Treatment and preventative therapy for type 2 diabetes

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Technology description

Summary

Type 2 diabetes is a devastating disease affecting 8.3% of the US population. It is characterized by insensitivity to insulin, which causes abnormally high blood glucose levels and a wide range of major health issues. There is currently no cure, and current treatments, including regular insulin injections and blood glucose monitoring, are cumbersome for patients and have limited efficacy. This technology is a method for suppressing the increase of fatty acids and glucose in the bloodstream by inhibiting the synthesis of serotonin in the gut using small molecule therapeutics. It is minimally invasive, can prevent or suppress the symptoms of type 2 diabetes, and is complementary with other preventative measures, including lifestyle changes.

Inhibition of serotonin synthesis protects against diabetes and treats diabetic symptoms

The neurotransmitter and signaling molecule serotonin causes release of fatty acids and glucose into the blood stream when it is present in the digestive system, both of which are associated with the onset of diabetes. This technology prevents serotonin synthesis by targeting tryptophan hydrolase, the enzyme responsible for the first biosynthetic step toward serotonin. By inhibiting the synthesis of serotonin in the gut, this technology decreases the risk of developing diabetes. In patients who have already developed diabetes, inhibiting the release of glucose to the bloodstream combats the hyperglycemia associated with diabetes. Therefore this therapy may be effective in both treating type 2 diabetes and in preventing the disease in patients at risk for developing the disease.

This technology has been tested in a murine model. Diabetic symptoms were suppressed in mice that were fed a high fat diet and were treated using the therapeutics described by this technology.

Publications

Oh CM, Namkung J, Go Y, Shong KE, Kim K, Kim H, Park BY, Lee HW, Jeon YH, Song J, Shong M, Yadav VK, Karsenty G, Kajimura S, Lee IK, Park S, Kim H. "Regulation of systemic energy homeostasis by serotonin in adipose tissues." Nat Commun. 2015 Apr 13;6:6794.

Kim K, Oh CM, Ohara-Imaizumi M, Park S, Namkung J, Yadav VK, Tamarina NA, Roe MW, Philipson LH, Karsenty G, Nagamatsu S, German MS, Kim H. "Functional role of serotonin in insulin secretion in a diet-induced insulin-resistant state." Endocrinology. 2015 Feb;156(2):444-52.

Sumara G, Sumara O, Kim JK, Karsenty G. "Gut-derived serotonin is a multifunctional determinant to fasting adaptation." Cell Metab. 2012 Nov 7;16(5):588-600.

Application area

Treatment and prevention of type 2 diabetes

Method for lowering blood fatty acid levels, and thus treat hyperlipidemia

Method to lower blood glucose levels, and thus treat hyperglycemia

Advantages

Few preventative or therapeutic drugs exist for type 2 diabetes

Common treatments are not effective, not persistent, and cumbersome

As target is an enzyme, which produces a signaling molecule, effects of drug should be persistent

Synergistic with improved diet and exercise

Less cumbersome and invasive than other diabetes treatment and prevention methods

Institution

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