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Expressing membrane antibody reporter in the islet cells of non-obese diabetic mice to non-invasive image the disease progression of autoimmune diabetes

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Expressing a reporter gene in the pancreatic islet of non-obese diabetic mice (NOD mice) allows researchers real-time monitoring the processes of islet loss by non-invasive imaging systems, overcoming the defect of traditional method in which researchers need to weekly sacrifice lots of NOD mice to observe the insulitis in pancreatic islet section. Towards achieving this aim, we previously developed a murine anti-polyethylene glycol antibody receptor (anti-PEG reporter) which can be stably expressed on cell surface and can selectively trap PEGylated imaging probes (PEG-NIR797, PEG-124I and PEG-SPIO) to assess the delivery of cells *in vivo* by different imaging systems (optical imaging, micro-PET and MRI). Currently, we have successfully developed the NOD/pIns-αPEG mice which stably express the anti-PEG reporter in their pancreatic islets by using an insulin promoter. The PEG-NIR797 fluorescent probe can specifically accumulate at the pancreatic islet region of NOD/pIns-αPEG mice but not control NOD mice, assisting researchers in conveniently and accurately tracing the process of islet loss and further investigating the islet-protective effects of drugs or genes by optical imaging system.Importantly, expressing the anti-PEG reporter in the pancreatic islet of NOD/pIns-αPEG mice does not affect the islet 3.size, insulin secretion, and the disease progression of type 1 diabetes. The NOD/pIns-αPEG mice may help researchers easily tracing the disease progression of type1 diabetes by noninvasive imaging systems, further providing a valuable tool for worldwide pharmaceutical companies and drug research institutes to screen and evaluate the diabetes drugs.

Biography

Kuo-Hsiang Chuang completed his PhD in Biomedicine at Kaohsiung Medical University, Taiwan, in 2010. From March 2010 to January 2012, he joined Tian-Lu Cheng's group (Kaohsiung Medical University) as a Post-doctoral Fellow to study protein engineering, including the development of humanized antibodies and novel recombinant protein drugs. In February 2012, he became an Assistant Professor in Graduate Institute of Pharmacognosy, Taipei Medical University, Taiwan. Now, he focuses on several research fields, including reporter genes/non-invasive imaging systems, protein engineering, immunotherapy, and type 1 diabetes.

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