Name and degree(s):

Geri Deevska, PhD

Research Focus Area:

Obesity, diabetes and cardiometabolic syndrome

Current Research Projects:

Project 1: Obesity-related pancreatic β-cell dysfunction.
Obesity is the major risk factor for type 2 diabetes (T2D), a disease that nearly 40% of the adults in the United States will develop throughout their lifetime. Central to the development of T2D is the exhaustion of β-cells functions resulting in inability to produce sufficient insulin. Chronic higher than normal levels of circulating nutrients such as glucose and free fatty acids (FFAs) are a hallmark of obesity and have been shown to interfere with the normal functions of the pancreas. This “obesogenic” environment has been known to disturb the regulation of intracellular lipid metabolism leading to lipotoxicity, progressive β-cell dysfunction and loss in T2D. The mechanisms however remain obscure. Increased supply of excess nutrients inside pancreatic cells can enter the synthetic metabolic pathway to produce triacylglycerol (TAG) lead to accumulation of fat in the pancreas known as non-alcoholic fatty pancreas disease. They can also be used as substrates for production of sphingolipids, a class of lipid molecules several of which have bioactive properties. This project will focus on establishing a longitudinal in vitro model to study obesity-related pancreatic β-cell dysfunction due to altered obesogenic environment. The overall goal is to investigate the role of the sphingolipid metabolic pathway in development of obesity-related pancreatic β-cells dysfunction. Using human pancreatic β-cell line as a model, the studies will focus on deciphering the precise cellular mechanisms by which sphingolipids affect β-cells’ functions and ability to secrete insulin.

Project 2: Role of the sphingolipid metabolic pathway in adipose tissue biology.
Adipose tissue is an active endocrine and metabolic organ that secretes hundreds of different molecules including hormones and cytokines (aka adipokines). It is composed of several different cell types, the predominant one of which is adipocytes. The mature adipocytes arise from existing pre-adipocytes throughout the individual’s lifespan, thus enabling hyperplastic expansion of adipose tissue when increased storage requirements are needed. In addition, adipocytes can expand in size to accommodate increased storage needs during periods of excess nutrient supply. As a result, the overall metabolism and secretory properties of these cells as well as the differentiation of pre-adipocytes to mature cells undergo tremendous changes documented in numerous previous studies. The precise molecular and cellular mechanisms underlying these changes, however, still remain poorly understood. The overall goal of this project is to understand how the metabolism of different lipids is regulated as pre-adipocytes undergo maturation and differentiation into mature adipocytes, followed by subsequent metabolic and morphological changes associated with increased energy demand.
This will allow to begin identifying potential novel targets for drug development and therapy for obesity and other metabolic diseases associated with adipose tissue dysfunction.

**Link to publications on PubMed:**

**Student Research Opportunities at ICOM:**
No specific skills are required or expected.
Anyone enthusiastic to obtain hands-on research experience is welcome in the lab.
Dependability and ability to work well with others are a must.