



Imaging the Pancreatic Beta Cell Mass

Application

- **Driver:** Existing tests of beta cell function in diabetes fail to distinguish between altered mass and altered function.
- **Market Size:** Diabetes/pre-diabetes affects >26M Americans
- **Need:** Emerging therapies are focused on beta cell preservation, expansion, regeneration or replacement, but are hard to explore without a measure of cell mass.

Research Needs

Scientific/technological problems and barriers:

- Beta cells are only ~1% of pancreas
- Long cell half-life, little turnover or growth
- Motion and location deep in gut make imaging difficult
- Few unique markers for molecular imaging
- Relatively little is known about the biology of the beta cell and islet

Advantages

Impact:

- Explore natural history of diabetes
- Potential for early detection of disease
- Improved endpoints for clinical trials

Benefits/ advantages over current capabilities

- Currently, measure only glucose or insulin c-peptide, which is a poor measure of function and cannot report on cell mass.

Metric(s) of Progress

Short term goals

- Identify cell markers and specific ligands
- Explore biology of marker/ligand to prove imaging approach is quantitative and specific
- Test in animals and people

Long term goals

- Study imaging approach in large clinical populations to prove robustness

Resource requirements: - Total spent to date by US and European funding agencies is about \$75M over 10 years. Needed are dedicated interdisciplinary facilities with imaging and diabetes researchers.