Stanford

Vincent Michael Alford

Postdoctoral Research Fellow, Stem Cell Biology and Regenerative Medicine

Bio

HONORS AND AWARDS

- SPARK Translational Research Program, Stanford School of Medicine and Weston Havens Foundation (2018 - Present)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Task Force Committee Member, Stanford School of Medicine Diversity Cabinet (2018 - present)

PROFESSIONAL EDUCATION

- Doctor of Philosophy, S.U.N.Y. State University at Stony Brook (2017)
- Bachelor of Arts and Science, University of Florida (2012)

PATENTS

- Jian Cao, Nicole S. Sampson, Iwao Ojima, Vincent M. Alford, Anushree Kamath, Xiaodong Ren. "United States Patent PCT/US18/23676 Novel Inhibitors of Matrix Metalloproteinase-9 (MMP-9) for Anti-cancer Drug Development", Stony Brook University, Mar 22, 2017
- Jian Cao, Yizhi Meng, Vincent M. Alford. "United States Patent us 62/346,141 A Novel Tissue Culture Plate for a Throughput, 3-Dimensional Assay for Screening of Drugs with Anti-metastatic Activity", Stony Brook University, Jun 6, 2016

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My interest in science and research was fostered at a young age after losing a family member to colorectal cancer. At that young age, it was made apparent to me that cancer remains poorly understood which is reflected in the total lack of target-specific treatment regiments available to this patient population. This disparity in patient care is what inspired me to pursue a Ph.D in Molecular and Cellular Pharmacology at Stony Brook University (SBU). During my time at SBU, my dissertation research focused on the development of a standard approach for rational drug design against the functional activity of individual matrix metalloproteinases (MMPs). Results from this work led to the successful development of the first small molecule inhibitor specifically targeting the hemopexin domain of MMP-9. Additionally, I was also given the opportunity to assist in the development of a cell based High-Throughput Screen assay for the identification of small molecules with activity against cancer cell invasion.

After obtaining my Ph.D, I pursued a postdoctoral scholar position at Stanford University within the Institute of Stem Cell Biology and Regenerative Medicine. Currently, my projects have slowly become broader and more focused around protein chemistry. More specifically, my research interest lies in identifying protein targets or cell populations responsible for chronic illnesses such as Triple Negative Breast Cancer and Alzheimer’s disease. After identifying the target, my passion lies in understanding the biological function of said target in various biological signaling cascades and cell niche population maintenance. Another area I specialize in is assigning function to the various domains of individual proteins and prioritizing drug development against the most promising targets. Upon identification of the target

and validation of the domains responsible for protein activity- it becomes my mission to develop specific inhibitors against them. To this end, I use techniques such as protein mutagenesis, expression, and purification systems in addition to x-ray crystallography and chemical-protein structure activity relationships to understand, rationally design, and optimize these small molecule inhibitors for potential use in clinical trials.

Publications

PUBLICATIONS

- **Linear Desferrichrome-linked silicon-rhodamine antibody conjugate enables targeted multimodal imaging of HER2 in vitro and in vivo.** *Molecular pharmaceutics*
  Ahn, S. H., Thach, D., Vaughn, B. A., Alford, V. M., Preston, A. N., Laughlin, S. T., Boros, E.
  2019

- **Matrix Metalloproteinases (MMPs) as Cancer Therapeutic Targets.** *Matrix Metalloproteinases in Health and Disease, Sculpting the Human Body*
  Cathcart, J., Alford, V. M., Cao, J.
  World Scientific Publishing.2017: 157–185

- **Targeting the Hemopexin-like Domain of Latent Matrix Metalloproteinase-9 (proMMP-9) with a Small Molecule Inhibitor Prevents the Formation of Focal Adhesion Junctions.** *ACS chemical biology*
  Alford, V. M., Kamath, A., Ren, X., Kumar, K., Gan, Q., Awwa, M., Tong, M., Seeliger, M. A., Cao, J., Ojima, I., Sampson, N. S.
  2017; 12 (11): 2788–2803

- **A Novel Collagen Dot Assay for Monitoring Cancer Cell Migration.** *Methods in molecular biology (Clifton, N.J.)*
  Alford, V. M., Roth, E., Zhang, Q., Cao, J.
  2016; 1406: 181-187