Pathophysiology of Diabetes: Assignment

The goal of this session is to deepen your understanding of the pathogenesis of type 2 diabetes mellitus in a physiological context. You will be introduced to the intricacies of organ crosstalk and how to study substrate fluxes in vivo by complex physiological studies. My hope is that you get an idea of current controversies that the field is battling with as well as a better understanding of the physiological defects that constitute the insulin resistant state.

Prepare for this session mainly by remembering what you have read and learned in module 1 and 2 so far.

A. Please predict (based on what you have learned so far, do not look up) the phenotype of the following tissue specific insulin receptor knock outs:
    1. Whole body
    2. Adipose tissue
    3. Muscle
    4. Liver
    5. Brain

The papers describing the knock outs are posted and we will discuss some more, but you only need to read the paper that will be assigned to you. Who should read which paper is listed below. Please get together with the other student and decide on how to present that paper (do focus on the phenotype, leave out strategy and confirmation of knock out, but do pick ~5 figures per paper that you would want to discuss. Try to keep below 5 min per paper in total. Try to explain what they were studying, why they were studying it, and what major findings they found). Choose one person that should present the paper. There is no need to prepare a powerpoint. Look through Dr. Buettner's slides and see the figures included there. If you want additional slides added, please email him. If you have any questions, email Dr. Buettner.

You will discover that there are seemingly paradox findings in these phenotypes (besides what is expected). We will try to make sense out of these phenotypes. I will highlight the role of organ crosstalk in the pathogenesis of type 2 diabetes.

What really leads to type 2 diabetes: is it cellular insulin resistance or is it metabolic inflexibility?

What is the role of the brain in organ crosstalk and type 2 DM?

How do we study lipid and glucose metabolism?

Groups:
Accili et al. – Group 1
Bluher et al. – Group 2
Bruning et al. 2000 --Group 3
Bruning et al. 1998 – Group 4
Michael et al. – Group 5