Biopolymer Encapsulation Increases the Bioavailability and Efficacy of D-PDMP in Interfering with Atherosclerosis and Cardiac Hypertrophy in apoE-/- Transgenic Mice

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Technology description

INVENTION NOVELTY

A novel biopolymer encapsulated anti-atherosclerosis drug compound able to enhance gastro-intestinal absorption and residence time to thus lower coronary heart disease and cholesterol-related disorders, e.g. diabetes, obesity, and Alzheimer's.

VALUE PROPOSITION

Despite great success of statins (cholesterol reducing agents), little is known about other molecules such as glycolipids that also rise with increased cholesterol levels which contribute to plaque formation within vessels. This technology identifies its unique role causing vessel constriction, irregular cell growth, and proposes the use of a biopolymer capsule to enhance glycolipid inhibitor drug delivery, absorption and half-life; more efficiently targeting molecular pathways that lead to atherosclerosis by targeting cholesterol homeostasis, and decreasing triglyceride levels. Decreased glucose levels and B amyloid levels have been recorded in diabetes and Alzheimer’ s mouse models.

TECHNICAL DETAILS

Johns Hopkins researchers identified the role of glycosphingolipids in atherosclerotic plaque formation and developed a biopolymer capsule to enhance delivery of a glycolipid synthesis inhibitor with absorptive properties within the circulatory system. This invention also demonstrates a direct relationship between observed stenosis (blood vessel narrowing) seen among atherosclerotic or inflamed vessels with elevated oxidative low density lipoproteins (OxLDL) levels. Heightened OxLDL levels, promote lipid enzymatic activity in smooth muscle cells that in turn amplify Lactosylceramide ; a glycosphingolipid inflammatory signal cascades causing cell growth or lumen vessel narrowing. However, in-vivo mouse models demonstrate that this compound can prevent vessel constriction by increasing genes that break down lipid by-products and diminish additional inflammatory responses. Additional applications include lowering blood glucose level in diabetic mice and decreasing the breakdown of amyloid precursor protein to toxic B amyloid.

Institution

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