer (CAR NK) cell therapies, adeno associated virus (AAV) and lentiviral/retroviral vector gene therapies, and lipid nanoparticle (LNP) delivered gene editing therapies.
* Served as the scientific and technical lead for contracted assay development, qualification, validation, and sample analysis projects under regulatory regimes including GCP, GLP, and GMP, using instruments including the Bio-Rad [QX 200](https://www.bio-rad.com/en-us/life-science/digital-pcr/qx200-droplet-digital-pcr-system) and [QX One](https://www.bio-rad.com/en-us/life-science/digital-pcr/qx-one-droplet-digital-pcr-ddpcr-system) droplet digital PCR systems, and the ThermoFisherScientific/Applied Biosystems [QuantStudio 7 Flex](https://www.thermofisher.com/order/catalog/product/4485701) Real-Time PCR system, and other equipment.
* Performed and validated nucleic acid extraction (including DNA and RNA) procedures from matrices including mammalian cells and tissues, and formulated gene therapy vectors using manual kits (e.g. Qiagen DNEasy, QIAamp) and automated systems including the Qiagen [QIAcube HT](https://www.qiagen.com/us/products/instruments-and-automation/nucleic-acid-purification/qiacube-ht/) and the ThermoFisherScientific [Kingfisher Flex](https://www.thermofisher.com/us/en/home/life-science/dna-rna-purification-analysis/automated-purification-extraction/kingfisher-systems/models/kingfisher-flex.html).
* Performed and validated nucleic acid quantification via UV/VIS and florescence methods including the Qiagen [QIAxpert](https://www.qiagen.com/us/products/instruments-and-automation/quality-control-fragment-analysis/qiaxpert-system/), the ThermoFisherScientific [NanoDrop One](https://www.thermofisher.com/order/catalog/product/ND-ONE-W), the Agilent [Take3-Trio](https://www.agilent.com/en/product/microplate-instrumentation/microplate-instrumentation-supplies-accessories/imager-reader-peripherals/biotek-take3-take3-trio-microvolume-plates-1623144), and the ThermoFisherScientific [Quant-iT dsDNA Assay Kit](https://www.thermofisher.com/order/catalog/product/Q33120).
* Performed initial qualification (IQ), operational qualification (OQ), and performance qualification (PQ) to validate instruments and systems for regulated use.
* Trained team members on and facilitated incorporation of laboratory automation into Gene and Cell Therapy team workflows to include the [Scinomix SciPrint VX2](https://scinomix.com/product/sci-print-vx2/) for tube labeling and fill operations, and the [Hamilton Microlab Prep](https://www.hamiltoncompany.com/automated-liquid-handling/platforms/microlab-prep) for phase separation, sample normalization, PCR plating, and other routine and non-routine procedures.
* Presented findings and communicated stakeholder opinions at industry conferences.

### LOCATION INFORMATION:

**Address:** 2300 Englert Drive

Durham, NC 27713-4405

**Point/s of Contact:** Albert Catalano, Manager I

**Website/s:** <https://www.bioagilytix.com>

<https://www.bioagilytix.com/solutions/gene-therapy/>

## BOWER ACQUISITIONS LLC

**Carrboro, NC Real Estate Investor 2/2019-to-2/2022**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Founded and registered a North Carolina Limited Liability Corporation (LLC) and filed annual reports to acquire and sell speculative real estate investments.

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Managed business banking, insurance, and tax accounts.
* Performed private title-searches and surveying to establish chain to title, and investigated zoning, tax, setback issues affecting prospective acquisitions.

### LOCATION INFORMATION:

**Address:** 104-R NC Highway 54 West, Suite # 245

Carrboro, NC 27510-1559 USA

**Point/s of Contact:** Brian Bower, PhD

## Chaperone Therapeutics, Inc. Chaperone Therapeutics, Inc. Logo.

**Durham, NC Research Scientist 3/2018-to-8/2020**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Independently set up and operated Chaperone Therapeutics, Inc.’s laboratory in the [BioLabs North Carolina incubator](https://www.biolabs.io/nc), and conducted cell- & tissue-based florescent western blotting (e.g., LI-COR) procedures to support drug development.
* Facilitated acquisition & setup of a LI-COR Odyssey Clx imager via arrangements with LI-COR, Biolabs, and Chaperone, saving Chaperone approximately $50,000.00.
* Worked on contract via BDB LLC.

Go to BDB LLC

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Cultured, cryopreserved and revived cells as necessary to maintain working cell stocks.
* Developed & qualified cell-based drug-screening assays to determine drug potency (EC50), timecourse of drug effect, and serum shift properties.
* Examined drug toxicity via Lactate Dehydrogenase (LDH) cytotoxicity assays.
* Optimized cell seeding density, adherence time, and drug application window for optimal effect, and lysis procedure to obtain sufficient volume and concentration of sample for meaningful, repeated and replicated western blot analyses.
* Cell counting generally done via Countess II FL automated cell counter.
* Developed and qualified duplex florescent western blotting (e.g., LI-COR Odyssey CLx) procedures to measure primary and secondary drug effects.
* Protein separation generally performed using Bio-Rad Criterion, and transfer generally conducted using ThermoFisherScientific iBlot 2 Semi-Dry Transfer System.
* Produced Microsoft Excel spreadsheets to automate assay setup, randomization, analysis, de-randomization, and facilitate Microsoft PowerPoint presentation drafting.
* Re-qualified procedures for analyzing mouse tissues in PK/PD studies and interacted with Contract Research Organizations (CROs) for sample delivery& management.
* Coordinated routine ordering, inventory, sample handling and data management.

### LOCATION INFORMATION:

*Chaperone Therapeutics, Inc. is no longer in business.*

*The below information is displayed to provide historical context.*

**Address:** 701 West Main Street, Suite 200

Durham, North Carolina 27701 USA

[[At the BioLabs NC Incubator](https://www.biolabs.io/nc)]

**Point/s of Contact:** Dennis Thiele, PhD

Maria Sippola-Thiele, PhD, MBA

## BASF Corp. BASF Logo.

**RTP, NC Regulatory Protein Biochemist 1/2017-to-2/2018**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Worked at BASF Corp. in the Plant Sciences division performing assays to quantify transgenic protein expression in plant materials to support successful deregulation of BASF and Cargill’s collaborative [Latitude™](https://www.cargill.com/2018/cargill-launches-latitude) canola crop product.
* Worked on contract for BASF Corp. via Synectics, Inc.

Go to Synetics

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Worked with a diverse, multinational team in a fast-paced, entrepreneurial environment, on tight deadlines in a highly regulated environment.
* Shipped, received, and processed study materials and logged them into inventory.
* Prepared samples for analysis via pulverization in a cryogenically chilled mill/mixer.
* Performed water content determination for plant materials and plant-derived products.
* Validated and employed capillary-electrophoresis western blot/immunoassays (i.e., Protein Simple Wes) to detect and quantify transgenic proteins in prepared samples.
* Optimized extraction buffer composition, extraction ratio, loading quantity, and determined limit of detection (LOD) and assay linearity.
* Extracted samples via bead shaking methods (e.g. Qiagen TissueLyser).
* Worked per Environmental Protection Agency (EPA) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Good Laboratory Practices (GLPs).

Click for GLP Cert.

* Performed initialization and calibrations of equipment including pH meters and scales.
* Coordinated with study directors and the Quality Assurance Unit (QAU/QA) to review Standard Operating Procedures (SOPs), study documents, equipment usage and calibration logs, and test, control and reference (TCR) usage logs.

### LOCATION INFORMATION:

**Address:** 26 Davis Drive

RTP, North Carolina 27709 USA

**Point/s of Contact:** Andrew Olson, PhD

Toralf Senger, PhD

Janna Slessareva, PhD

**Website/s:** <https://www.basf.com/>

## SYNECTICS, INC. Synectics Logo.

**Chicago, IL Technical Consultant 1/2017-to-2/2018**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Provided scientific and technical consultation and expertise to Synetics, Inc. clients located in North Carolina on a contract basis.

### CLIENTS:

Go to BASF Corp

* **BASF Corp.:** 1/2017-2/2018

### LOCATION INFORMATION:

**Address:** 200 South Wacker Drive, Suite 3100

Chicago, IL 60606-5877

**Website/s:** <https://www.synectics.com>

## University of Michigan: University of Michigan Logo.

**Ann Arbor, MI Postdoctoral Research Fellow 10/2014-to-11/2016**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Worked in the laboratory of Dr. Richard Miller in the Career Training in the Biology of Aging program designing and conducting experiments investigating aging biology and other topics relevant to the NIH Interventions Testing Program.
* Worked with a diverse multinational team on large-scale, multi-site collaborations.
* Competed for, won, and renewed grants worth $86,556.00.

Go to Grants/Awards

* Contributed mouse tissue harvesting, sample preparation, western blotting and qPCR expertise to support two Aging Cell publications investigating the effects of gender hormone modulation on mouse lifespan and healthspan.

Go to Related Pubs.

* Won an award for best postdoctoral research presentation.

Go to Grants/Awards

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Routinely isolated mouse primary skin fibroblast *ex vivo* via collagenase digestion and manipulated and passaged said cells *in vitro* via standard and novel cell culture techniques to support drug screening, and other projects.
* Performed live cell counting with conventional and automated hemocytometers.
* Cryopreserved and revived cells as needed to maintain adequate working stocks.
* Sacrificed and dissected mice to retrieve tissues including liver, kidney, heart, lungs, assorted muscles and fat depots, skin, whole brain and brain sections.
* Cryogenically processed obtained mouse tissue into homogenous powder via liquid nitrogen (LN2) chilled mortar and pestle, and BioPulverizer based methods.
* Purified RNA from homogenized tissues and cells using TRIzol or Qiagen RNeasy kits, quantified RNA via NanoDrop or Quant-iT RiboGreen assay, analyzed RNA integrity using an Agilent 2100 Bioanalyzer, quantified RNA expression by SYBR Green real time quantitative PCR (RT-qPCR) using a Thermo Fisher Scientific / Applied Biosystems StepOnePlus Real-Time PCR System.
* Extracted protein from tissues and cells, quantified via plate-based colorimetric assays (Bradford, BCA), separated proteins via SDS-PAGE and analyzed protein expression by chemiluminescent (e.g. HRP/ECL) western/immunoblotting, and analyzed expression using ImageJ and other image analysis software
* Performed protein transfer to membranes via both wet and semi-dry methods.
* Extracted DNA from via direct lysis and kit-based methods and performed PCR and probe-based (e.g. TaqMan) RT-qPCR genotyping to maintain mouse colonies.
* Assisted with design and data analysis for an *in vitro* high throughput drug screen.
* Cloned transgene expression vectors used to establish three novel transgenic mouse lines and developed and validated genotyping and gene expression analysis procedures to characterize the resulting mice.

### LOCATION INFORMATION:

**Address:** 109 Zina Pitcher Place

Ann Arbor, MI 48109-2200

[[Biomedical Science Research Building, BSRB](https://medresearch.umich.edu/facility/biomedical-science-research-building-bsrb)]

**Point/s of Contact:** Richard Miller, MD, PhD

**Website/s:** <http://www.richmillerlab.com/>

## University of North Carolina at Chapel Hill University of North Carolina Logo.

**Chapel Hill, NC Graduate Research Assistant 8/2009-to-9/2014**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Worked in the laboratory of Dr. Jack Griffith as part of the Curriculum in Genetics and Molecular Biology, developing and conducting experiments to investigate telomere biology, and other topics related to ongoing collaborations.
* Worked with small, close-knit, but diverse team on collaborative projects.
* Competed for and won grants worth $21,180.00.

Go to Grants

* Conducted an independent research project to investigate a functional interaction between DNA repair and telomere protection proteins:

Go to Related Pubs.

* Contributed protein expression and purification expertise for a Science publication that elucidated a guanosine centric mechanism RNA folding:

Go to Related Pubs.

* Contributed transmission electron microscopy (TEM) experience for a Journal of Virology publication that elucidated aspects of gene therapy vector capsid/genome interactions, which was featured on that issues cover.

Go to Related Pubs.

* Presented research at conferences including Cold Springs Harbor.

Go to Meetings

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Cloned vectors including *E. coli* protein expression constructs, and plasmids containing repetitive or interesting DNA elements for molecular biology use via procedures including: plasmid purification via Qiagen kits, restriction endonuclease (RE) digestion, adapter and genotyping primer design and polymerase chain reaction (PCR) optimization, agarose gel electrophoresis, gel purification, dephosphorylation, ligation, transformation into chemically or electrocompetent cells, plating/streaking for isolation, colony picking and blue/white selection, and confirmatory DNA sequencing.
* Example plasmids are available on Addgene: [www.addgene.org/Jack\_Griffith/](http://www.addgene.org/Jack_Griffith/)
* Induced and purified proteins from said vectors via conventional and fast protein liquid chromatography (FPLC) using the GE ÄKTA protein purification system and UNICORN software using techniques including: isopropyl β-D-1-thiogalactopyranoside (IPTG) induction, optical density (OD) monitoring, cell lysis via physical (e.g. sonication) and chemical/biochemical means (e.g. Lysozyme, DNAse, RNAse, Benzonase), clarification via ultracentrifugation, protein separation via SDS-PAGE, purity analysis via Coomassie blue or silver staining, protein quantification via colorimetric assays including Bradford assays, and buffer exchange via dialysis.
* Developed a novel *in vitro* fluorescent displacement loop (D-loop) electrophoretic mobility shift assay (EMSA) to quantify enzymatic activity between purified proteins.
* Examined the interaction of proteins and DNAs, and stability of adeno-associated virus (AAV) capsid/genome interactions via transmission electron microscopy (TEM).

### LOCATION INFORMATION:

**Address:** Room 127

[UNC Lineberger Comprehensive Cancer Center](https://unclineberger.org/)

450 West Drive

Campus Box 7295Chapel Hill, NC 27599

**Point/s of Contact:** Jack Griffith, PhD

**Website/s:** <https://unclineberger.org/griffithlab/>

## Ohio University Ohio University Logo

**Athens, OH Research Technician 3/2008-to-8/2009**

 **Undergraduate Technician 4/2007-to-3/2008**

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Worked at the Edison Biotechnology Institute in the laboratory of Dr. John Kopchick under the guidance of Dr. Edward List investigating the effects of hormonal and dietary interventions on the development of type 2 diabetes mellitus (T2DM) and obesity in mouse models.
* Worked with a diverse multinational team on collaborative R01 projects.
* Contributed mouse colony maintenance, mouse handling (e.g., injection), and other expertise to publications that elucidated some of the effects of growth hormone (GH) and insulin-like growth factor-1 (IGF-1) on mouse biology.

Go to Related Pubs.

* Repeatedly presented research at major international conferences.

Go to Meetings

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Carried out routine mouse husbandry to maintain transgenic and knockout (KO) mouse colonies, to include organizing matings, weanings, genotyping, and record keeping.
* Extracted DNA from mouse tissues and cells via direct lysis, and proteinase K digestion followed by phenol-chloroform washing and performed polymerase chain reaction (PCR) based genotyping reactions and agarose gel electrophoresis.
* Administered growth hormone (GH) and insulin-like growth factor 1 (IGF-1) via subcutaneous (sub-Q) injection during endocrinology studies.
* Performed intraperitoneal (IP) injections and blood glucose measurement during IP glucose tolerance testing (GTT) and IGF-1 maximum tolerated dose (MTD) testing.
* Anaesthetized mice via intraperitoneal (IP) avertin injection.
* Conducted blood glucose measurement, blood collection, & serum/plasma separation.
* Analyzed serum and plasma, to include measuring insulin and IGF-1 by enzyme-linked immunosorbance assay (ELISA) and triglyceride & cholesterol by colorimetric assays.
* Conducted live animal body composition analysis using a Bruker minispec NMR.
* Assisted with cloning a mouse gene targeting vector, which included optimizing PCR conditions, performing restrictions digestions, ligations, agarose gel electrophoresis and DNA quantification via conventional cuvette spectrophotometer.
* Mastered basic bacteria culture techniques including heat shock transformation, streaking and plating for isolation, expansion in liquid culture, and optical density (OD) monitoring via spectrophotometer.

### LOCATION INFORMATION:

**Address:** 172 Watertower Drive

[Konneker Research Laboratories](https://www.ohio.edu/building-directory/konneker-research-center)

The Ridges, Ohio University

Athens, OH 45701

**Point/s of Contact:** John Kopchick, DO, PhD

Edward List, PhD

**Website/s:** <https://www.ohio.edu/research/biotech>

## QuidelOrtho *(formerly Diagnostic Hybrids)* English | QuidelOrtho

**Athens, OH Laboratory Technician 9/2006-to-9/2007**

*R&D Department - Virology Section*

### MAJOR ITEMS AND ACHIEVEMENTS:

* **SUMMARY:** Worked in the Virology Section of the Research & Development (R&D) department at Diagnostic Hybrids Inc. (now QuidelOrtho) under the management of Joe Jollick isolating, propagating, serotyping / identifying and titrating pathogenic human viruses from patient clinical samples.
* Maintained a 27,000-sample clinical viral isolate archive per regulatory & compliance regimes, including an ISO 13485 compliant quality management system (QMS).
* Worked with a large team on tight deadlines in an entrepreneurial environment.

### SKILLS, TECHNIQUES, EXPERIENCE & EXPERTISE:

* Routinely worked in a Biosafety Level 2 (BSL-2) laboratory with pathogenic viruses.
* Isolated viruses from patient clinical samples via ultrafiltration.
* Applied isolated viruses to various immortalized human cell lines based on preliminary clinical diagnosis and monitored cells for signs of cytopathic effect (CPE).
* Lysed cytopathic cells via mechanical/syringe lysis, and cryopreserved harvested virus.
* Applied isolated virus to culture cells (shell vials), fixed cells via acetone/methanol after incubation, and serotyped and titrated viruses via florescent light microscopy.
* Maintained the viruses as part of the Clinical Viral Isolate Archive and ensured archived viruses were available in needed quantities to R&D staff.

### LOCATION INFORMATION:

**Address:** 2005 East State Street #100

Athens, OH 45701

**Point/s of Contact:** Joe Jollick

Jim Class, PhD

Website/s: <https://www.quidelortho.com/>

# GRANTS AND AWARDS:

## UNIVERSITY OF MICHIGAN:

**1st Place** Award Outstanding Research Presentation 2016
**$44,556** 2T32AG000114-31 Career Training in the Biology of Aging 2016
**$42,000** 2T32AG000114-30 Career Training in the Biology of Aging 2015

Click to open Grant Notice

## UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL:

**$21,180** 2T32GM007092-36 NRSA in Genetics 2010

Click to open Grant Notice

## OHIO UNIVERSITY:

**$10,000** Scholarship AMVETS Diabetes Institute Scholar 2008
**1st Place** Award Research & Creative Activity Expo 2008

# PANNELS AND PRESENTATIONS:

## AAPS NBC. 2023

Vyhlidal C, Pasas-Farmer S, Falese L, Coletti K, Kuhel D, **Bower B**. Panel Discussion: Common Challenges in Bioanalytical Assay Validation/Development in CGTP. *2023 American Association of Pharmaceutical Scientist National Biotechnology Conference Poster Session*. April 24, 2023.

# PEER REVIEWED MANUSCRIPTS:

## Aging Cell. 2019

Apr;18(2):e12920. Epub 2019 Feb 10.
17-α ESTRADIOL AMELIORATES AGE-ASSOCIATED SARCOPENIA AND IMPROVES LATE LIFE PHYSICAL FUNCTION IN MALE MICE BUT NOT IN FEMALES OR CASTRATED MALES.
Garratt, Michael; Leander, Danielle; Pifer, Kaitlyn; **Bower, Brian**; Herrera, Jonathan; Day, Sharlene; Fiehn, Oliver; Brooks, Susan; Miller, Richard.

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/30740872>

**Abstract:** Pharmacological treatments can extend mouse lifespan, but lifespan effects often differ between sexes. 17-α estradiol (17aE2), a less feminizing structural isomer of 17-β estradiol, produces lifespan extension only in male mice, suggesting a sexually dimorphic mechanism of lifespan regulation. We tested whether these anti-aging effects extend to anatomical and functional aging-important in late-life health-and whether gonadally derived hormones control aging responses to 17aE2 in either sex. While 17aE2 started at 4 months of age diminishes body weight in both sexes during adulthood, in late-life 17aE2-treated mice better maintain body weight. In 17aE2-treated male mice, the higher body weight is associated with heavier skeletal muscles and larger muscle fibers compared with untreated mice during aging, while treated females have heavier subcutaneous fat. Maintenance of skeletal muscle in male mice is associated with improved grip strength and rotarod capacity at 25 months, in addition to higher levels of most amino acids in quadriceps muscle. We further show that sex-specific responses to 17aE2-metabolomic, structural, and functional-are regulated by gonadal hormones in male mice. Castrated males have heavier quadriceps than intact males at 25 months, but do not respond to 17aE2, suggesting 17aE2 promotes an anti-aging skeletal muscle phenotype similar to castration. Finally, 17aE2 treatment benefits can be recapitulated in mice when treatment is started at 16 months, suggesting that 17aE2 may be able to improve aspects of late-life function even when started after middle age.

## Aging Cell. 2017

Dec; 16(6): 1256-1266. Epub 2017 Aug 22.
Sex differences in lifespan extension with acarbose and 17-α estradiol: gonadal hormones underlie male-specific improvements in glucose tolerance and mTORC2 signaling.
Garratt M, **Bower B**, Garcia GG, Miller RA.

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/28834262>

**PDF:** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5676051/pdf/
ACEL-16-1256.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5676051/pdf/ACEL-16-1256.pdf)

**Abstract:** Interventions that extend lifespan in mice can show substantial sexual dimorphism. Here, we show that male-specific lifespan extension with two pharmacological treatments, acarbose (ACA) and 17-α estradiol (17aE2), is associated, in males only, with increased insulin sensitivity and improved glucose tolerance. Females, which show either smaller (ACA) or no lifespan extension (17aE2), do not derive these metabolic benefits from drug treatment. We find that these male-specific metabolic improvements are associated with enhanced hepatic mTORC2 signaling, increased Akt activity, and phosphorylation of FOXO1a - changes that might promote metabolic health and survival in males. By manipulating sex hormone levels through gonadectomy, we show that sex-specific changes in these metabolic pathways are modulated, in opposite directions, by both male and female gonadal hormones: Castrated males show fewer metabolic responses to drug treatment than intact males, and only those that are also observed in intact females, while ovariectomized females show some responses similar to those seen in intact males. Our results demonstrate that sex-specific metabolic benefits occur concordantly with sexual dimorphism in lifespan extension. These sex-specific effects can be influenced by the presence of both male and female gonadal hormones, suggesting that gonadally derived hormones from both sexes may contribute to sexual dimorphism in responses to interventions that extend mouse lifespan.

## Biochemistry (ACS). 2014

Sep 2;53(34):5485-95. Epub 2014 Aug 21.
TRF1 and TRF2 differentially modulate Rad51-mediated telomeric and nontelomeric displacement loop formation in vitro.
**Bower BD**, Griffith JD.

### LINKS, ABSTRACT, ETC.:

**Notes:** As a demonstration of competency with the MS Office Suite, writing, scientific presentations and other topics, documents related to the drafting of this publication are hyperlinked below.

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**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/25115914>

**PDF:** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4151696/
pdf/bi5006249.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4151696/pdf/bi5006249.pdf)

**Abstract:** A growing body of literature suggests that the homologous recombination/repair (HR) pathway cooperates with components of the shelterin complex to promote both telomere maintenance and nontelomeric HR. This may be due to the ability of both HR and shelterin proteins to promote strand invasion, wherein a single-stranded DNA (ssDNA) substrate base pairs with a homologous double-stranded DNA (dsDNA) template displacing a loop of ssDNA (D-loop). Rad51 recombinase catalyzes D-loop formation during HR, and telomere repeat binding factor 2 (TRF2) catalyzes the formation of a telomeric D-loop that stabilizes a looped structure in telomeric DNA (t-loop) that may facilitate telomere protection. We have characterized this functional interaction in vitro using a fluorescent D-loop assay measuring the incorporation of Cy3-labeled 90-nucleotide telomeric and nontelomeric substrates into telomeric and nontelomeric plasmid templates. We report that preincubation of a telomeric template with TRF2 inhibits the ability of Rad51 to promote telomeric D-loop formation upon preincubation with a telomeric substrate. This suggests Rad51 does not facilitate t-loop formation and suggests a mechanism whereby TRF2 can inhibit HR at telomeres. We also report a TRF2 mutant lacking the dsDNA binding domain promotes Rad51-mediated nontelomeric D-loop formation, possibly explaining how TRF2 promotes nontelomeric HR. Finally, we report telomere repeat binding factor 1 (TRF1) promotes Rad51-mediated telomeric D-loop formation, which may facilitate HR-mediated replication fork restart and explain why TRF1 is required for efficient telomere replication.

## Science. 2013

Apr 12;340(6129):190-5. 1230715. Epub 2013 Mar 7.
A guanosine-centric mechanism for RNA chaperone function.
Grohman JK, Gorelick RJ, Lickwar CR, Lieb JD, **Bower BD**, Znosko BM, Weeks KM.

### LINKS, ABSTRACT, ETC.:

**PubMed**: <https://www.ncbi.nlm.nih.gov/pubmed/23470731>

**PDF:** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4338410/
pdf/nihms663657.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4338410/pdf/nihms663657.pdf)

**Abstract:** RNA chaperones are ubiquitous, heterogeneous proteins essential for RNA structural biogenesis and function. We investigated the mechanism of chaperone-mediated RNA folding by following the time-resolved dimerization of the packaging domain of a retroviral RNA at nucleotide resolution. In the absence of the nucleocapsid (NC) chaperone, dimerization proceeded through multiple, slow-folding intermediates. In the presence of NC, dimerization occurred rapidly through a single structural intermediate. The RNA binding domain of heterogeneous nuclear ribonucleoprotein A1 protein, a structurally unrelated chaperone, also accelerated dimerization. Both chaperones interacted primarily with guanosine residues. Replacing guanosine with more weakly pairing inosine yielded an RNA that folded rapidly without a facilitating chaperone. These results show that RNA chaperones can simplify RNA folding landscapes by weakening intramolecular interactions involving guanosine and explain many RNA chaperone activities.

## Journal of Virology. 2013

Mar;87(6):2994-3002. Epub 2012 Dec 26.
Biophysical and ultrastructural characterization of adeno-associated virus capsid uncoating and genome release.
Horowitz ED, Rahman KS, **Bower BD**, Dismuke DJ, Falvo MR, Griffith JD, Harvey SC, Asokan A.

### LINKS, ABSTRACT, ETC.:

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**PubMed:**  <https://www.ncbi.nlm.nih.gov/pubmed/23269804>

**PDF:** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3592113/
pdf/zjv2994.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3592113/pdf/zjv2994.pdf)

**Cover:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3754009/>



Cover photograph (Copyright © 2013, American Society for Microbiology. All Rights Reserved.): Tungsten shadowing electron micrograph showing genome release from an intact adeno-associated virus (AAV) capsid upon heat treatment. A fully base-paired, self-complementary AAV vector genome with the internal terminal repeat (TR) hairpin is seen for the first time. Molecular modeling simulations of various DNA packaging configurations within the AAV capsid containing single-stranded (blue licorice) and/or double-stranded (red beads) DNA are also shown. (See related article in March 2013, vol. 87, no. 6, p. 2994.)

**Abstract:** We describe biophysical and ultrastructural differences in genome release from adeno-associated virus (AAV) capsids packaging wild-type DNA, recombinant single-stranded DNA (ssDNA), or dimeric, self-complementary DNA (scDNA) genomes. Atomic force microscopy and electron microscopy (EM) revealed that AAV particles release packaged genomes and undergo marked changes in capsid morphology upon heating in physiological buffer (pH 7.2). When different AAV capsids packaging ss/scDNA varying in length from 72 to 123% of wild-type DNA (3.4 to 5.8 kb) were incrementally heated, the proportion of uncoated AAV capsids decreased with genome length as observed by EM. Genome release was further characterized by a fluorimetric assay, which demonstrated that acidic pH and high osmotic pressure suppress genome release from AAV particles. In addition, fluorimetric analysis corroborated an inverse correlation between packaged genome length and the temperature needed to induce uncoating. Surprisingly, scAAV vectors required significantly higher temperatures to uncoat than their ssDNA-packaging counterparts. However, externalization of VP1 N termini appears to be unaffected by packaged genome length or self-complementarity. Further analysis by tungsten-shadowing EM revealed striking differences in the morphologies of ssDNA and scDNA genomes upon release from intact capsids. Computational modeling and molecular dynamics simulations suggest that the unusual thermal stability of scAAV vectors might arise from partial base pairing and optimal organization of packaged scDNA. Our work further defines the biophysical mechanisms underlying adeno-associated virus uncoating and genome release.

## Endocrinology. 2011

Oct;152(10):3791-802. Epub 2011 Jul 26.
Differential effects of growth hormone versus insulin-like growth factor-I on the mouse plasma proteome.
Ding J, List EO, **Bower BD**, Kopchick JJ.

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/21791560>

**Full Text:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3176651>

**Abstract:** The GH/IGF-I axis has both pre- and postpubertal metabolic effects. However, the differential effects of GH and/or IGF-I on animal physiology or the plasma proteome are still being unraveled. In this report, we analyzed several physiological effects along with the plasma proteome after treatment of mice with recombinant bovine GH or recombinant human IGF-I. GH and IGF-I showed similar effects in increasing body length, body weight, lean and fluid masses, and organ weights including muscle, kidney, and spleen. However, GH significantly increased serum total cholesterol, whereas IGF-I had no effect on it. Both acute and longer-term effects on the plasma proteome were determined. Proteins found to be significantly changed by recombinant bovine GH and/or recombinant human IGF-I injections were identified by mass spectrometry (MS) and MS/MS. The identities of these proteins were further confirmed by Western blotting analysis. Isoforms of apolipoprotein A4, apolipoprotein E, serum amyloid protein A-1, clusterin, transthyretin, and several albumin fragments were found to be differentially regulated by GH vs. IGF-I in mouse plasma. Thus, we have identified several plasma protein biomarkers that respond specifically and differentially to GH or IGF-I and may represent new physiological targets of these hormones. These findings may lead to better understanding of the independent biological effects of GH vs. IGF-I. In addition, these novel biomarkers may be useful for the development of tests to detect illicit use of GH or IGF-I.

## Diabetologia. 2009

Aug;52(8):1647-55. Epub 2009 May 26.
Growth hormone improves body composition, fasting blood glucose, glucose tolerance and liver triacylglycerol in a mouse model of diet-induced obesity and type 2 diabetes.
List EO, Palmer AJ, Berryman DE, **Bower B**, Kelder B, Kopchick JJ.

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/19468705>

**PDF:** <https://link.springer.com/content/pdf/10.1007/s00125-009-1402-z.pdf>

**Abstract:**  **Aims/hypothesis:** Growth hormone has been used experimentally in two studies to treat individuals with type 2 diabetes, with both reporting beneficial effects on glucose metabolism. However, concerns over potential diabetogenic actions of growth hormone complicate its anticipated use to treat type 2 diabetes. Thus, an animal model of type 2 diabetes could help evaluate the effects of growth hormone for treating this condition.

**Methods:** Male C57BL/6J mice were placed on a high-fat diet to induce obesity and type 2 diabetes. Starting at 16 weeks of age, mice were treated once daily for 6 weeks with one of four different doses of growth hormone. Body weight, body composition, fasting blood glucose, insulin, glucose tolerance, liver triacylglycerol, tissue weights and blood chemistries were determined.

**Results:** Body composition measurements revealed a dose-dependent decrease in fat and an increase in lean mass. Analysis of fat loss by depot revealed that subcutaneous and mesenteric fat was the most sensitive to growth hormone treatment. In addition, growth hormone treatment resulted in improvement in glucose metabolism, with the highest dose normalizing glucose, glucose tolerance and liver triacylglycerol. In contrast, insulin levels were not altered by the treatment, nor did organ weights change. However, fasting plasma leptin and resistin were significantly decreased after growth hormone treatment.

**Conclusions/interpretation:** Growth hormone therapy improves glucose metabolism in this mouse model of obesity and type 2 diabetes, providing a means to explore the molecular mechanism(s) of this treatment.

## Infectious Disorders Drug Targets. 2008

Mar;8(1):31-45.
The use of proteomics to study infectious diseases.
List EO, Berryman DE, **Bower B**, Sackmann-Sala L, Gosney E, Ding J, Okada S, Kopchick JJ.

### LINKS, ABSTRACT, ETC.:

**PubMed**: <https://www.ncbi.nlm.nih.gov/pubmed/18473905>

**Abstract:** Technology surrounding genomics, or the study of an organism's genome and its gene use, has advanced rapidly resulting in an abundance of readily available genomic data. Although genomics is extremely valuable, proteins are ultimately responsible for controlling most aspects of cellular function. The field of proteomics, or the study of the full array of proteins produced by an organism, has become the premier arena for the identification and characterization of proteins. Yet the task of characterizing a proteomic profile is more complex, in part because many unique proteins can be produced by the same gene product and because proteins have more diverse chemical structures making sequencing and identification more difficult. Proteomic profiles of a particular organism, tissue or cell are influenced by a variety of environmental stimuli, including those brought on by infectious disease. The intent of this review is to highlight applications of proteomics used in the study of pathogenesis, etiology and pathology of infectious disorders. While many infectious agents have been the target of proteomic studies, this review will focus on those infectious diseases which rank among the highest in worldwide mortalities, such as HIV/AIDS, tuberculosis, malaria, measles, and hepatitis.

# ACKNOWLEDGEMENTS:

## Aging Cell. 2022

Sep; 21(9). Published online 2022 Aug 5.Cap‐independent translation of GPLD1 enhances markers of brain health in long‐lived mutant and drug‐treated miceXinna Li, Xiaofang Shi, Madaline McPherson, Mary Hager, Gonzalo G. Garcia, and Richard A. Miller

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9470888/>

**Correction:** <https://onlinelibrary.wiley.com/doi/10.1111/acel.13901>

**PDF:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9470888/pdf/ACEL-21-e13685.pdf>

**Abstract:** Glycosylphosphatidylinositol-specific phospholipase D1 (GPLD1) hydrolyzes inositol phosphate linkages in proteins anchored to the cell membrane. Mice overexpressing GPLD1 show enhanced neurogenesis and cognition. Snell dwarf (DW) and growth hormone receptor knockout (GKO) mice show delays in age-dependent cognitive decline. We hypothesized that augmented GPLD1 might contribute to retained cognitive function in these mice. We report that DW and GKO show higher GPLD1 levels in the liver and plasma. These mice also have elevated levels of hippocampal brain-derived neurotrophic factor (BDNF) and of doublecortin (DCX), suggesting a mechanism for maintenance of cognitive function at older ages. GPLD1 was not increased in the hippocampus of DW or GKO mice, suggesting that plasma GPLD1 increases elevated these brain proteins. Alteration of the liver and plasma GPLD1 was unaltered in mice with liver-specific GHR deletion, suggesting that the GH effect was not intrinsic to the liver. GPLD1 was also induced by caloric restriction and by each of four drugs that extend lifespan. The proteome of DW and GKO mice is molded by selective translation of mRNAs, involving cap-independent translation (CIT) of mRNAs marked by N6 methyladenosine. Because GPLD1 protein increases were independent of the mRNA level, we tested the idea that GPLD1 might be regulated by CIT. 4EGI-1, which enhances CIT, increased GPLD1 protein without changes in GPLD1 mRNA in cultured fibroblasts and mice. Furthermore, transgenic overexpression of YTHDF1, which promotes CIT by reading m6A signals, also led to increased GPLD1 protein, showing that elevation of GPLD1 reflects selective mRNA translation.

**Acknowledgement:**

“*This work was supported by NIA grants AG024824 and AG023122, and by the Glenn Foundation for Medical Research. We wish to thank Roxann Alonzo, Ilkim Erturk, Lori Roberts, Jacob Sheets, and Natalie Stamper for expert animal colony management, and thank* ***Brian Bower*** *for his assistance in preparing the YTHDF1 transgenic mouse line.*”

## Nucleic Acids Res. 2014

Jul;42(12):7748-61. Epub 2014 May 31.
Strand exchange of telomeric DNA catalyzed by the Werner syndrome protein (WRN) is specifically stimulated by TRF2.
Edwards DN, Orren DK, Machwe A.

### LINKS, ABSTRACT, ETC.:

**PubMed:** <https://www.ncbi.nlm.nih.gov/pubmed/24880691>

**PDF:** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4081078/
pdf/gku454.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4081078/pdf/gku454.pdf)

**Abstract:** Werner syndrome (WS), caused by loss of function of the RecQ helicase WRN, is a hereditary disease characterized by premature aging and elevated cancer incidence. WRN has DNA binding, exonuclease, ATPase, helicase and strand annealing activities, suggesting possible roles in recombination-related processes. Evidence indicates that WRN deficiency causes telomeric abnormalities that likely underlie early onset of aging phenotypes in WS. Furthermore, TRF2, a protein essential for telomere protection, interacts with WRN and influences its basic helicase and exonuclease activities. However, these studies provided little insight into WRN's specific function at telomeres. Here, we explored the possibility that WRN and TRF2 cooperate during telomeric recombination processes. Our results indicate that TRF2, through its interactions with both WRN and telomeric DNA, stimulates WRN-mediated strand exchange specifically between telomeric substrates; TRF2's basic domain is particularly important for this stimulation. Although TRF1 binds telomeric DNA with similar affinity, it has minimal effects on WRN-mediated strand exchange of telomeric DNA. Moreover, TRF2 is displaced from telomeric DNA by WRN, independent of its ATPase and helicase activities. Together, these results suggest that TRF2 and WRN act coordinately during telomeric recombination processes, consistent with certain telomeric abnormalities associated with alteration of WRN function.

**Acknowledgement:**

***“****His-tagged TRF2ΔB, kindly provided by Jack Griffith and* ***Brian Bower***

*(University of North Carolina at Chapel Hill), was purified as described.”*

# BOOK CHAPTERS:

Kopchick, JJ and **Bower, B**. (2011). Cancer. In: Laron, Z and Kopchick, JJ. *Laron Syndrome – From Man to Mouse.* Heildelberg: Springer-Verlag GmbH Berlin. 495-505.

### LINKS, ABSTRACTS, ETC.:

URL: <https://link.springer.com/chapter/10.1007/978-3-642-11183-9_57>

# DISSERTATION:

**Bower, B**. (2014). *An In Vitro Characterization of Functional Interactions Between Purified Telomere Repeat Binding Factors 1 and 2 and Rad51 Recombinase* (Doctoral Dissertation)*.* Retrieved from Carolina Digital Repository. (UMI No. 14904)

### LINKS, ABSTRACTS, ETC.:

**Notes:** As a demonstration of competency with the MS Office Suite, writing, scientific presentations and other topics, documents related to the drafting of my dissertation are hyperlinked below.

**MS Word Version of Dissertation:

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# POSTERS, & PUBLISHED ABSTRACTS:

1. **Bower B**, Jih G, Sam K, Catalano A, Gullick B, Hays A, Ramachandran I. (T1130-01-02) Evaluating a Merged Well Analysis Strategy for Validation of a Cellular Kinetics Assay to Quantify an Allogeneic Cell Product in Human Blood by ddPCR. *2023 American Association of Pharmaceutical Scientist National Biotechnology Conference Poster Session*. April 25, 2023.
2. **Bower B**, Garratt M, Farooqui M, Namkong S, Lee JH, Miller R. STRESS RESISTANCE PATHWAYS IN LONG-LIVED MICE. *10th Annual Aging Research Symposium Poster Session.* May 18, 2016.

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1. **Bower B**. ATF4 is Not Consistently Elevated in Long-Lived Mouse Models. Career Training in the Biology of Aging. Ann Arbor, Michigan. April 21, 2016.

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1. Farooqui M, **Bower B**, Miller R. ATF4 is Elevated in the Livers of Long-Lived Snell Dwarf Mice via a Non-Canonical Mechanism. *Undergraduate Research Opportunity Program Poster Session.* Ann Arbor, MI. April 19, 2016.

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1. **Bower B**, Richard Miller R. INVESTIGATING HOW AMINO ACID SENSING MAY INFLUENCE MOUSE LIFESPAN. *14th Annual Pathology Research Symposium Poster Session.* November 5, 2015.

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1. **Bower B**, Miller R. INCREASED HEPATIC ATF4 IN MICE WITH ALTERED GROWTH HORMONE AND/OR INSULIN-LIKE GROWTH FACTOR 1 SIGNALS. *9th Annual Aging Research Symposium*. Ann Arbor, Michigan. May, 2015.

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1. **Bower B**, Griffith J. TRF2 Inhibits Rad51-mediated D-loop formation *in vitro*. *9th Annual CSH Meeting on Telomeres and Telomerase*. Cold Spring Harbor, NY. April 30-May 4, 2013.

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1. **Bower B**, Griffith J. Rad51 promotes telomeric displacement loop formation in vitro. *The Dept. of Genetics/Curriculum in Genetics 2012 Joint Retreat*, Myrtle Beach, SC. September 7-9, 2012.

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1. **Bower B**, Horowitz H, Asokan A, Griffith J. Interrogating adeno-associated virus genome organization and structure. *The Dept. of Genetics/Curriculum in Genetics 2011 Joint Retreat*, Myrtle Beach, SC. September 16-18, 2011.

Click for Poster

1. **Bower B**, Sezgin O, Compton S, Özlem A, Schmidt K, Griffith J. Human hnRNP A1 Preferentially Bind to Telomeric DNA In Vitro. *The Dept. of Genetics/Curriculum in Genetics 2010 Joint Retreat,* Myrtle Beach, SC. September 17-19, 2010.

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1. List EO, Berryman DE, **Bower B**, Blischak JD, Wright-Piekarski J, Lubbers E, Malgor R, and Kopchick JJ. The Effects of GH, IGF-1 or Combined GH/IGF-1 Therapies on Type 2 Diabetes and Nonalcoholic Fatty Liver Disease (NAFLD) in Mice. *The Endocrine Society 92nd Annual Meeting.* San Diego, CA. June 19-22, 2010.
2. List EO, **Bower B**, Berryman DE, Kopchick JJ. Comparing the effects of GH and IGF-1 in a mouse model of diabetes (T2DM). *The First International Joint Meeting on Obesity Research. Madrid, Spain.* May 18, 2009.
3. List EO, **Bower B,** Berryman DE, Kopchick JJ. Comparing the effects of GH and IGF-1 in a mouse model of diabetes (T2DM). *The Third Annual Endocrine Society Retreat*. Rotterdam, Netherlands. May 13-15, 2009.
4. Zhai YF, **Bower B**, List EO, Kopchick JJ, Berryman DE. Optimizing Protein Levels in Ketogenic Diets To Induce Weight Loss in Obese C57BL/6J Mice. P2-377, *The Endocrine Society 91st Annual Meeting*. Washington DC. June 10-13, 2009.
5. **Bower B**, Zhai Y, Zacharias A, Blischak JD, Wright-Piekarski J, Berryman DE, Kopchick JJ, List EO. Growth Hormone Treatment in Lean Non-Diabetic Versus Obese Type 2 Diabetic Mice. P2-449, *The Endocrine Society 91st Annual Meeting*. Washington DC. June 10-13, 2009.
6. List EO, **Bower B**, Berryman DE, Kopchick JJ. A Study Comparing the Use of Growth Hormone, Metformin and IGF-1 for Treating Type 2 Diabetes in Mice. P2-448. *The Endocrine Society 91st Annual Meeting*. Washington DC. June 10-13, 2009.
7. Wright-Piekarski J, Zacharias A**, Bower B**, Wright-Piekarski M, Kopchick JJ, Berryman DE, List EO. The effects of diet cycling on food consumption and body composition in a mouse model of type 2 diabetes. *The 3rd Annual Diabetes Research Initiative Conference*. Athens, OH. April 3-4, 2009.
8. Blischak J, Sackmann-Sala L, Ding J, **Bower B**, Berryman DE, Kopchick JJ, List EO. The effects of insulin-like growth factor-1 on the mouse skin proteome. *The 3rd Annual Diabetes Research Initiative Conference,* Athens, OH. April 3-4, 2009.
9. Zacharias A, **Bower B**, Ivins D, Bently A, Hines A, Iwafor N, Tanda H, Esch D, Tarnowski M, Hall K, Kopchick JJ, Berryman DE, List EO. Comparison of metformin versus IGF-1 when used in combination with GH for treating obesity and diabetes. *The 3rd Annual Diabetes Research Initiative Conference.* Athens, OH. April 3-4, 2009.
10. **Bower B,** Berryman DE, Kopchick JJ, List EO. A study comparing growth hormone, metformin and IGF-1 therapies for treating type 2 diabetes in mice. *The 3rd Annual Diabetes Research Initiative Conference.* Athens, OH. April 3-4, 2009.
11. List EO, **Bower B**, Zhai Y, Berryman DE, Zacharias A, Wright-Piekarski J, Blischak J, Kopchick JJ. The effects of growth hormone treatment in lean versus obese mice. *The 3rd Annual Diabetes Research Initiative Conference.* Athens, OH. April 3-4, 2009.
12. List EO, Berryman DE, Palmer A, **Bower B,** Kopchick JJ. High Dose and Not Low Dose Growth Hormone Reverses Type 2 Diabetes in Mice. *The 4th International Congress of the GRS and the IGF Society*. Genoa, Italy. GH and IGF Research vol.18(suppl#1). Sept, 2008.
[[growthhormoneigfresearch.com/article/S1096-6374(08)70081-9/fulltext](http://www.growthhormoneigfresearch.com/article/S1096-6374%2808%2970081-9/fulltext)]
13. Gosney, ES, **Bower, B**, Kopchick, JJ. Efficient Production of Biologically Active Mouse and Human Growth Hormone Antagonist in Escherichia coli. Endocrine Society, *90th Annual Meeting*, San Francisco, CA. June 2008.
14. List EO, Berryman DE, Palmer A, **Bower B**, Hines A, Tanda H, Bentley A, Bogosian G, Kopchick JJ. Slow Release Growth Hormone (GH) Preferentially Alters Lean Mass and Not Fat Mass Compared to Once Daily GH Injections. *The Endocrine Society 90th Annual Meeting,* San Francisco. CA. June 2008.
15. Zhai YF, Bower B, List EO, Kopchick JJ, Palmer AJ, Berryman DE. Optimizing Ketogenic Diets To Promote Weight Loss in Mice. *The Endocrine Society 90th Annual Meeting.* San Francisco, CA. June 2008.
16. List EO, Berryman DE, Palmer A, Tanda H, Wright-Piekarski J, **Bower B**, Bentley A, Bogosian G, Kopchick JJ. Obese Mice Treated with GH Results in Depot Specific Changes in Adipose Tissue. *The Endocrine Society 90th Annual Meeting.* San Francisco, CA. June 2008.

# MEETINGS, SYMPOSIA AND CONFERENCES:

1. 2023 American Association of Pharmaceutical Scientist
National Biotechnology Conference
April 23rd to 26th Philadelphia, PA
2. 15th Annual Pathology Research Symposium
November 1-2, 2015 Ann Arbor, MI.
3. 10th Annual Aging Research Symposium
May, 2016 Ann Arbor, MI.
4. 14th Annual Pathology Research Symposium
November 5, 2015 Ann Arbor, MI.
5. 13th Annual Pathology Research Symposium
November 14, 2014 Ann Arbor, MI.
6. 9th Annual Aging Research Symposium
May 12, 2015 Ann Arbor, MI.
7. 9th Annual CSH Meeting on Telomeres and Telomerase
May, 2013 Cold Spring Harbor, NY.
8. Nexus of Gene Therapy and Regenerative Medicine
February 7, 2013 Winston-Salem, NC



1. The Dept. of Genetics/ Curriculum in Genetics 2012 Joint Retreat
September, 2012 Myrtle Beach, SC.
2. The Dept. of Genetics/ Curriculum in Genetics 2011 Joint Retreat
September, 2011 Myrtle Beach, SC.
3. 2011 Meeting on Genetics and Mechanisms of Aging & Genome Maintenance
June, 2011 Girdwood, AK.



1. 8th Annual CSH Meeting on Telomeres and Telomerase
May, 2011 Cold Spring Harbor, NY.
2. The Dept. of Genetics/Curriculum in Genetics 2010 Joint Retreat
September, 2010 Myrtle Beach, SC.
3. The Dept. of Genetics/ Curriculum in Genetics 2009 Joint Retreat
September, 2009 Asheville, NC.
4. First International Joint Meeting on Obesity Research
May, 2009 Madrid, Spain.



1. Third Annual Endocrine Society Retreat
May, 2009 Rotterdam, Netherlands.
2. Endocrine Society 91st Annual Meeting
June, 2009 Washington DC.
3. The 3rd Annual Diabetes Research Initiative Conference
April, 2009 Athens, OH.



1. Endocrine Society 90th Annual Meeting
June, 2008 San Francisco, CA.



1. 2008 Ohio University Research & Creative Activity Expo
May, 2008 Athens, OH.