

BIOMEDICAL & VETERINARY SCIENCES

GRADUATE PROGRAM



ANNOUNCES

The Master of Science Seminar and Examination of

Ester Yang

"Mechanical High-Intensity Focused Ultrasound (Histotripsy)
in Dogs with Spontaneously Occuring Soft Tissue Sarcomas "

Friday, June 30th, 2023 June 30th, 2023 8:00am
Classroom 121

[https://viriniatech.zoom.us/j/9228698987?](https://viriniatech.zoom.us/j/9228698987?pwd=R1l1Sy9mT2Nkd3REZWYyR21ldzc3UT09)
[pwd=R1l1Sy9mT2Nkd3REZWYyR21ldzc3UT09](https://viriniatech.zoom.us/j/9228698987?pwd=R1l1Sy9mT2Nkd3REZWYyR21ldzc3UT09)

Meeting ID: 922 869 8987

Passcode: 1234



Bio

I'm from the DC area and always wanted to become a veterinarian since I had my first dog, Max, as a child. I found my passion in Oncology during vet school, and enjoy forming meaningful connections with my patients and clients going through challenging diagnoses. I plan to stay in academia after graduation.

Funded by

Focused Ultrasound Foundation
VMCVM Office of Research and Graduate Studies

Awards and Academic Achievements

- Poster Presentation as VCS Resident Winner, ACVIM 2022
- Edward L. Gillette Memorial Outstanding Poster Presentation, VCS 2021
- Cancer Biology Abstract 3rd Place, VCU 2021
- Poster Presentation 1st place, VCU 2021

Lay Language Abstract

Histotripsy is a non-thermal high-intensity focused ultrasound (HIFU) ablative technique that uses controlled acoustic cavitation to cause mechanical fragmentation of tissue. To date, there are no reports investigating histotripsy for the treatment of soft tissue sarcoma (STS). This study aimed to investigate the *in vivo* feasibility of ablating STS with histotripsy and to characterize the impact of partial histotripsy ablation on the acute immunologic response in canine patients with spontaneous STS. CT of the chest, abdomen, and the tumor was performed for staging and treatment-planning. Pretreatment biopsies were obtained. Safety was monitored with physical examinations, through owner reports, and CBC/serum biochemistry. A custom 500 kHz histotripsy system was used to treat ten dogs with naturally occurring STS. Anatomical ablation zones were evaluated with contrast CT at 1- and 4-days post-treatment, with tumor resection at 4-days post-treatment. Safety was determined by monitoring vital signs during treatment and post-treatment physical examinations, routine lab work, and owners' reports. Ablation was characterized using radiologic and histopathologic analyses. Systemic immunological impact was evaluated by measuring changes in cytokine concentrations, and tumor microenvironment changes were evaluated by characterizing changes in infiltration with tumor-associated macrophages (TAMs) and tumor-infiltrating lymphocytes (TILs) using multiplex immunohistochemistry and differential gene expression. Results showed histotripsy ablation can achieve safe and effective tumor ablation in all ten dogs. Immunological results showed histotripsy induced pro-inflammatory changes in the tumor microenvironment. Histotripsy as an immunotherapeutic treatment option needs to be further investigated. Overall, this study demonstrates histotripsy's potential as a precise, non-invasive treatment for STS.

Publications

Ruger, L., Yang, E., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervisis, N., Allen, I., Daniel, G., Tuohy, J., Vlaisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. *IEEE Transactions on Biomedical Engineering (TBME)*. 2022. DOI: [10.1109/TBME.2022.3201709](https://doi.org/10.1109/TBME.2022.3201709)

Yang, E., Kubicek, L., Pavletic., M. Use of imaging-guided intensity-modulated stereotactic body radiation therapy to treat a well-differentiated hepatocellular carcinoma in a dog. *JAVMA*, 2021 Aug 15;259(4):392-395. DOI: [10.2460/javma.259.4.392](https://doi.org/10.2460/javma.259.4.392)

M. Nguyen, M., Yang, E., Neelkantan, N., Mikhaylova, A., Arnold, R., Poudel, M. K., Stewart, A. M., Kalueff, A. V. Developing 'integrative' zebrafish models of behavioral and metabolic disorders. *Behav. Brain Res.*, 256, 2013, pp. 172-187

Stewart, A.M., Yang, E., Nguyen, M., Kalueff, A.V. Developing zebrafish models relevant to PTSD and other trauma- and stressor-related disorders. *Prog. NeuroPsychopharmacol. Biol. Psychiatry*. 2014., 55, 67–79

Presentations

Oral abstracts:

Yang, E., Ruger, L., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervis, N., Allen, I., Daniel, G., Tuohy, J., Vlasisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. Focus Ultrasound Symposium Presentation, Bethesda, MD, 2022

Poster Abstracts:

Yang, E., Ruger, L., Coutermarsh-Ott, S., Nightengale, M., Hsueh, A., Ciepluch, B., Vlasisavljevich, E., Dervis, N., Klahn, S. Pilot study of partial ablation using thermal high-intensity focused ultrasound (HIFU) in feline injection site sarcomas. VCS Conference Poster Presentation, Norfolk, VA, 2022

Yang, E., Ruger, L., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervis, N., Allen, I., Daniel, G., Tuohy, J., Vlasisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. American College of Veterinary Internal Medicine Research Forum, Austin, TX, 2022

Yang, E., Ruger, L., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervis, N., Allen, I., Daniel, G., Tuohy, J., Vlasisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. Society of Interventional Oncology Annual Scientific Meeting, San Francisco, CA, 2022

Yang, E., Ruger, L., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervis, N., Allen, I., Daniel, G., Tuohy, J., Vlasisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. VCU Conference Poster Presentation, Richmond, VA, 2021

Yang, E., Ruger, L., Gannon J., Sheppard, H., Coutermarsh-Ott, S., Ziemlewicz, T., Dervis, N., Allen, I., Daniel, G., Tuohy, J., Vlasisavljevich, E., Klahn, S. Mechanical High-Intensity Focused Ultrasound (Histotripsy) in Dogs with Spontaneously Occurring Soft Tissue Sarcomas. VCS Conference Poster Presentation, Boise, ID, 2021

Examination Graduate Committee

Major Advisor/Chair:

Shawna Klahn, DVM, Diplomate ACVIM (Oncology)
Associate Professor, Oncology
Department of Small Animal Clinical Sciences

Graduate Advising Committee Members:

Nick Dervisis, DVM, PhD, Diplomate ACVIM (Oncology)
Associate Professor, Oncology
Department of Small Animal Clinical Sciences

Eli Vlasisavljevich, PhD
Associate Professor
Department of Biomedical Engineering and Mechanics

Sheryl Coutermarsh-Ott, DVM, PhD, DACVP
Adjunct Professor
Department of Biomedical Sciences and Pathobiology



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