Non-Confidential Description - PSU Inv. Disc. No. 4229
“Preventing Obesity, Insulin Resistance, and Non-Alcoholic Fatty Liver Disease”

Keywords:
obesity, diabetes, non-alcoholic fatty liver disease, farnesoid X receptor, bile acid synthesis

Links:
Inventor Website

Penn State Inventors:
Andrew Patterson, Dhimant Desai, Shantu Amin

Background
Obesity has reached epidemic proportions worldwide and is associated with chronic diseases such as type 2 diabetes, cardiovascular disease, hepatosteatosis, and cancer. Non-alcoholic fatty liver disease (NAFLD) is closely associated with obesity and type 2 diabetes. NAFLD is the most common liver disorder affecting 20%-30% of the adult population and more than 80% of obese people in the world. Bile acids are formed from cholesterol in the liver and secreted into the intestine where they promote the digestion and absorption of dietary fat. Suppressing bile acid formation leads to a decrease in the absorption of dietary fat, resulting in a significant reduction in obesity.

Invention Description
This therapeutic utilizes the nuclear receptor Farnesoid X Receptor (FXR) for treating or preventing obesity. The FXR functions in suppressing the rate-limiting enzyme in bile acid synthesis from cholesterol. Without this enzyme, the conversion of cholesterol to bile acid is reduced, thereby decreasing the absorption of dietary fat. This treatment can be used to decrease obesity and related metabolic disorders such as NAFLD.

Advantages/Applications
- Animal studies demonstrate up to a 65% reduction in weight gain
- Decreases obesity and related metabolic disorders
- Suppresses bile acid formation from cholesterol
- Utilizes Farnesoid X Receptor to suppress rate-limiting enzyme in bile acid synthesis

Status:
PCT Patent Application No. PCT/US2014/049460 was filed on 8/1/2014

Co-owned with NIH