Laboratory Introduction

The long term research goal in our laboratory is to study the pathogenesis of complex human diseases with an emphasis on solving the “cause or consequence” puzzle using mouse genetics and cell system as tools. In the past few years, we have generated multiple mouse models with a spectrum of PPARγ levels to test whether subtle change in PPARγ levels is the basis leading to metabolic dysregulation. Through this system, we identified several novel functions of PPARγ, including its distinct role in maintenance of individual fat functionality and regulation of vascular integrity. In addition to the research in PPARγ, we initiated research work focused on dissecting the contribution of lipid inflammation to insulin resistance. Considering the contribution of the dietary factors in induction of inflammatory signaling, we focused on TLR-mediated inflammatory signals transduced by dietary nutrients and their involvements on metabolic diseases. For the next stage of our research, we will turn our interests in a rapidly emerging field, molecular imaging, which provides noninvasive visual quantitative representations of fundamental biological processes in intact living subjects. Together with the powerful in vivo imaging system (IVIS) and several light reporting mouse models we generated, we plan to analyze NF-κB and PPAR activation noninvasively in a variety of pathological conditions. We believe a combined basic and translational approach is worth of such an investment in time and effort to better understand the human disease.

Representative Publications