A New Phosphate Binder for Blocking Phosphate Absorption and Reducing Hyperphosphatemia

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods and compositions for controlling serum phosphate levels in mammals.

OVERVIEW

The kidney filters toxins and excess nutrients from the blood. It also synthesizes the active form of vitamin D$_3$. In patients with chronic kidney disease, levels of active vitamin D$_3$ decline, leading to hypocalcemia. At the same time, nutrients, particularly phosphorous, accumulate in the blood. Hypocalcemia and excess phosphorous stimulate the secretion of parathyroid hormone (PTH). PTH can cause excess bone resorption, leading to a condition known as renal osteodystrophy.

To prevent renal osteodystrophy, patients who are undergoing dialysis are given vitamin D analogs, such as Zemplar®. These analogs suppress PTH levels but are still capable of stimulating intestinal calcium and phosphate absorption. Oral phosphate binders can be given with meals to reduce the absorption of phosphorous, but current binders are expensive or associated with toxic side effects. New methods of reducing phosphate absorption are needed.

THE INVENTION

UW-Madison researchers have developed compositions that reduce phosphate absorption in the intestine. These compositions could be administered to patients to lower blood phosphate levels, decreasing the risk of developing renal osteodystrophy.

The compositions consist of dendrimers, which are highly branched, symmetric molecules. Dendrimers are well known therapeutic tools, although dendrimers that bind phosphate were not known previously. The dendrimer compositions of this invention may include a hydrochloride, hydrobromide, hydroacetate or other hydroanionic form.
APPLICATIONS

• Can be administered to patients on dialysis and others who are unable to excrete phosphate to lower their risk of developing renal osteodystrophy

KEY BENEFITS

• Capable of preventing the absorption of more than 50 percent of the phosphate in a patient’s GI tract
• More versatile, cheaper and effective on a weight basis than the most commonly used phosphate binder
• Dendrimer composition is soluble.

STAGE OF DEVELOPMENT

These compositions successfully decreased serum phosphate levels in rats.

ADDITIONAL INFORMATION

Tech Fields
Pharmaceuticals & Vitamin D - Metabolic disorders

CONTACT INFORMATION

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847.