

Non-Confidential Description - PSU No. 1818
“Dietary Fatty Acid Having Anti-Diabetic Effects and Other Health-related Benefits”

Keywords:

Diabetes, fatty acid, glucose, insulin, NIDDM, treatment

Links:

[Inventor website](#)

[U.S. Patent #7,015,249](#)

Inventors:

John Vanden Heuvel, Martha Belury, Karen Houseknecht, Louise Peck

Background

A dietary fatty acid has several structural similarities and results in analogous physiological effects as a group of important hypolipidemic drugs. In addition to their lipid-lowering effects, many of these agents are potent modulators of glucose and insulin action. The molecular mechanism of action of these hypolipidemic drugs is shared by endogenous fatty acids and includes activation of a steroid hormone intracellular receptor: a receptor protein associated with hypolipidemia as well as effects on circulating glucose levels and the reversal of insulin resistance typical of non-insulin dependent diabetes mellitus (NIDDM or type II diabetes mellitus).

Thiazolidinediones (TZDs) are a class of oral insulin-sensitizing agents that improve glucose utilization without stimulating insulin release. The Parke-Davis drug Troglitazone is an example of a TZD currently being used for treating NIDDM. In vitro tests with these chemicals showed they promote adipocyte differentiation by acting through the steroid hormone receptor activated mentioned above. The adipogenic signaling cascade is believed to be linked to their anti-diabetic action and is also caused by the invention's dietary fatty acid. Therefore, although the dietary fatty acid and TZDs share little structural similarity, they have the same molecular mechanism of action and are expected to have the similar biological effects.

Invention Description

Using an animal model for NIDDM, the Zucker fa/fa rat, researchers fed the invention's dietary fatty acid, resulting in more rapid removal of glucose compared to the control animals. Since glucose tolerance is the predominant test used to assess the existence of NIDDM, the data convincingly show that the dietary fatty acid is as effective as TZD in this assay. This invention significantly improved symptoms of diabetes in the Zucker fa/fa rats including a 50-60% decline in plasma insulin, triglycerides and free fatty acids. Therefore, the inventors believe that this dietary fatty acid and/or its isomers may be an effective treatment for individuals with NIDDM, especially in light of the fact that it is a natural product, which will enhance marketability as a treatment for this intractable disease.

Contact: Matthew D. Smith
Sr. Technology Licensing Officer
The Pennsylvania State University

Phone: (814) 863-1122
Fax: (814) 865-3591
E-mail: mds126@psu.edu