UCONN | COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES

ANIMAL SCIENCE

ANSC Undergraduates Conducting Research

Caitlyn Splaine, a junior Animal Science undergraduate student in the Honors Program, has worked with Dr. Sarah Reed since March of her freshman year.

Dr. Reed's laboratory focuses on the effects of maternal diet on muscle satellite cell function and metabolism in offspring using a sheep model. This work is conducted in collaboration with Dr. Kristen Govoni, whose laboratory focuses on growth and development, and Dr. Steven Zinn, who focuses on endocrinology. Current research indicates that poor maternal nutrition during gestation has detrimental effects on muscle stem cell function, metabolism, muscle development, and postnatal growth and development. Thus, poor maternal nutrition predisposes offspring to disease and results in a decrease in the economic productivity of the animal due to the resulting reduction in muscle development.

Caitlyn began her work in the Reed Lab by assisting on a project in collaboration with the laboratories of Drs. Govoni and Zinn to investigate the effects of antioxidant supplementation on the growth of ram lambs. Her responsibilities in this role included assisting with daily preparation of dietary rations for the herd of 20 ram lams, maintaining the sanitary conditions of their pens, and utilizing proper techniques and procedures to restrain the lambs to allow graduate students to collect samples from these animals. This experience exposed Caitlyn to the graduate and undergraduate students working in the Reed and Govoni laboratories and allowed her to ask questions about their research in the department, ultimately inspiring her to pursue a formal position in the Reed laboratory to perform a project of her own.

Caitlyn is currently working on her honors thesis project, which is a project of her own design that she developed with the help of Dr. Reed and is funded in part by a UConn IDEA Grant from the Office of Undergraduate Research. The goal of this project is to evaluate the effects of poor maternal nutrition during gestation on the placental mRNA expression of insulin-like growth factor (IGF)-I, IGF-II, insulin-like binding protein (IGFBP)-2, and IGBP-3 in sheep. Both the caruncle, the maternal side of the placenta,

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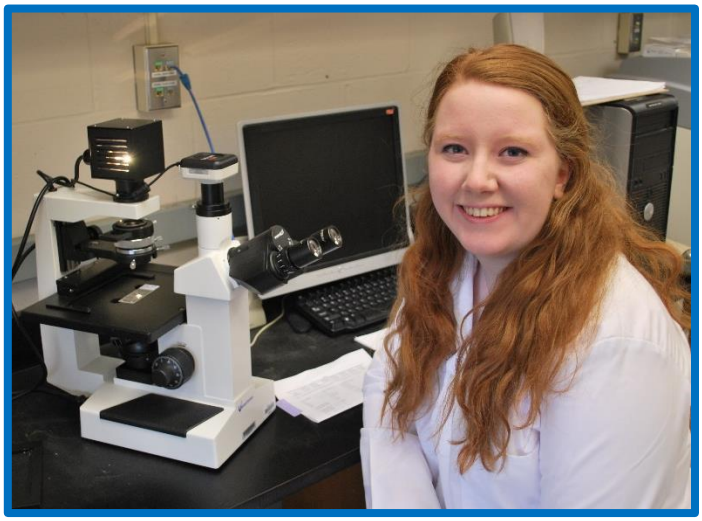
and the cotyledon, the fetal side of placenta, are being quantified in this experiment to observe any potential differences in the expression between these tissues. The literature indicates that IGF-I, IGF-II, IGFBP-2, and IGFBP-3 are affected by maternal nutrition and essential to the growth of a fetus, so Caitlyn is eager to obtain her data and observe these effects over the entirety of gestation.

Working in Dr. Reed's lab has allowed Caitlyn to hone her skills in the laboratory and given her a greater appreciation for the scientific process. After finishing her research and graduating from UConn with honors, Caitlyn plans to attend veterinary school to attain a DVM and pursue a career in veterinary medicine.



Veronica Pleasant, a senior Animal Science undergraduate student, has been working in the laboratory of **Dr. Kristen Govoni** since September of her sophomore year. Veronica has a passion for understanding disease pathogenesis and is pursuing a double major in both the Animal Science and Pathobiology departments. Dr. Govoni's laboratory focuses on the effects of maternal programming on the offspring growth and development using a sheep model. This work is in collaboration with Dr. Sarah Reed, whose laboratory focuses on muscle physiology, and Dr. Zinn. The literature, including publications from the UConn ANSC department, indicate that poor maternal nutrition during gestation has effects on muscle development, insulin-like growth factors, postnatal growth and development, metabolism, and stem cell function. In general, poor maternal nutrition during gestation predisposes the offspring to disease, obesity, and other biological dysfunctions.

In Dr. Govoni's lab, Veronica aided a graduate student in determining how poor maternal nutrition during gestation affects the number of myogenic progenitor cells expressing the transcription factor Paired Box 7 positive [Pax7(+)] in offspring muscle. This was accomplished using a cryostat to slice cross-sections of fetal sheep muscles to make histological slides. These slides were then stained and imaged with a microscope in order to determine the number of Pax7(+) progenitor cells within a given cross-section of fetal muscle tissue. During the spring semester of her sophomore year, Veronica assisted in a project focused on how high maternal milk production during gestation affects dairy calf growth and health. She performed several enzyme-linked immunosorbent assays (ELISAs) in order to determine the concentrations of interferon gamma (IFNy) and immunoglobulin G (IgG) in the

colostrum of the Holstein cows at the Kellogg Dairy Center (KDC), as well IgG concentrations in calf serum. These were performed to determine if the inflammatory and passive transfer of antibodies from cow to calf are altered due to high maternal milk production. Veronica continued the analysis of these data into her junior year. Currently, she is working on further detection of IgG in the serum and administered colostrum of female Holstein calves from the KDC, as funded by the Office of Undergraduate Research.

Working in Dr. Govoni's laboratory has given Veronica greater confidence in a lab setting, as well as a much larger appreciation for the applications of research in real life. After graduating from UConn, she hopes to attend veterinary school and pursue a career in companion animal emergency medicine.

Kelli Knapp, a senior Animal Science undergraduate student with an Equine Business Management minor, has been working with **Dr. Jenifer Nadeau** on various projects since her freshman year. From 4-H to horse health, Dr. Nadeau's work focuses on equine science and Kelli has been involved in many of her activities. She first started working with Dr. Nadeau as an independent study student assisting with the programs that Dr. Nadeau runs for the Connecticut 4-H Horse Program. That included making educational materials and helping run events for 4-H youth.

Kelli's interest in research started in high school. As a member of the Mattabesett FFA Chapter, she conducted several agri-science research projects, the one of which inspired her to do more of her own research. For that project, a friend helped her build a life-size model horse-head with a weighted pulley system attached to the reins. They fitted different bits and bridles on the model and measured the forces applied to the nose, poll, and roof of the mouth (bits only) when a standardized amount of pressure was applied via the pulley. This year, Kelli will be conducting her own research project supervised by Dr. Nadeau, through the IDEA Grant program offered by the UConn Office for Undergraduate Research. This project involves testing the forces applied to a real horse's face while being ridden with a bitted English bridle, as compared to two types of bitless bridles: a mechanical hackamore and a simple side-pull.

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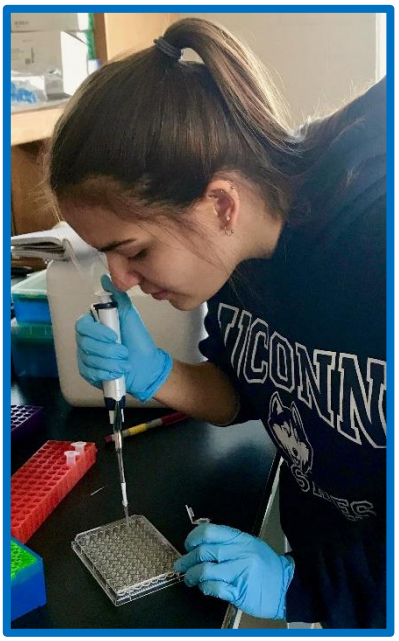

Helenrose Iannitti, a senior Animal Science undergraduate student, is a member of the Honors Program. Helenrose has worked with **Dr. Sarah Reed** since December of her freshman year. She began assisting in the UConn equine barns as part of a collaborative project with Dr. Reed's lab, other universities, and the United States Polo Association during which Helenrose helped collect blood samples, weight data, and heart rate monitor data from the UConn polo horses.

Helenrose has participated in various ongoing projects in Dr. Reed's lab. She has worked with Dr. Reed and graduate students to run protein assays, quantify cell culture and histology data, collect blood and muscle samples from sheep, ultrasound horses and sheep, and section mouse muscle tissue using a cryostat.

Helenrose has continued working in Dr. Reed's lab on an ongoing project investigating the role of maternal nutrition during gestation on offspring growth and development. Helenrose developed her honors project on this work, focusing on the effects of poor maternal nutrition during gestation on offspring oxidative stress. Oxidative stress occurs when the body cannot adequately detoxify oxygen-centered free radicals. This effects numerous aspects of animal health and it is a growing field of animal research.

During the spring semester of her sophomore year, Helenrose began her individual project. Since then she has completed a series of oxidative stress assays using samples from the offspring of the ewes who experienced poor maternal nutrition during gestation. Thus far, she has analyzed these samples for malondialdehyde (MDA) concentrations. Malondialdehyde is an indicator of lipid peroxidation, which occurs when an animal experiences oxidative stress. Helenrose has analyzed sheep plasma, serum, and muscle tissue for MDA. Her data demonstrate a tendency for poor maternal nutrition to affect offspring MDA concentrations, and therefore, oxidative stress. She is currently working to analyze muscle samples from the offspring for additional markers of oxidative stress.

Helenrose has enjoyed her research, and she plans to attend veterinary school after completing her undergraduate career and research here at UConn. She hopes to attain a DVM and pursue a career in large animal medicine.