

# **It is possible to cure a person with type 1-diabetes!**

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*Today 400 million people are diagnosed with the worldwide spread disease, diabetes and since the discovery of the disease different treatments have developed rapidly and numerous of advancements have been made throughout the years. Not only in treatment but also in attempt to cure the disease. There are several suggestions on how to cure diabetes. One example is transplantation of either pancreas or islets of tissue with insulin producing cells another is stem cells transplantation. Is it possible that some of these methods are the future cure to diabetes? If so are any of these alternatives suited for clinical use? Scientists all over the world are trying to understand these questions, as the answer to the question if it's possible to cure diabetes is hopefully yes!*

## **Type 1-diabetes**

Type 1-diabetes is an autoimmune disease where people suffering from the disease can't produce a specific hormone called insulin. The reason for this is destruction of the insulin producing cells in the pancreas by the immune system. However, insulin is essential because it stimulates the transport of glucose from the blood into the different organs and cells in the body. Without insulin the blood glucose concentration will arise and eventually this will be toxic for the person. The consequences for people with diabetes are insulin dependence and that they need injections with exogenous insulin several times a day. Previously the insulin used for treatment was isolated from pancreatic insulin producing cells from pigs, today the insulin used for treatment is human insulin and synthesised from bacteria using protein-synthesizing insulin.

## **Possible cure for diabetes**

When discussing possible alternatives for curing diabetes the commonly outcome is that the cure will lead to insulin independency amongst the person, which practically means that the person can produce its own insulin again and that the insulin producing cells are restored. There are several current alternatives to restore these cells. One method with positive outcome is pancreas transplantation. Disadvantages with this method are the low availability of suitable organ for donation and also other complications that can occur during organ transplantation such as severe infection or thrombosis. Another option for organ transplantation is islet transplantation from either a human pancreas or pancreas from a pig, an islet is a small fragment of tissue consisting of insulin producing cells. Interestingly this method has a lower risk of complications even though it will follow with a lifelong treatment of immunosuppressive medicine. However this procedure with islet transplantation is significantly minor comparing to pancreas transplantation. Unfortunately, these methods have not yet led to total insulin independency, and after a couple of years the transplanted islets will be destroyed by the immune system once more. Further alternatives for a cure have been to investigate the possibility of stem cells transplantation and to regenerate new insulin producing cells using stem cells as a source. As there are many different stem cells, the concern for this alternative is to understand which stem cells are the most applicable. The method with stem cells transplantation seems to be most accurate according to the scientists, no need to wait for suitable organs and not the same risk of complications compared to other transplantations. However this method is not yet fully developed but hopefully this alternative

holds the future cure for type 1-diabetes.

### **Type 1-diabetes – an autoimmune disease**

The immune system is responsible for protecting the body from external threats e.g, bacterias and viruses and prevent it from infections. If the immune system instead starts to attack healty cells in the body you classify it as an autoimmune disease. During the development of specific cells working for the immune system something goes wrong and these cells will start to react and attack cells in the body. When talking about diabetes it's the insulin producing  $\beta$ -cells in the pancreas who is the target, which leads to insulin dependence and life long treatment with exogenous insulin. Insulin is a hormone and is important for the sugar transport to the cells and therefore essential for survival.

### **If you want read more about the possible cures for diabetes**

Ronquist, M.AM. 2015. Hur ser framtidens botemedel ut för personer med typ 1-diabetes?  
Självständigt arbete i biologi. Uppsala Universitet.