Beta Cell Interest Group (BIG)

Current and ongoing beta cell research is presented in this weekly seminar by faculty, postdoctoral fellows and students. If you are interested in attending the Beta Cell Interest Group (BIG) seminars and joining the BIG community, please contact David Jacobson.

Keywords: BIG beta cell

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Meeting Details

Start Date / Time	May 11, 2016 at 9:00 AM
End Date / Time	May 11, 2016 at 9:55 AM
Duration	55 minutes
Location	512 Light Hall
Presenter Name	Nathaniel Hart, PhD (Powers' lab)
Presentation Title	Dissecting the role of the cystic fibrosis transmembrane conductance regulator (CFTR) in cell function
Status	This meeting has already occurred

Meeting Agenda/Notes

Cystic Fibrosis Related Diabetes (CFRD) affects up to 50% of individuals with CF, but its pathogenesis is unclear. While disruption of islet function by CF-induced pancreatic damage is the most cited explanation, recent data indicate the CFTR is expressed in islets, suggesting a possible role in insulin secretion (IS). To investigate the role of the CFTR in beta cell function, we developed a tamoxifen (T) inducible/beta cell-specific (MIP-CreER^{T}) mouse model of CFTR inactivation and assessed *in vivo* and *in vitro* islet function. Oral glucose tolerance in mice was similar after T or vehicle (V) treatment. In islets isolated from mice treated with T or V, baseline IS, glucose-stimulated insulin secretion (GSIS), and glucose-stimulated cytosolic Ca^{2+} in single beta cells were similar. To investigate islet function and gene expression in humans with CF, we obtained and studied pancreatic tissue and isolated islets from 3 individuals with CF. The pancreatic exocrine tissue was markedly abnormal with immune infiltration and only a few morphologically intact islets. In an islet perifusion system, isolated islets from one individual with CF and one individual with CFRD had nearly normal GSIS and potentiated IS when compared to age-matched control human islets while islets from one individual with CFRD showed impaired GSIS and limited response to cAMP-evoked stimulation, and KCl-mediated depolarization. These data suggest that: 1) CFTR inactivation in mouse beta cells does not impair GSIS *in vivo* or in isolated islets, 2) beta cell mass is greatly reduced in individuals with CF (with and without CFRD), 3) GSIS by human CF islets, while present, is reduced, suggesting a role for both reduced beta cell mass and reduced beta cell function in CFRD.