

Evaluation of MMPC Centers – Winter 2015 (Streamson Chua, Jr.)

Each of the Centers presented summaries of their annual output, including users and services provided. Overall, the Centers provided services that were equal to NIH support, indicating excellent utilization of the Centers' cores. There was good indication of a stable base of users with repeat users representing a major fraction. Cores showed indications of continued development with the incorporation of novel assays or newer techniques.

Vanderbilt – New space that integrates all of the cores into one unified space. The Center continues to be the leader in metabolic analyses with a newer focus on metabolic flux analyses.

Yale – Continues with the Center's highly competent provision of services. Newer co-directors with former co-directors moving on to faculty positions at other universities.

UC Davis – Continues with developing new technologies, such as brain imaging. Seemed to lack details in services provided and user numbers.

Case Western Reserve – Dr. Henri Brunengraber announced that he will be stepping down as Center Director. The Center continues to be a leader in metabolomics analysis with a focus on flux analysis. A question arises as to the direction in which the new leadership will steer the Center.

Univ of Cincinnati – Dr. Patrick Tso announced that he will step down as Center Director with Dr. Sean Davidson as the rising Director. The Center has done well with continuing its services focused on lymph analyses. The directions in which the new Director will lead the Center to remains a question.

U Massachusetts – The Center continues to do well with its Core services and provides valuable services to the community.

Working Groups

Overall, the Working Groups worked well as a team although the end results were somewhat patchy. The Energy Balance group did well with a concerted effort to examine the capabilities and uniformity across the Centers. A valuable document of these efforts is forthcoming and should serve as a standard for years to come. The Brain Imaging group produced some interesting results although its applicability and utility to a large group of users remains untested. The Bariatric Surgery group proved to be a useful forum for exchange and discussion of techniques and experiences. Surgical techniques are oftentimes difficult to translate across sites and visits may be necessary for successful transfer. However, much of the field has moved on to the concept that bile acid signaling and FGF19/FGF21 are major players in the effects of bariatric surgery on energy balance and glucose metabolism. The Vanderbilt group produced results that indicated biliary diversion was sufficient to replicate the effects of most bariatric surgeries. This area is moving quickly and the need for mouse models of gastric bypass may not be large.

There was a discussion about new directions and a strong consensus that exercise effects could be valuable. I would agree and a standardized protocol that produced a strong and robust effect in energy expenditure and/or substrate utilization would be extremely useful and broaden the scope of the Centers. There are several areas that could be investigated: 1) basal exercise tolerance; 2) response to exercise training; 3) genetic influences on exercise tolerance and training. There is a strong literature that indicate a strong genetic influence on exercise tolerance. While C57BL/6J mice are low in basal exercise tolerance, their ability to respond is very high among strains. Thus, B6 mice, after training, achieve levels of exercise tolerance equivalent to the high basal runners. The impact of exercise, before, during and after high fat feeding, would be an interesting area of study.

One other area to consider is the large population of inbred strains with which to study phenotypic variation. While the C57BL/6 strains are now the standard, a large untapped variation exists among the other inbred strains. For example, the BALB/c strain is lean and highly resistant to developing DIO, as well as having a high basal exercise tolerance. (Training brings B6 mice up to the level of BALB/c mice as BALB/c mice do not increase their exercise tolerance with training) As most inbred mouse strains have had their genomes sequenced and comparisons to the B6 strain are readily done, combined genetic-phenotypic studies could be very fruitful if pursued.