T32 Trainees

CARDIOVASCULAR DIVISION
UNIVERSITY OF MINNESOTA
Driven to Discover℠

Victoria "Tori" Osinski

Started T32 in 2020

Research:

Her research involves two projects focused on improving the understanding of the role that stromal and vascular cells play in response to chronic inflammation in the mitral valves. These studies will examine specific cellular processes and signaling molecules that they believe to be relevant to the mechanisms driving pathologies observed in rheumatic heart disease and other forms of endocarditis. To study this, she is employing the use of the transgenic mouse model of arthritis K/B.g7 in which the mouse generates autoantibodies that prompt inflammation and fibrosis in the joints as well as the heart. Project 1 specifically focuses on characterizing the lymphatics in the mitral valves of these mice and determining whether they promote or inhibit disease progression early on and later in valve inflammation. Her specific hypothesis is that lymphangiogenesis inhibits disease early on, but later promotes it. This project was motivated by data identifying new vascular structures in inflamed valves of K/B.g7 mice using cre-lox recombination lineage-tracing driven by the endothelial-specific Cdh5 promoter. These identified vessels express lymphatic markers VEGFR3 and LYVE1. Project 2 aims to understand whether expression of IL4Rα in fibroblasts promotes valve inflammation and fibrosis. Previous work from the laboratory demonstrates that macrophage-produced IL-13 drives valve inflammation, but it remains unclear which cell types bind and respond to this cytokine to induce this pathology. She hypothesizes that loss of IL4Rα in fibroblasts will protect against IL-13-driven valve inflammation and fibrosis. Both projects will employ the use of cell-specific gene knockout murine lines, flow cytometry and histology assays, and human mitral valve samples to validate the presence of important cell types and proteins in patients with rheumatic disease and other inflammatory heart diseases. Since the mitral valve samples are obtained from deidentified, discarded tissue, this is not considered human research.

Coursework completed:

- **CTS100, -101, -102:** Optimizing the Practice of Mentoring and Enhancing Motivation Using the CARES Mentoring Model - completed 1/14/21 and 1/15/21
- **Women Innovators Conference** - attended on 11/16/20 (1:00 - 3:15 pm); https://mincorps.umn.edu/programs/women-innovators-conference
- **"Expanding American Innovation" Webinar** - attended on 12/18/20 (10:00 - 11:00 am); Organized by University of Minnesota Technology Commercialization
- **LNL X003** - Tech Entrepreneurship @ The Toaster, "Help! Startup and Commercialization Resources" - attended on 11/23/20
- **Inclusive Innovators Network** - 6x webinars January - February 2021 (Fridays, 11:30 am - 1:00 pm); NSF-funded, MIN-Corps program
- **MILI 6990: The Healthcare Marketplace** (2 cr) - Spring - A Term
  Survey of multitrillion dollar medical industry, this course covers physician and hospital services, insurance, pharmaceuticals, medical devices, information technology, and industry scale, interactions, oppor-

tunities, and barriers. This course is also offered as a 2 cr. undergraduate seminar (MILI 5990). (Fall - B Term, Online & Spring - A Term)
Mondays 5:45-9:05 PM, 1/19/21 - 3/8/21, Remote, Instructor is Stephen Parente

- **MILI 6235: Pharmaceutical Industry (2 cr) - Spring - B term**
Focusing on the unique characteristics of the pharmaceutical industry, including its market, regulation, and policy issues, this course leverages interdisciplinary perspectives and industry leader involvement to develop student skill sets. (Spring - B term, Saturdays)
Saturdays 8 AM-5 PM, 3/13/21, 3/27/21, and 4/17/21, Hanson Hall 1-106, Instructor is TBD
- **Center for Immunology Postdoc Grant Writing Workshop** - 3x sessions during Fall 2021

Publications: (as of 2/21/2022)

1. Loss of Id3 (Inhibitor of Differentiation 3) Increases the Number of IgM-Producing B-1b Cells in Ischemic Skeletal Muscle Impairing Blood Flow Recovery During Hindlimb Ischemia. **Osinski V**, Srikakulapu P, Haider YM, Marshall MA, Ganta VC, Annex BH, McNamara CA. *Arterioscler Thromb Vasc Biol*. 2022 Jan;42(1):6-18. doi: 10.1161/ATVBAHA.120.315501. PMID: 34809449
2. Helix-Loop-Helix Factor Id3 (Inhibitor of Differentiation 3): A Novel Regulator of Hyaluronan-Mediated Adipose Tissue Inflammation. Angelina Misiou, James C Garmey, Jack M Hensien, Daniel B Harmon, **Victoria Osinski**, Chantel McSkimming, Melissa A Marshall, Jens W Fischer, Maria Grandoch, Coleen A McNamara. *Arterioscler Thromb Vasc Biol*. 2020 Dec 31; ATVBAHA120315588. doi: 10.1161/ATVBAHA.120.315588. PMID: 33380173
3. *In vivo* liposomal delivery of PPARα/γ dual agonist tesaglitazar in a model of obesity enriches macrophage targeting and limits liver and kidney drug effects. **Osinski V**, Bauknight DK, Dasa SSK, Harms MJ, Kroon T, Marshall MA, Garmey JC, Nguyen AT, Hartman J, Upadhye A, Srikakulapu P, Zhou A, O'Mahony G, Klibanov AL, Kelly KA, Boucher J, McNamara CA. *Theranostics*. 2020 Jan 1;10(2):585-601. doi: 10.7150/thno.36572. eCollection 2020. PMID: 31903139 Free PMC article.
4. Pre-operative aerobic exercise on metabolic health and surgical outcomes in patients receiving bariatric surgery: A pilot trial. Gilbertson NM, Gaitán JM, **Osinski V**, Rexrode EA, Garmey JC, Mehaffey JH, Hassinger TE, Kranz S, McNamara CA, Weltman A, Hallowell PT, Malin SK. *PLoS One*. 2020 Oct 2;15(10):e0239130. doi: 10.1371/journal.pone.0239130. eCollection 2020. PMID: 33006980 Free PMC article.
5. Preparation, Administration, and Assessment of In vivo Tissue-Specific Cellular Uptake of Fluorescent Dye-Labeled Liposomes. **Osinski V**, Klibanov AL, McNamara CA. *J Vis Exp*. 2020 Jul 30;(161). doi: 10.3791/61585. PMID: 32804164
6. PPARγ and PPARα synergize to induce robust browning of white fat in vivo. Kroon T, Harms M, Maurer S, Bonnet L, Alexandersson I, Lindblom A, Ahnmark A, Nilsson D, Gennemark P, O'Mahony G, **Osinski V**, McNamara C, Boucher *J. Mol Metab*. 2020 Jun;36:100964. doi: 10.1016/j.molmet.2020.02.007. Epub 2020 Feb 18. PMID: 32248079 Free PMC article.
7. Importance of thorough tissue and cellular level characterization of targeted drugs in the evaluation of pharmacodynamic effects. Bauknight DK*, **Osinski V***, Dasa SSK, Nguyen AT, Marshall MA, Hartman J, Harms M, O'Mahony G, Boucher J, Klibanov AL, McNamara CA, Kelly KA. *PLoS One*. 2019 Nov 14;14(11):e0224917. doi: 10.1371/journal.pone.0224917. eCollection 2019. PMID: 31725756 Free PMC article.
*Co-first authors

Publications in process:

- Emergent lymphatic growth promotes progression of autoimmune valvular carditis. Amritha Yellamilli*, **Victoria Osinski***, Maria M. Firulyova, Jennifer L. Auger, Lee A. Meier, Jessica L. Faragher, Konstantin Zaitsev, Bryce A. Binstadt. *Co-first authors. To be submitted to *Circulation*.

Conference Presentations:

Osinski V, Yellamilli A, Auger J, Faragher J, Firulyova M, Zaitsev K, Binstadt BA. Uncovering the role of lymphatics in mitral valve disease. Pediatrics Research, Education, & Scholarship Symposium (PRESS) 2021, University of Minnesota Medical School, Minneapolis, MN, held virtually (04/2021).

Osinski V, Yellamilli A, Auger J, Faragher J, Firulyova M, Zaitsev K, Binstadt BA. Uncovering the role of lymphatics in mitral valve disease. Vascular Biology 2021, North American Vascular Biology Organization, held virtually (10/2021).

Osinski V, Yellamilli A, Firulyova M, Auger J, Faragher J, Zaitsev K, Binstadt BA. Uncovering the role of lymphatics in mitral valve disease. InFocus Session: Lymphatic-Vascular Cross Talk, invited speaker (01/2022).