Type 1 diabetes and stem cells

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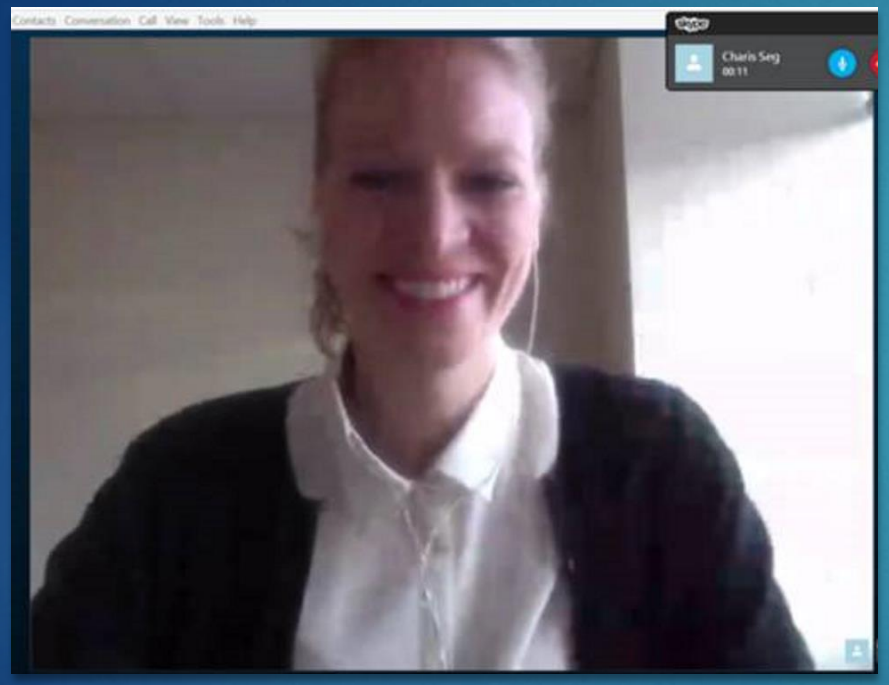
Proposal

Diabetes is one of the most common diseases in the world with approximately 415 million people are suffering with this disease. There's treatments for patients, but it wouldn't really "cure" the patients. By using stem cells to make it into insulin-producing cells, patients won't have to suffer injecting insulins every day. Using pancreatic stem cells is more convenient and efficient than insulin injections because this treatment lasts for about two to four years. Researchers are still improvising this to make this very much efficient and make it last longer.

Skype Chat with Charis Seg

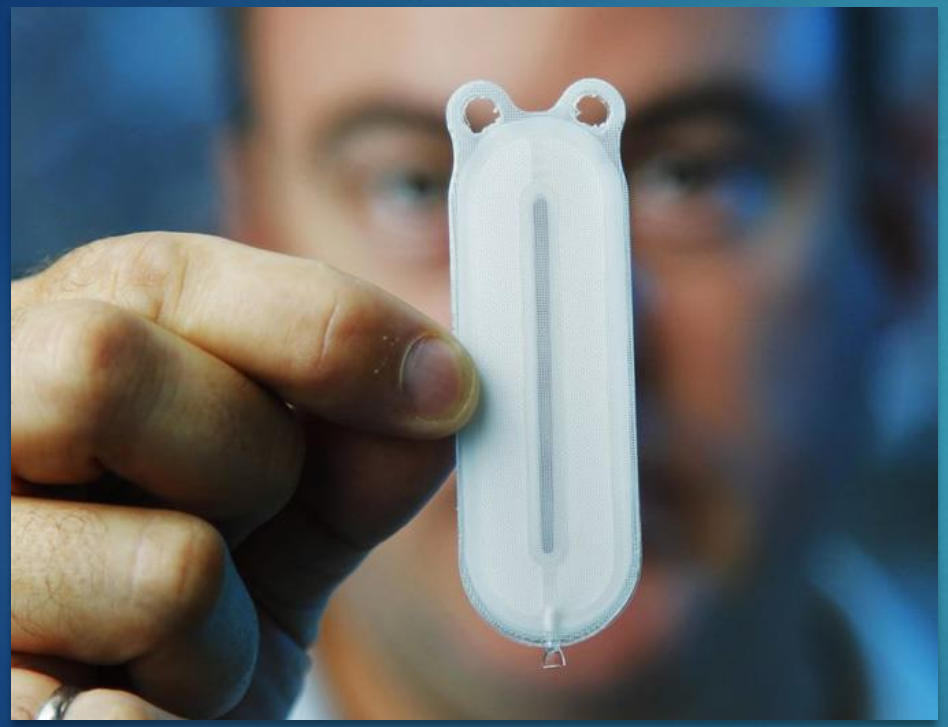


- To further out our research and investigation, we talked to a stem cell researcher named, Charis Seg to help us give more information regarding this stem cell research.
- She is from Germany but she traveled all the to Canada to study in UBC
- Charis Seg graduated in UBC in Canada, and she mastered experiment medicine and is now working in a biotic company.
- Because of her, I got to understand and learn a little bit more about stem cells, and she gave us information regarding it very detailed that I don't think I'll have to do more research online.
- It felt nice to talk with an expert who knows a lot about organoids and her responses were very detailed.

Our Question

- We only had one question to ask her - which is, "Would pancreatic stem cells be more efficient/convenient than taking insulin injections? If so, in what ways?",
- but she actually answered our question with a lot of information. And she even recommended a company website regarding diabetes called ViaCyte to help us find more information and dig deeper into our research.

Her Response



- "Would pancreatic stem cells be more efficient/convenient than taking insulin injections? If so, in what ways?"
- She answered yes, and she mentioned that the efficiency of pancreatic stem cells is that it lasts longer than one year and patients will be free from insulin injections therapy.
- She mentioned that the ViaCyte company built a device called, VC-O1 product candidate, and she said that this device has the ability to produce pancreatic cells and it would mature after the implantation and will function as the insulin beta cells inside the human body.
- The device can also produce hormones necessary for the sugar in the blood to balance its blood sugar level.

Type 1 Diabetes

- Type 1 diabetes or known as juvenile diabetes is an autoimmune disorder – where the body's immune system attacks the pancreas inside the human's body.
- In 2015, about 415 million people had diabetes all over the world and will still increase each year comes. When a person has T1D (Type 1 Diabetes), his/her blood sugar (glucose) level will increase because the pancreas inside her/his body has stopped producing insulin due to the attack of the immune system to the pancreas.
- Insulin is very necessary inside our body because it helps maintain our blood sugar level, and if the blood sugar level is imbalanced, the cells won't be able to receive the glucose that is important for energy and normal function. Without insulin, it can make a huge impact on a human being because it affects all the organs and the rest of the parts of our body like the brain, nervous system, muscles, and so on. And if there's no insulin, the glucose might start to build up in the bloodstream.

Type 1 Diabetes Treatment

- Treatments for diabetes isn't really going to actually 'cure' a patient because its main purpose is to keep the insulin in a right amount to keep blood glucose (sugar) level stabilized; not too high or low.
- Normally, people with type 1 diabetes have to inject insulin at least twice a day. They also have to maintain a healthy diet, regular blood glucose monitoring.
- Patients can also do transplantation however, in most cases, there’s lack of donors.

Pancreatic Stem Cells to Cure Patients

- For now, these pancreatic stem cells wouldn't really cure a patient completely, but it can help by serving as a supply bank for the regeneration purposes of beta cells, and it may become into healing implementations for the patients with type 1 diabetes in the future. Patients who did the treatment of using pancreatic stem cells have stayed free from insulin injections, but it would only last for two to four years only, so it won't really last a lifetime unless the researchers do further research to make it last.

Efficiency of Pancreatic Stem Cells

- Stem cell researchers are interested and focused on producing more pancreatic stem cells with the use of adult, embryonic, and pluripotent stem cells. They have declared that this is more efficient and safer solution to treat diabetes instead of doing insulin injections and donor transplantations by regenerating and restoring the patient's own insulin production in the pancreas.
- However, it's not going to last for a lifetime because the researchers' are still working it to improvise it more. Overall, patients find this pancreatic stem-cell treatment effective and beneficial for those who don't want to do the insulin injections daily.
- Although, some patients have encountered side effects in this treatment like fever, nausea, suppression of bone marrow, hair loss, and vomiting. And within, two to four weeks, it will eventually disappear, and thankfully no patients have developed infections, organ damage, and pneumonia. Patients would also need to come to their doctor regularly to make sure they won't develop long-term complications.
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Stem Cells as a Treatment for Type 1 Diabetes

- By converting the human embryonic cells into pancreatic progenitor cells, it can turn into insulin-producing beta cells (β-cells) and can develop into a fully matured beta (β) cells, which makes up the Islets of Langerhans.
- Islets of Langerhans is a duster of cells in the pancreas that makes hormones and in control of maintaining the blood sugar (glucose) level.
- A developmental medicine company called ViaCyte is a company that mainly focuses on generating a cure for type 1 diabetes (T1D).
- ViaCyte designed and built an encapsulation system device (VCO1 Product Candidate) - which is to keep the immune cells out, preserving the cells inside that device. What it does is that it sends sugar and responds by making insulin and it can easily exit out of the blood.