Vasodilator hormone improved kidney function, blood flow in PKD model

December 6 2011

After a four-week course of the vasodilator hormone relaxin, kidney function and blood flow immediately improved in lab rats genetically altered to model polycystic kidney disease (PKD), a life-threatening genetic disorder, according to research presented on Dec. 6 at the American Society for Cell Biology Annual Meeting in Denver.

In addition to widening the blood vessels, relaxin lowered the collagen scores of the PKD rats, indicating that the drug had slowed scar formation or helped dissolve the old fibroid tissue that characterizes the kidneys of animals and humans with the disease, according to Heather Ward, Ph.D., and Angela Wandinger-Ness, Ph.D., of the University of New Mexico and collaborators.

PKD is a life-threatening genetic disorder that affects 600,000 Americans, according to the National Institute of Diabetes, Digestive, and Kidney Diseases (NIDDK). About 50% of individuals diagnosed with PKD develop end-stage renal disease by age 60.

The researchers also noted that in rats, relaxin reduced the size of the large fluid-filled cysts that gradually encroach on kidney function in human PKD patients.

PKD was the first disease to be recognized as a ciliopathy, a disorder characterized by defects in primary cilia, tiny hair-like structures that protrude from virtually every cell in the human body.

In the search of effective treatments, most PKD researchers have concentrated on halting or reversing PKD's characteristic cyst formation.

Ward and her colleagues instead examined the non-cystic aspects of PKD progression, particularly the poor blood flow and extensive internal scarring called fibrosis that encroaches on the glomeruli, the vital clusters of looping blood vessels that filter wastes and excess water from the blood.

They decided to evaluate relaxin because the hormone is a powerful vasodilator. It was first identified in pregnant women but also occurs in men.

Prompted by the hormone's positive effects on the PKD animals, Ward and colleagues explored the differences in kidney gene expression between relaxin and control-treated rats. The results of the gene expression analysis suggested that relaxin, in part, affects genes associated with epithelial trafficking.

The researchers said that they hypothesize that relaxin's direct effect on signaling pathways of kidney fibroblasts and vascular cells improves the renal environment, indirectly affecting cystic epithelia and slowing cyst growth.

Provided by American Society for Cell Biology