State-of-The Art 9.4 Tesla MRI

We are very excited to announce that the final stages of the site work began on Thursday, May 3, 2018 to install the new Small Animal 9.4T MR unit awarded as part of an NIH Major Equipment Grant written by Dr. Natalie Serkova, and site work supported by multiple groups throughout campus.

As part of the process to install the new MR unit, prep work will be occurring and so we expect to have some noise and vibration over the next 3-4 weeks centered around the Small Animal Imaging suite and over the Southwest corner of the R2 Shell Space and R2 Return Hallway. The Small Animal Imaging suite will require some demolition of existing structures and room preparation, including some mechanical upgrades. The R2 Shell Space will have the Equipment Access Portal that was installed when R2 was constructed opened in order to create a portal of entry large enough to accommodate the new MRI Unit.

As we get closer to the date that the MR unit will be delivered, we will keep everyone informed, as there will be brief periods of time where traffic is restricted in the R2 Return Hallway and RC1 Entry Hallway to move the unit into place.

We have a commitment from the contractors that they will do everything that they can to minimize noise and disruption during the entire process. Please let me know if you have any questions regarding this project.

Thank you for your understanding as we work with the Small Animal Imaging Core to bring additional resources to the campus.

RESEARCH CORNER

Dr. Holger Russ' long-standing research interests center on the human insulin-producing beta cells in health and disease, with a growing emphasize on their interactions with the adaptive immune system. Dr. Russ received his PhD degree from Tel Aviv University where he pioneered novel technologies in primary human tissues to promote the expansion of adult human pancreatic beta cells. He followed up on these studies during his postdoctoral training at the UCSF Diabetes Center, where he was among the first three groups to directly differentiate functional pancreatic beta-like cells. He also made major contributions to studies that pioneered the generation of a functional human thymus from human stem cells. Dr. Russ joined the Barbara Davis Center for Diabetes at University of Colorado Denver in August 2016 to establish his independent research program. The research in his lab focuses on elucidating the underlying molecular mechanisms resulting in Type 1 Diabetes (T1D) and establishing novel stem cell-derived human model systems for the diabetes research community. These studies include: (i) the generation of T1D patient-specific beta cells by reprogramming somatic patient cells into induced pluripotent stem cells (iPSC), followed by directed differentiation into beta cells that can be characterized for phenotypic defects; (ii) the
use of novel gene editing technologies, including TALEN and CRISPR/Cas9, in combination with directed differentiation approaches to investigate previously inaccessible biological questions related to the genetics of human T1D. This includes the generation of patient-specific mutations, genetic deletions, gene tagging and reporter generation; and (iii) the use of reprogramming and directed differentiation technologies to study the development of T-cells in the human thymus and the interaction of T cells with isogenic tissues and cells, such as the pancreatic beta cells, that are targeted in an autoimmune response. These studies will provide for the first time a platform for studying the initiation and progression of T1D in a human context.

**COMPARATIVE PATHOLOGY SHARED RESOURCE (CPSR)**

Do you know how to handle a gerbil, chinchilla, or pig? How is a drop of blood obtained from a zebrafish? What is a good way to perform a nonterminal blood collection on a mouse?

The CPSR was initiated in the fall of 2015, upon the hiring of the comparative (veterinary) pathologist, Linda Johnson. This Shared Resource received startup funding from the Department of Pathology, The Office of the VCR, The Cancer Center, Children’s Hospital, The departments of Psychiatry & Medicine as well as CCTSI. Representatives from each hospital, Department or Center also serve on an Advisory Board, which oversees the activities of this small-shared resource. In its first year, the CPSR assisted more than 50 researchers, with the majority from the CU School of Medicine. Activities included necropsy and histopathology, tissue/lesion grading, photomicroscopy, clinical hematology and clinical chemistry. Researchers at CU Boulder and at CSU also were facilitated with some cases. In July, 2016, the CPSR welcomed Susan Tousey, who had 18 years of experience as a certified veterinary technician, and 9 years as a (human) laboratory technologist. Previously, Susan had worked at Heska, as well as IDEXX, and as many know, she is a remarkable asset to the CPSR. Susan resides on the 5th floor of RC1, across from Research Histology, room 5222A.

Obtaining nonterminal blood from a mouse, of sufficient volume and quality, is not easy due to their small size, however we do believe that sampling can be done, and that the research animal can remain alive. We have a variety of tubes to offer you, and will typically urge you to consider using a lance to the facial vein, or the submental vein. With practice, large, nonterminal volumes of blood may be obtained from mice. Susan is able to perform a complete blood count, (with a hematology analyzer), a manual differential count with a blood smear, or with whole, unclotted blood, serum or plasma, able to look for various chemistry analytes. Susan also analyzes urine samples. In addition, for larger animals, we have a point of care device that is able to provide similar, but different values when the animal is prepped for surgery, or at cage-side. Please see the CPSR brochure, which is available in both vivaria.

Projects that the CPSR has initiated this year include the Mouse Models of Cancer Workshop, teaching in the Introduction to Laboratory Animals Course (BIOE 5074), assisting with small group teaching of medical students, and frequent trips to R1 or R2 vivaria. Many assisted in the survey we’d used last summer, and more than 100 research labs now utilize the services of the CPSR. The CPSR would like to hire a full time clinical pathologist for the analysis of blood, saliva, or any bodily fluid. It also is anticipated that a clinical pathologist would most likely enable rotation of pathology graduate students from CSU, as well as assist in teaching the small numbers of students who apply for consideration each year. CU is unique among public universities to offer both a veterinary anatomic pathologist and (in the near future) a veterinary clinical pathologist devoted to laboratory research animals. The CPSR establishes the University of Colorado as a premier research institution, and in particular recognizes the Department of Pathology as being mindful of ‘One Health’ with emphasis on the well-being of all research laboratory animal species. Additional funds are currently being sought in order to hire a clinical pathologist, as there is much to report upon in the laboratory animal research field.

The CPSR is independent of OLAR, although often the anatomic pathologist will help with OLAR animal health cases, especially if the research animal had died. The CPSR often interfaces with OLAR, the Imaging or Flow Cytometry cores, as well as Clinical Pathology.