

## **Dioscaris R. Garcia**

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### **Education**

**Ph.D. Molecular Pharmacology, Brown University, Providence, RI** 2005-2012

**Thesis Title:** Sigma-2 Receptor-Mediated Cytotoxicity and Calcium Signaling: Evidence for Bifurcating Pathways

- Studied the signaling pathway of the Sigma-2 Receptor through the characterization of synthetic compounds. My work provided evidence for a bifurcating pathway which lead to a cytotoxic pathway leading to apoptosis, and a non cytotoxic pathway modulated by calcium signaling.

**B.S. Microbiology, Minor in Chemistry, University of Rhode Island, Kingston, RI** 2000-2004

- Employed my knowledge of molecular biology and microbiology in synergy with pharmacognosy, in the discovery of bioactive secondary metabolites from marine bacteria.

### **Experience**

**Director of Biomedical Research and Operations, Material Science Associates, LLC., North Kingston, RI**  
2014-Present

**Associate, Material Science Associates, LLC., North Kingston, RI** 2013-2014

**Consultant, BioIntraface, Inc., Riverside, RI** 2013-Present

**Stein-Bellet Research Fellow,**

**Sr. Research Scientist, Rhode Island Hospital, Providence, RI** 2013-Present

- Characterization of anti-microbial coatings on orthopedic implants.
- Characterization of bacterial adherence on spinal implant materials.
- Characterization of bacterial adherence pattern on orthopedic explants.
- Confocal and Electron Microscopy
- Bacterial culture
- Coating synthesis
- Lead trainer and student supervisor
- Grant writing
- Laboratory administration

**Visiting Scientist, Brown University, Providence, RI** 2013-Present

**Post Doctoral Scholar under Wayne D. Bowen, Brown University, Providence, RI** 2012-2013

- Characterized the calcium signaling kinetics of the Sigma-2 Receptor compounds MV1036A and SN79 and their role in identifying a possible Sigma-2 Receptor subtypes.
- Served as research instructor for incoming graduate and undergraduate students.
- Managed laboratory logistics and day to day operations.
- Generated and edited protocols.
- Supervised undergraduate research projects.
- Monitored lab safety and trained incoming laboratory members in the use of laboratory equipment.
- Senior cell culture and aseptic technique trainer.

**Teaching Assistant, Brown University, Providence, RI**

2006-2011

- CEBN0910: Nervous System Function in Health and Disease
- BIOL1116: Principles of Exercise Physiology
- BIOL 0800: Principles of Physiology

**Research Associate, Process Development, Amgen Inc., West Greenwich, RI**

2004 – 2005

- Characterized Bench-Top Purification Systems for their use as small scale purification systems in the production of Enbrel® (etanercept).
- Optimized Ultrafiltration/Diafiltration Systems to increase the protein yield from raw product originating from the main production plant.
- Utilized AKTA Liquid Chromatography Systems to purify the protein product of the Ultrafiltration/Diafiltration Systems.
- Edited and optimized protocols relating to the use of Bench-Top Purification Systems in the manufacturing of Enbrel® (etanercept).
- Produced and optimized buffers according to the exact specifications of protocols directly leading towards the production of Enbrel® (etanercept) in both small and large scales.

**Research Associate, University of Rhode Island, Kingston, RI**

2003-2004

- Studied the *Micromonospora Sp.* population in the marine sediment of Fisher's Island Sound through the use of phylogenetic studies.
- Assayed for the production of bioactive secondary metabolites from Gram-positive marine bacteria through novel screening methods.
- Developed gram-positive selective medium for the culture of marine bacteria.
- Developed scale-up protocol for the culture and purification of *Streptomyces Sp.* and *Micromonospora Sp.* bacteria cultured from the gram-positive selective medium.
- Designed proliferation protocols for bacteria cultured from Fisher's Island Sound.
- Developed genetic and morphological Identification scheme for bacteria which were found to be producers of bioactive secondary metabolites.
- Developed DNA extraction methods for *Micromonospora Sp.* And *Streptomyces Sp.*

**Research Associate, Hybrigene LLC.,** West Kingston, RI

2002-2003

- Tested various experimental bi-directional promoters using the genetic model *Arabidopsis thaliana*.
- Assisted in projects related to the production and analysis of transgenic turf grass and rice.

## **Publications**

**Garcia, Dioscaris R.,** Bowen, Wayne, Van Dort, Marcian. Characterization of Sigma-2 Receptor Ligand MV1036A Leading Towards a Non-Cytotoxic Signaling Pathway – In Preparation

**Garcia, Dioscaris R.,** Bowen, Wayne. Evidence for a Sigma-2 Receptor Bifurcating Pathway Leading Towards Apoptosis and Non-Cytotoxic Calcium Signaling – In Preparation

**Garcia, Dioscaris R.,** Bowen, Wayne. Role of Sigma-2 Receptors in Cancer – In Preparation

Nhiem Tran, Phong A. Tran, **Dioscaris R. Garcia,** John D. Jarrell, Julie B. Engiles, Nathan P. Thomas, Matthew D. Young, Roman A. Hayda and Christopher T. Born. *Development of a Goat Model of Osteomyelitis for the Assessment of Bacterial Resistant Intramedullary Nailing Systems: A Safety Evaluation* - In Preparation

**Dioscaris R. Garcia,** PhD., Alexandra Zega, Ayano Kondo, David Deckey, Alan Daniels, MD, John Jarrell, PhD., Craig Ebersson, MD, Roman A. Hayda, MD, Christopher T. Born. *Characterization of Adherence Patterns and Biofilm Density of Commonly Encountered Bacterial Pathogens to Spinal Instrumentation of Differing Compositions*-In Preparation

**Dioscaris R. Garcia,** PhD., Henry Fox, Caryn Cobb, Janice Havasy Alan Daniels, MD, John Jarrell, PhD., Craig Ebersson, MD, Roman A. Hayda, MD, Christopher T. Born. *Development of a Rapid-Detection Assay for the Visualization and Quantification of Bacterial Colonization and Biofilm Formation on Orthopaedic Trauma Explants*-In Preparation

Nhiem Tran, Michael N. Kelley, Phong A. Tran, **Dioscaris R. Garcia,** John D. Jarrell, Roman A. Hayda and Christopher T. Born Silver Doped Titanium Oxide - PDMS Hybrid Coating Inhibits *Staphylococcus aureus* and *Staphylococcus epidermidis* Growth on PEEK. – Mater Sci Eng C Mater Biol Appl. 2015 Apr;49:201-9.

Socha AM, **Garcia D,** Sheffer R, Rowley DC. Antibiotic bisanthraquinones produced by a streptomycete isolated from a cyanobacterium associated with Ecteinascidia turbinata. Journal of Natural Products. 2006 Jul;69(7):1070-3

## **Presentations and Meeting Abstracts**

**Podium Talk,** *Characterization of the Adherence Patterns and Biofilm Density of Commonly Encountered Bacterial Pathogens to Spinal Instrumentation of Differing Compositions*

**Dioscaris R. Garcia, Ph.D.**, Alan H. Daniels, MD, Alexandra M. Zega, David G. Decekey, Ayano Kondo, John D. Jarrell, Ph.D., Craig P. Ebersson, MD, Andrew Green, MD, Roman A. Hayda, MD and Christopher T. Born, MD, **Spine Research Society 2015**, Minneapolis, August, 2015.

**Poster Presentation**, Silver Doped Titanium Oxide - PDMS Hybrid Coating Inhibits *Staphylococcus aureus* and *Staphylococcus epidermidis* Growth on PEEK, Nhiem Tran, Michael N. Kelley, Phong A. Tran, **Dioscaris R. Garcia**, Alan Daniels, John D. Jarrell, Roman A. Hayda, and Christopher T. Born, **2<sup>nd</sup> International PEEK Meeting**, Washington D.C., April, 2015.

**Poster Presentation**, *Adherence Patterns and Biofilm Density of Commonly Encountered Bacterial Pathogens to Spinal Instrumentation of Differing Compositions with Silver-Doped Polydimethylsiloxane/Titanium Dioxide Coatings*, Alexandra Zega, David G. Decekey, Henry M. Fox, Ayano Kondo, Artym Hayda, Dioscaris Garcia, PhD, Alan Daniels, MD, Craig Ebersson, John D. Jarrell, PhD, and Christopher T. Born, MD. 2015 Annual Undergraduate Research Poster Day in the Biological Sciences, Providence, RI, April, 2015.

**Poster Presentation**, *Development of an in vitro Co-Culture Model for the Detection and Quantification of Biofilm on Orthopaedic Explants*, Caryn B.C. Cobb, Henry M. Fox, Janice A. Havasy, David G. Decekey, Artym V. Hayda, Alan Daniels, MD, Craig Ebersson, MD, John D. Jarrell, PhD, **Dioscaris R. Garcia, PhD**, and Christopher T. Born, MD. 2015 Annual Undergraduate Research Poster Day in the Biological Sciences, Providence, RI, April, 2015.

**Poster Presentation**, *Development of an in vitro Co-Culture Model for the Detection and Quantification of Biofilm on Orthopaedic Explants*, Caryn B.C. Cobb, Henry M. Fox, Janice A. Havasy, David G. Decekey, Artym V. Hayda, Alan Daniels, MD, Craig Ebersson, MD, John D. Jarrell, PhD, **Dioscaris R. Garcia, PhD**, and Christopher T. Born, MD. New England Science Symposium, Boston, MA April, 2015.

**Poster Presentation**, *A Silver-Doped TiO<sub>2</sub>-PDMS Hybrid Coating to Deter Infection in Orthopaedic Surgery*, David G. Decekey, Alexandra Zega, Henry M. Fox, Ayano Konda, **Dioscaris Garcia, PhD**, Alan Daniels, MD, Craig Ebersson, MD, John D. Jarrell, PhD, and Christopher T. Born, MD. 2015 Annual Undergraduate Research Poster Day in the Biological Sciences, Providence, RI, April, 2015.

**Poster Presentation**, *Development of a Rapid-Detection Assay for the Visualization and Quantification of Bacterial Colonization and Biofilm Formation on Orthopaedic Trauma Explants*, Henry M. Fox, Janice Havasy, Caryn B. Cobb, David G. Decekey, Ayano Kondo, Artym V. Hayda, **Dioscaris R. Garcia, PhD**, Alan Daniels, MD, John D. Jarrell, PhD, and Christopher T. Born, MD. 2015 Annual Undergraduate Research Poster Day in the Biological Sciences, Providence, RI, April, 2015.

**Podium Talk**, **Dioscaris R. Garcia**, PhD., Henry Fox, Caryn Cobb, Janice Havasy Alan Daniels, MD, John Jarrell, PhD., Craig Ebersson, MD, Roman A. Hayda, MD, Christopher T. Born *Development of a Rapid-Detection Assay for the Visualization and Quantification of Bacterial Colonization and Biofilm Formation on Orthopaedic Trauma Explants*, **Foundation for Orthopaedic Trauma Research**, Las Vegas, NV, March 2015.

**Poster Presentation**, *Visualization and Characterization of Bacterial Biofilm on Orthopaedic Trauma Explants*, Henry M. Fox, David G. Decekey, Ayano Kondo, Artym V. Hayda, **Dioscaris R. Garcia, PhD**, Alan

Daniels, MD, John D. Jarrell, PhD, and Christopher T. Born, MD. Brown University Undergraduate Summer Research Symposium, 2014. Brown University, August, 2014, Providence, RI.

**Poster Presentation**, *The Characterization of Biofilm Formation on Spinal Implants of Varying Compositions*. David G. Deckey, Henry M. Fox, Ayano Kondo, **Dioscaris Garcia, PhD**, Alan Daniels, MD, John D. Jarrell, PhD, and Christopher T. Born, MD. Brown University Undergraduate Summer Research Symposium, 2014. Brown University, August, 2014, Providence, RI.

**Seminar Speaker**, *Characterization of the Adherence Patterns of Staphylococcus aureus on Various Spinal Implant Materials*, **Dioscaris R. Garcia, PhD**, Alan Daniels, MD, Craig Ebersson, MD, John D. Jarrell, PhD, and Christopher T. Born, MD. Orthopaedic Department Seminar, Rhode Island Hospital, January, 2014 Providence, RI.

**Invited Participant**, **Rally for Medical Research Hill Day**, Washington D.C., September, 2013.

**Invited Speaker**, **University of Rhode Island**, 6<sup>th</sup> INBRE SURF Conference, July, 2013.

**Panelist**, **Morgan State University**. 13<sup>th</sup> Annual Graduate Career Workshop, September, 2012.

**Guest Lecturer**, **Brown University**. Principles of Pharmacology, July, 2012.

Mullur, Jyotsna, **Garcia, Dioscaris**, Bowen, Wayne. Characterization of Sigma-2 Mediated Signaling in Human Neuroblastoma. Brown University Undergraduate Honors Symposium. April, 2012.

Pham, Vincent, **Garcia, Dioscaris**, Bowen, Wayne. Sigma-2 Receptor-Activated of SPC Transiently Mobilizes [Ca<sup>2+</sup>]<sub>i</sub> in the SK-N-SH Neuroblastoma Cell Line. Brown University Undergraduate Honors Symposium. April, 2012.

Savoca, Emily, **Garcia, Dioscaris**, Bowen, Wayne. Sigma-2 Receptor Expression in Proliferating Tumor Cells and Changes in Drug Sensitivity. Brown University Undergraduate Honors Symposium. May, 2011.

**Garcia, Dioscaris**, McCurdy, Christopher R., Bowen, Wayne. Sigma-2 Receptor-Mediated Apoptosis and Calcium Signaling: Are They Bifurcating Pathways?. *Society for Neuroscience*, November, 2010. 470.17.

**Garcia, Dioscaris**, Bowen, Wayne. Exploring the sigma-2 receptor-selective ligand SN79 as a tool for studying possible sigma-2 receptor heterogeneity. *NABRIT Conference*. March 2010.

**Garcia, Dioscaris**, Bowen, Wayne. Sphingosylphosphorylcholine promotes cell survival and proliferation parallel to sigma-2 receptor ligand CB-64D in Neuroblastoma SK-N-SH cells. *NABRIT Conference*. March, 2008.

## Honors

### Graduate

- Pharmacia Scholar
- Sigma Xi Scholar

## **Undergraduate**

- USDA Scholar
- DiMaio Scholar

## **Professional Society Memberships**

Sigma Xi

### **Graduate**

- AAAS Member
- SfN Member

### **Undergraduate**

- National Scholars Honor Society
- Outstanding Students Honor Society
- Member of American Society for Microbiologists

## **Skills**

- Experience using advanced instrumentation in the discovery of drugs and protein purification including:
  - RotaVapor
  - HPLC
  - AKTA Systems
- Advanced Molecular Biology techniques:
  - Western Blotting
  - DNA Extraction
  - PCR
- Expert in cell culture and aseptic techniques.
- Advanced Pharmacological techniques:
  - Cytotoxicity and Proliferation Assays
  - HTRF
  - Calcium Release Kinetics
  - Ligand Binding
  - Signal Transduction Characterization
  - Spectrophotometry
- Advanced Microbiological Techniques
  - Scanning/Transmission Electron Microscopes
  - Development of growth and selective media
  - High scale culture
  - Critical Point Dry
  - Confocal Microscopy
- Plant tissue culture
  - Gene expression analysis in plants

- Gus assay
  - Gene bombardment using the Sanford Gene Gun
- Fluent speaker and writer of English and Spanish
- Well versed in cGMP