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Fields of Interest: glucose metabolism, insulin resistance and obesity, diabetes, therapeutic targets for the diabetic population, cardiac complications in the diabetic patient.

Research program of the Comparative Metabolism laboratory: Diabetes, insulin resistance and obesity have reached epidemic levels, and impose a considerable medical and economic burden on societies that requires urgent action. The research mission of our laboratory is to improve animal and human health by a better understanding of the metabolic effects of insulin resistance and diabetes. The main pathogenic process underlying sustained hyperglycemia, the landmark of diabetes, results from a defect of insulin production or action, with dysfunctional glucose uptake into insulin-sensitive tissues (i.e., striated muscles and adipose tissues). Despite intensive research for over 50 years, the mechanisms of altered glucose transport observed during diabetes are still not well elucidated. Therefore, the main current mission of my laboratory is to investigate the regulation of glucose transport in insulin-sensitive tissue. In particular, we are investigating the pathways by which Ca2+-stimulated glucose transport in striated muscle, using transgenic healthy and diabetic mice. We also investigated the role and regulation of novel isoforms of glucose transporters, a family of proteins that tightly regulate glucose uptake. Finally, we investigate novel large animal models of insulin resistance and type 2 diabetes. Therefore, the strength of our research program is to use a unique comparative approach by investigating both small and large animal models of metabolic diseases, spinning from transgenic mice to horses. In addition, we use an integrative physiological approach ranging from whole-animal to cellular and molecular studies. State-of-the-art techniques used in the laboratory include echocardiography, cardiac myocyte isolation, western blot, RT-PCR and cell surface biotinylation assay. Findings from our ongoing studies could unravel new pathogenic mechanisms, which could translate in the discovery of novel therapeutic directions that could be beneficial to both veterinary and human patients. Potential summer students will participate in one of the ongoing projects.

Additional information can be found at:

http://www3.cvhs.okstate.edu/profiles/DisplayProfile.asp?RecordID=973