National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
Imaging the Pancreatic Beta Cell, 4th Workshop
April 6 - 7, 2009
Marriott at Metro Center
Washington, DC

Monday, April 6, 2009

7:30 a.m. - 8:30 a.m. Registration and Coffee

8:30 a.m. - 8:40 a.m. Welcome

8:40 a.m. - 11:30 a.m. Session I. Imaging Beta Cell Mass

Molecular imaging approaches for tissue mass depend on molecular targets that are specific for the beta cell, as well as agents that bind with appropriate kinetics, and imaging agents that provide the sensitivity needed to visualize cells that make up only 1 or 2 percent of the pancreas. The imaging approaches also must be quantitative. In addition to targeted imaging agents that someday may be suitable for the clinic, genetic approaches using animals have proved informative and may be necessary to validate molecular imaging techniques. This session will include presentations on topics such as:

1. Molecular imaging approaches such as PET, SPECT, and others used to visualize beta cell mass *in vivo*;
2. Progress in discovery of beta cell-specific molecular targets;
3. Novel imaging agent development;
4. Focus on specific aspects of molecular imaging agents for the beta cell—kinetics, binding properties, specificity, etc.;
5. Focus on quantification of imaging data for beta cell mass in animals and people;
6. Lessons learned or progress stemming from other imaging studies, such as neuroimaging agents developed for the brain.

8:40 a.m. - 9:15 a.m. Keynote Address: Tools for Imaging the Beta Cell: Target Discovery and Antibody Production
Jacob Hald, Hagedorn Research Institute, Denmark

9:15 a.m. - 11:30 a.m. 15-minute talks chosen from abstracts
(There will be a 20-minute break during this period.)

11:30 a.m. - 3:30 p.m. Session II. Pancreatic Vasculature, Architecture, and Neuroregulation

Molecular imaging most often targets a molecule on the surface of a cell, but other approaches take advantage of one of many physical or chemical phenomena. In addition, interpretation of imaging data often requires considerable knowledge of the target. This session will concentrate on imaging other important phenomena, including:

1. Pancreas and islet vasculature
2. Islet angiogenesis
3. Endocrine pancreas and islet architecture, and islet cell organization
4. Islet innervation
5. Neurotransmitters, and neuroregulation of islet cells and their function

11:30 a.m. - 12:00 p.m. Keynote Address: Regulation of Pancreatic Islet Vasculature
Leif Jansson, Uppsala, Sweden

12:00 p.m. - 12:30 p.m. Keynote Address: Functional Consequences of Islet Innervation
Jesper Gromada, Novartis

12:30 p.m. - 2:30 p.m. Lunch and Poster Viewing

2:30 p.m. - 3:30 p.m. 15-minute talks chosen from abstracts

3:30 p.m. - 5:30 p.m. Session III. Imaging of Islet Function

Imaging technologies can provide biomarkers of function or metabolism *in vivo* and *in vitro*. These include the use of special imaging agents as well as genetic approaches. This session will include topics such as:

1. Imaging calcium and other ion metabolism in the islet *in vivo* and *in vitro*;
2. Imaging markers of nutrient-sensing and insulin release;
3. Imaging markers of apoptosis;
4. Imaging markers of development, islet expansion, regeneration, etc.;
5. Special considerations for imaging deep tissues, etc.

3:30 p.m. - 5:30 p.m. 15-minute talks chosen from abstracts
(There will be a 20-minute break during this period.)

Poster Session
5:30 p.m. - 7:00 p.m. Poster Viewing

7:00 p.m. Adjournment

Tuesday, April 7, 2009

7:30 a.m. - 8:30 a.m. Registration and Coffee

8:30 a.m. - 11:30 a.m. Session IV. Imaging of Islet Transplantation and Its Outcome

Since islet transplantation emerged as a clinical tool to achieve insulin independence in Type 1 diabetes patients, the need to noninvasively follow the fate of transplanted islets grew dramatically in the past decade. This session will concentrate on various topics dealing with imaging of islet transplantation and its outcome, including but not limited to:

1. Longitudinal imaging of transplanted islets using various clinical imaging modalities
2. Evaluating fate of islets transplanted at investigational/alternative sites (nonliver/kidney)
3. Imaging as a method to determine islet fate after islet preservation (encapsulation, gene transfer, etc.)
4. Imaging of immune rejection following transplantation
5. Imaging of the formation of islet vascularization following transplantation (Note: This will be different from imaging of damaged islet vasculature in Type 1 and Type 2 diabetes.)
6. Imaging of islet transplantation as a method to assess the effectiveness of therapeutics preventing graft rejection (Note: This could include BLI as the imaging modality.)
7. Unresolved problems with transplanted islets: What is the best way to label pancreatic islets, considering their complex structure and the fact that the label must be retained for a long period of time without any side effects?

8:30 a.m. - 9:00 a.m. Keynote Address: Current State of Clinical Islet Transplantation
Bernhard Hering, University of Minnesota

9:00 a.m. - 11:30 a.m. 15-minute talks chosen from abstracts
(There will be a 20-minute break during this period.)

11:30 a.m. - 3:00 p.m. Session V. Imaging of Islet Inflammation

Inflammation is a hallmark in diabetes development and occurs long before clinical symptoms emerge. If there were a clinical way to monitor this event noninvasively, patients would benefit from preventive intervention and possible reversal of the disease. This session will focus on the following topics:

1. Identification of suitable targets on diabetogenic T cells
2. *In vivo* imaging methods to assess immune cell activation
3. *In vivo* methods to visualize accumulation of diabetogenic immune cells in the pancreas
4. *In vivo* imaging methods to assess vascular dysfunction due to inflammation in Type 1 and Type 2 diabetes

5. *In vivo* imaging methods to assess the effectiveness of immunotherapeutic intervention (anti-CD3 antibody, immunosuppressants and adjuvant therapy, etc.)
6. *In vivo* assessment of beta-cell death (could be in beta-cell imaging session as well).

11:30 a.m. - 12:00 p.m.	Keynote Address: What Is Islet Inflammation? Teresa DiLorenzo, Albert Einstein College of Medicine
12:00 p.m. - 12:30 p.m.	Keynote Address: Imaging T Cell Activation Caluis Radu, University of California at Los Angeles
12:30 p.m. - 2:00 p.m.	Lunch and Poster Viewing
2:00 p.m. - 3:15 p.m.	15-minute talks chosen from abstracts
3:00 p.m. - 5:00 p.m.	**Special Topic Talks and Panel Discussion**
3:15 p.m. - 3:30 p.m.	Industry Perspective Didier Laurent, Novartis
3:30 p.m. - 3:45 p.m.	European Funding Opportunities Nathalie Vercruysse, European Commission
3:45 p.m. - 4:00 p.m.	Regulatory Issues Bruce Schneider, U.S. Food and Drug Administration (FDA)
4:00 p.m. - 5:00 p.m.	Panel Discussion Panelists: Bruce Schneider, Center for Biologics Evaluation and Research, FDA Didier Laurent, Novartis Ann Jerkins, Cellular Aspects of Diabetes and Obesity, Center for Scientific Review, NIH Eileen Bradley, Medical Imaging, CSR, NIH Maren Laughlin, NIDDK, NIH Adrianne Wong, Juvenile Diabetes Research Foundation International Nathalie Vercruysse, European Commission
5:00 p.m.	Adjournment