Emad Fawzy Eskander, J Tissue Sci Eng 2017, 8:4(Suppl)
DOI: 10.4172/2157-7552-C1-039

Diabetes and regenerative medicine, a new strategy on rearrangement of amino acids consequences in insulin formation

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Diabetes, also known as diabetes mellitus, is a group of metabolic diseases in which a person has high blood sugar either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. There are two primary types of diabetes. Type 1 diabetes, also known as insulin-dependent or juvenile diabetes, is an autoimmune disorder in which the immune system attacks and destroys the insulin-producing beta cells in the pancreas. Type 2 diabetes, known as adult onset or non-insulin dependent diabetes, is caused when either there is a deficiency in the insulin being produced, or when the cells of the body become resistant to the action of insulin. Diabetes is a chronic condition that requires constant monitoring and creates dangerous and debilitating secondary conditions. Long-term complications include increased risk of cardiovascular problems such as coronary artery disease, heart attack and stroke. Other complications include nerve damage in the limbs, kidney failure, blindness and nerve damage in the feet and legs that can cause diabetic foot ulcers which can lead to amputation, if not treated properly. There are a variety of regenerative medicine technologies in preclinical and clinical development that aim to reestablish insulin production and mediate the immune system's attack on insulin producing beta cells. Presently, companies believe that multistem has the potential to regulate immune system function, and could thus work to protect the beta cells mesoblast and are using their patented human mesenchymal progenitor cells to target type 2 diabetes. In preclinical trials, the injection of a dose of MPCs into mice with diabetes resulted in a significant increase in blood insulin levels and sustained reduction in blood glucose levels during the follow-up period. Mesoblast is in the midst of a 60 patients' Phase 2 clinical trial. Osiris Therapeutics has completed enrollment for a Phase 2 type 1 diabetes clinical trial evaluating the efficacy and safety of their product, Prochymal. Prochymal uses mesenchymal stem cells for their believed ability to delay the progression of type 1 diabetes by preserving beta cell function, and thus insulin production. The researchers are developing a stem cell based technology for the treatment of type 1 and type 2 diabetes derived from a human embryonic stem cell. In animal models, the cells differentiated into insulin producing and other endocrine cells that regulated blood glucose in a manner very similar to the normal pancreas when implanted under the skin. The study showed promising signs of long-term control of diabetes in large animals, current regenerative medicine therapies for diabetes.

Biography

Emad Fawzy Eskander has completed his BSc in Biochemistry from Ain-Shams University, MSc in Organic Chemistry from the same university. He has obtained his PhD in Organic Chemistry from Cairo University. Then he has finished his Diploma of Medicinal Chemistry in the year of 1993 from Georgia (USA).

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