

# Islet $\beta$ cells exosome profile as biomarker platform for early diagnosis and monitoring of diabetes

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## Technology description

Quantitative RNA, proteomic, and metabolite profiling of islet  $\beta$  cells-specific exosomes in patient plasma/serum as marker for monitoring metabolic diseases, such as type I or type II diabetes, metabolic syndrome, and obesity.

### Problem:

Metabolic disorders including type I or type II diabetes, morbid obesity, and metabolic syndrome affect over 1/3 of the US population. There is a critical clinical need for biomarker platforms that would allow for early diagnosis, prognosis, and monitoring of these conditions.

### Solution:

Exosomes are extracellular microvesicles released by many tissue types into bodily fluids. They carry tissue specific RNA and protein cargoes reflecting the conditional status of the originating tissue. Islet  $\beta$  cells are also known to release exosomes that are specific to the tissue. Dr. Vallabhajosyula at Penn discovered that transmembrane protein ion channel regulator FXD2 is expressed on the surface of the islet  $\beta$  cell exosomes and can be used for isolation and purification of islet  $\beta$  cell-specific exosomes. Islet exosomes demonstrated expression profile differences in type I diabetes patients compared to normal controls, including reduced insulin levels. Inventor currently further analyzes differences in microRNA, long RNA, as well as proteomic and metabolite profiles. Together, ability to isolate islet  $\beta$  cell specific exosomes from patients' blood can potentially be used as a novel biomarker platform to monitor patients with type I and type II diabetes and other metabolic diseases.

### Reference Media:

under review

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## Application area

Method of isolation and purification of islet  $\beta$  cells specific exosomes from serum/plasma

## Advantages

Diagnostic platform for early prognosis and diagnosis of metabolic diseases

## Institution

[University of Pennsylvania](#)

## Inventors

[Prashanth Vallabhajosyula](#)

Assistant Professor of Surgery

UP-SOM-Cardiothoracic Surgery

## 联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : yeyingsheng@zf-ym.com