

Methods and Compositions of Treating Diabetic Nephropathy and Insulin Resistance

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Technology description

The incidence of diabetes mellitus has reached epidemic proportions. The number of people afflicted with this disease will only continue to increase. By 2035 close to 600 million people worldwide will have developed this disease. Although many treatments are available for the complications associated with diabetes mellitus, few have been effective at stabilizing blood glucose levels. Elevated blood glucose levels are responsible for the plethora of systemic complications, the most serious of which are diabetic nephropathy. Diabetic nephropathy presents as proteinuria then progresses to renal inflammation and the associated decline in glomerular filtration barrier, which all ultimately lead to end stage kidney disease. Individuals with end stage kidney disease are left with no other options but permanent dialysis or kidney transplant to maintain renal function. Therefore, therapies aimed at maintaining the integrity of the glomerular filtration barrier will be beneficial for prevention of end stage kidney disease.

The glomerular filtration barrier is composed of podocytes and glomerular endothelial cells. Podocytes are key cells for maintaining the integrity of the glomerular filtration barrier in humans. In a mouse model, a podocyte-specific deletion of soluble epoxide hydrolase (sEH) significantly improved kidney function and systemic glucose homeostasis under hyperglycemic conditions. This suggests that pharmacological inhibitors of sEH may improve glucose homeostasis in an insulin-resistant, pre-diabetic state, in addition to possibly improving kidney function and protecting podocytes from hyperglycemia-induced injury.

Researchers at the University of California, Davis have developed novel methods and compositions for the treatment of diabetic nephropathy and insulin resistance. The compositions target sEH in podocytes to help increase kidney function, maintain glucose homeostasis, and protect against hyperglycemia-induced toxicity in patients with diabetes. Protecting podocyte integrity maintains the glomerular filtration barrier, which is essential for maintaining normal kidney function when treating diabetic nephropathy.

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Additional Information

Additional Technologies by these Inventors

[Brown Adipose Tissue Cell Lines Derived from Protein-Tyrosine Phosphatase 1B Knockout Mice](#)

[Reconstituted with Sumoylation Mutant PTP1B K4R](#)

[Improved Dioxin Detection and Measurement](#)

[Recombinant Neurotoxin: A More Effective Insecticide](#)

[Antibodies: Urea Herbicide Pabs](#)

[Antibodies: Triazine Herbicide Pabs](#)

[Antibodies: Bacillus Delta Endotoxin PAbs](#)

[Antibodies: Bromacil Herbicide PAbs](#)

[Dual Inhibitors of Soluble Epoxide Hydrolase and Cyclooxygenase-2](#)

[Novel and Specific Inhibitors of p21](#)

[Beneficial Effects of Novel Inhibitors of Soluble Epoxide Hydrolase as Adjuvant Treatment for Cardiac Cell-Based Therapy](#)

[Novel Neuropathy Treatment Using Soluble Epoxide Inhibitors](#)

[Detection System for Small Molecules](#)

[Method of Preventing Bone Loss and Periodontal Disease](#)

[A New Pharmaceutical Therapy Target for Depression and Other Central Nervous System Diseases](#)

[Multi-Target Inhibitors for Pain Treatment](#)

[Antibodies for Pseudomonas \(P.\) aeruginosa](#)

[Chemical Synthesis of Lipid Mediator 22-HDoHE and Structural Analogs](#)

Application area

Treatment for diabetic nephropathy associated with diabetes mellitus

Advantages

Improves kidney function and systemic glucose homeostasis in diabetic and pre-diabetic states

Maintains glomerular filtration barrier for preventing end stage kidney disease

Improves gluconeogenesis in kidneys and liver

Institution

[University of California, Davis](#)

Inventors

[Ahmed Bettaieb](#)

[Bruce Hammock](#)

[Fawaz Haj](#)

[Darryl Zeldin](#)

联系我们



叶先生

电 话 : 021-65679356

手 机 : 13414935137

邮 箱 : yeyingsheng@zf-ym.com