Alejandro Scaffa

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CONTACT INFORMATION

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INTERESTS

Research, clinical science, startups, high throughput biology, CRISPR, and physiology.

EDUCATION

Brown University, Providence, Rhode Island USA

Ph.D. Candidate, Molecular Pharmacology and Physiology (expected graduation: Dec 2019)

- Dissertation Topic: "The effect of senescence in neonatal lung exposed to hyperoxia"
- Adviser: Prof. Phyllis Dennery M.D.

M.A., Molecular Pharmacology and Physiology, May 2016

Danish Institute for Study Abroad (DIS), Copenhagen, Denmark

Biomedicine Semester Abroad, 2012

Grinnell College, Grinnell, Iowa USA

B.A. with honors, Biochemistry, May 2014

HONORS AND AWARDS

Best Aging in Place Hack, MIT Hacking Medicine Grand Hack, Cambridge, MA 2016
Pharmacology Pre-Doctoral Fellow, Brown University, Providence, RI 2015
Intel International Science and Engineering Fair (ISEF) co-hosted by Google, San Jose, CA 2010
- **1st Prize in Biochemistry, Best in Category Award (Biochemistry), and Naming rights of a minor planet**

CURRENT RESEARCH

The effect of Senescence in Neonatal Lung Exposed to Hyperoxia
Premature babies are often placed in artificial ventilation which provides them with a high concentration of oxygen in contrast to our atmospheric 20%. This hyperoxic condition can drive the neonate to develop bronchopulmonary dysplasia (BPD). My goal is to study the effects of senescence in models of healthy and BPD lungs using biochemical assays and mice.

PAST RESEARCH

Understanding the effect of Splicing in Autism Spectrum Disorders, P.I.: Dr. William Fairbrother: Pre-mRNA splicing abnormalities have been seen in Autism Spectrum Disorder. Aiming to characterize all the genetic abnormalities, I used computational biology techniques, high throughput splicing assays, and CRISPR

Optimizing expression, purification, and refolding of the MqsR toxin from Y. pestis and P. fluorescens in E. Coli P.I.: Dr. Rebecca Page: MqsR is a toxin that when overexpressed and not bound to antitoxin MqsA will arrest cell growth. We aimed to refold MqsR acquired from inclusion bodies in E.Coli in order to obtain large amounts of folded protein for structural analysis.

Elucidating the structure of mutant Protein Tyrosine Phosphatase 1B (PTP1B) using X-Ray Crystallography and NMR - P.I Dr. Wolfgang Peti: PTP1B is a negative regulator of the insulin pathway and a drug target. We elucidated the structure of the Y152A/Y153A PTP1B using X-Ray Crystallography after optimizing process to obtain crystals.

Determining the structure of the N-terminal domain (NTD) of TAR DNA-binding protein 43 (TDP-43) and the effect of phosphorylation on its assembly - P.I.: Dr. Nicolas Lux Fawzi: TDP-43 is found to form cytoplasmic inclusions in the motor neurons of patients with Amyotrophic Lateral Sclerosis (ALS). Its NTD is found to easily aggregate in vitro. We are studying how phosphorylation and specific mutations affect the NTD monomeric/oligomeric equilibrium in order to stabilize the monomeric form and solve its structure via NMR.

Work Experience

Graduate student, Brown University **August 2014 - present**
Attended classes, seminars, and performed research under my advisor Dr. Dennery.

Undergraduate researcher, Grinnell College **Jan 2012 - May 2014**
Under PI's Dr. Mark Levandoski and Dr. Elaine Marzluff I Improved purification for Torpedo nicotinic acetylcholine receptor (nAChR) for better LC-MS sample preparation and eventual characterization of nAChR and other model proteins. Also, voltage clamp techniques were used to study nAChR in Xenopus oocytes. Research done throughout academic year and one full-time summer.

Publications

A. Scaffa, "CRISPR Precision Gene Editing Congress Post Event Report (A Review)". CRISPR Congress 2016.

Abstracts and Presentations

Scaffa A., Glidden, D., Soemedi R., Fairbrother W. , "Engineering splicing mutations in HEK 293 cells using CRISPR/Cas9 system". Genome Engineering: The CRISPR/Cas Revolution, Cold Spring Harbor Laboratories 2015.

Scaffa A. and Page R., "Elucidating the structure of Protein Tyrosine Phosphatase 1B YAYA". First Year Talk, Brown University 2015.

Scaffa A., Levandoski M., Marzluff E., "Elucidating the allosteric binding site of nicotinic acetylcholine receptors via liquid chromatography mass spectrometry". Midstates Conf. for Math and Science, U. of Chicago 2013.

Skills

Programming Languages: Python, Julia, Unix, and basic HTML/CSS
Languages: Fluent: English, Portuguese, Spanish; basic knowledge of Bulgarian and Danish
Laboratory: Experience with NMR, X-Ray Crystallography, LC-MS, protein purification, DNA manipulation, E. Coli expression, Western Blots, Senescent cells, voltage-clamp, frog surgery, splicing assays, CRISPR, and scientific writing.

Teaching Experience

Certificate I: Sheridan Teaching Seminar - Reflective Teaching, Brown University **2015**
Brazilian Portuguese Curriculum Developer, Grinnell College **Jan 2013 - May 2014**
Developed a teaching guide and a syllabus for Portuguese courses and online tests.
Biochemistry (BCM 262) Teaching Assistant, Grinnell College **Aug - Dec 2013**
Held mentor sessions and provided support to Dr. Elizabeth Trimmer during all class sessions.
General Chemistry (CHM 129) Laboratory Assistant, Grinnell College **Jan - May 2013**
Helped Dr. Trimmer by enforcing laboratory safety, explaining procedures, and grading students.
Brazilian Portuguese I and II Instructor, Grinnell College **Aug 2011 - Jun 2012**
Created syllabus and developed dynamic presentations about Portuguese language and culture.

Community Involvement

Department Representative, Brown University **Oct 2015 - Present**
Class Representative of Psychopharmacology, DIS, Copenhagen **Aug 2012 - Dec 2012**
Leader on the Internat. Pre-Orientation Program, Grinnell College **Aug 2011 - Oct 2011**

Relevant Coursework

Brown University
- Biomolecular Interactions
- Molecular Pharm. and Phys.
- Quantitative Approaches to Bioloty
- Molecular Targets of Drug Discov.
- Computational Molecular Biology

Grinnell College
- Intro to Biochemistry
- Physical Chemistry
- Bioorganic Chemistry
- Advanced Genetics