

- 25 -

ABSTRACT

A polymer that changes hydration at a temperature between 0 to 80°C is coated on the surface of a cell culture support, and islet cells are cultured on the support at a temperature range that causes polymer to have weak hydration, then the temperature of a culture solution is changed to a temperature that causes the polymer to have strong hydration to obtain islet cells in a sheet form. Such islet cells in a sheet form have an insulin producing function even if there is no blood flow.

- 1 -

DESCRIPTION

ISLET CELL SHEET, PROCESS FOR PRODUCTION THEREOF, AND USE THEREOF

TECHNICAL FIELD

[0001] The present invention relates to an islet cell sheet useful in fields including medicine, biology, drug development and pharmacy, a process for the production thereof and a use thereof.

BACKGROUND ART

[0002] The pancreas is an important organ in a living body, which is composed of an exocrine gland that secretes amylase and other digestive enzymes into the duodenum and of islets. Ninety percent or more of the pancreas is occupied by the exocrine gland. Islets which are masses of endocrine gland float like islands in the exocrine gland. An islet is composed of four types of endocrine gland cells that secrete substances in the pancreas, which is an animal organ. The four types of cells are an α cell (A cell) secreting glucagon, a β cell (B cell) secreting insulin, which is a hormone that decreases the blood glucose level, a δ cell secreting somatostatin and a PP cell secreting pancreatic polypeptide. The β cell is a spherical endocrine gland tissue dispersed in the pancreas of various vertebrate animals. It mainly secretes insulin and adjusts the blood glucose level. The diameter of an islet is 100 to 300 μm . A human is said to possess 10 to 20 islets in 1 mg of pancreas and a million or more islets in the whole pancreas. A rodent's islet has β cells situated in the center, and α cells, δ cells and PP cells situated in the periphery, but a human's islet does not have such clear cell distribution.

[0003] A damaged islet function leads to severe diseases. An example is the complete loss of insulin secretion by β cells which leads to severe diabetes. Such severe diabetes cases are often accompanied by extreme difficulty in blood glucose control, and also by diabetes-related complications as well as hypoglycemic attack following insulin administration; accordingly, they lead to extremely low quality of life (QOL).

[0004] Various treatments have been applied to patients of such severe diabetes. One

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Figures: 1-2-3-4-5-6-7-8-9-10-11-12-13-

Pages:

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