Renin-angiotensin-aldosterone System: Target of Vitamin D Protection and Therapy

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Technology description

Summary

Pharmaceutical compositions and methods for preventing, treating, and delaying diseases with an overactive renin-angiotensin system by administering Vitamin D and its analogues, optionally with ACE inhibitors, angiotensin inhibitors or aldosterone blockers.

Description

The renin-angiotensin system is involved in blood pressure, electrolyte and volume homeostasis. Inappropriate activation of the renin-angiotensin system may lead to infarction, congestive heart failure, progressive atherosclerosis and renal failure. Renin is a rate-limiting component of the renin-angiotensin system. Renin cleaves angiotensin I from angiotensinogen, which is then converted to angiotensin II byt angiotensin-converting enzyme. Angiotensin II, through binding to its receptors, exerts diverse actions that affect the electrolye, volume, and blood pressure. Inappropriate stimulation of the renin-angiotensin system has been associated with hypertension, heart attack and stroke. Vitamin D is a negative regulator of renin expression in vivo. Increases in serum vitamin D levels lead to suppression of renin expression. Vitamin D is an endocrine suppressor for renin biosynthesis.

Advantages

Vitamin D analogues with less calcemic effect and higher potency then Vitamin D can be used for suppressing renin biosynthesis. Treatment of patients with cardiovascular disease by administration of a therapeutically effective amount of a Vitamin D analog or Vitamin D receptor activator is expected to be advantageous for effective reduction of renin expression, decreased inflammation and improved cardiac function. Since ACE inhibitors, angiotensin II inhibitors, and aldosterone receptor blockers have different efficacies and affect the body through different pathways than Vitamin D does, compositions may include one of these agents in therapeutically effective amounts which are well known to inhibit activation of the renin-angiotensin system and readily available.

Institution

University of Chicago

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com