Brown Adipose Tissue Cell Lines Derived from Protein-Tyrosine Phosphatase 1B Knockout Mice Reconstituted with Sumoylation Mutant PTP1B K4R

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ABSTRACT

Platform for testing the effects of human PTP1B inhibition on insulin signaling, adipose differentiation and glucose uptake.

FULL DESCRIPTION

Since Protein-Tyrosine Phosphatase 1B (PTP1B), a non-receptor PTP, has emerged as a potential target for the treatment of obesity and type 2 diabetes, a number of academic and industry research laboratories focused on generating PTP1B-specific inhibitors. Currently, the cell-based platforms that could be utilized to test the specificity and efficiency of PTP1B inhibitors are not ideal. They are mostly fibroblast cells that do not respond to insulin appropriately and in a "physiological" manner.

To circumvent these problems, researchers at the University of California, Davis have developed a platform to test the effects of human PTP1B inhibition not only on insulin signaling, but also adipose differentiation and metabolic regulation. Primary brown adipose tissue (BAT) cells were derived from PTP1B knockout (KO) mice, immortalized, then retrovirally-reconstituted with either backbone vector (KO), human wild type PTP1B, "substrate-trapping" mutant PTP1B D181A, and sumoylation-resistant mutant PTP1B K4R. These pre-adipocytes could be induced to differentiate into fat cells enabling one to assess the effect(s) of PTP1B deletion and its mutants on insulin signaling, adipocyte differentiation and metabolic regulation. In addition, the substrate(s) of PTP1B that are mediating these effects could be easily identified.

APPLICATIONS

- Obesity
- Diabetes Type 2

FEATURES/BENEFITS

- Provide a platform for cell-based high throughput screening for testing the efficiency and specificity of human PTP1B inhibitors
- The differentiation and signaling in this cell system is well characterized
- Facilitate the dissection of the role of PTP1B inhibition in insulin signaling and metabolic regulation

OTHER INFORMATION

UC Davis is able to license or bail tangible property rights to the BAT PTP1B KO cell line reconstituted with sumoylation mutant PTP1B K4R.

For the related technologies: (1) BAT PTP1B KO cell line; (2) BAT PTP1B KO cell line reconstituted with human wild type (WT) PTP1B; and (3) BAT PTP1B KO cell line reconstituted with "substrate-trapping" mutant PTP1B D181A (D/A), please contact:

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OTHER INFORMATION

KEYWORDS

brown adipose tissue, fat differentiation, protein-tyrosine phosphatases, protein-tyrosine phosphatase 1B, PTP1B, substrate-trapping, insulin signaling, sumoylation, K4R.

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Materials & Chemicals**
  - Biological
- **Medical**
  - Disease: Digestive System
  - Disease: Genetic Diseases and Dysmorphic Syndromes
  - Disease: Metabolic/Endocrinology
  - New Chemical Entities, Drug Leads

RELATED CASES

2008-338-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Method of Preventing Bone Loss and Periodontal Disease
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