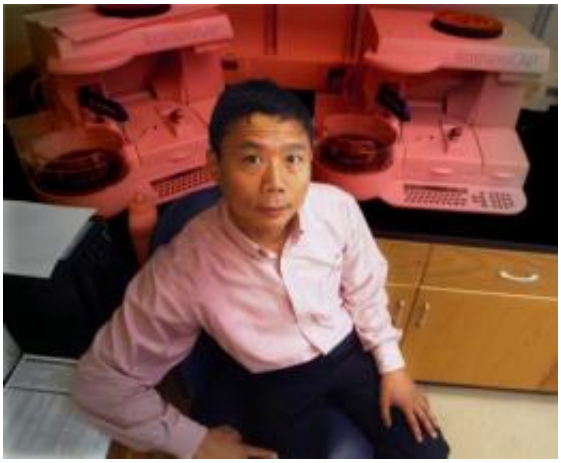
Connection elucidated between obesity, salt sensitivity and high blood pressure

June 17 2010



Dr. Yanbin Dong is a geneticist and cardiologist at the Medical College of Georgia's Georgia Prevention Institute. Credit: Phil Jones, Campus Photographer for the Medical College of Georgia

One way obese people become salt sensitive and hypertensive has been identified by Medical College of Georgia researchers.

They've documented a chain of events in which excess inflammatory factors resulting from excess fat cause the body to retain more sodium and, consequently, more fluid and higher blood pressure, said Dr. Yanbin Dong, geneticist and cardiologist at MCG's Georgia Prevention Institute.

Their findings point toward a biomarker in the urine that could one day help physicians identify the most effective therapy for these patients.

"It's well established that obesity increases inflammation, salt sensitivity and high blood pressure," said Dong, corresponding author on the study in the American Journal of Physiology Regulatory - Integrative and Comparative Physiology. But there were dots that needed connecting.

Dong's team outlined the process that appears to start with fat producing more inflammatory factors, such as interleukin-6, or IL-6.

When he and his colleagues exposed mouse kidney cells to IL-6, they found increased production of prostasin, a protease, which typically inhibits a protein's action by cutting it. But when prostasin cut fellow protein ENaC it increased its activity and so salt reabsorption.

ENaC, or epithelial sodium channel, is the last of many kidney channels that determines how much sodium to excrete. Although ENaC calls the shots on a relatively small amount of sodium, it's significant in a system that is all about balance, Dong said. "It's very special; there are not too many proteases like that. We found that in cells fed IL-6, ENaC gets activated and the cells take in more sodium. It is the last step of your salt reabsorption."

Whether the mouse cell findings are true in humans is tough to answer but it appears measuring prostasis, which is excreted in the urine, may be a way to gauge ENaC activity in humans. Dong already is measuring its levels in obese people with and without hypertension as well as normal-weight individuals. A simple urine test could one day help identify those at risk for or experiencing this type of inflammation-based hypertension, he said.

A number of cholesterol-lowering or antihypertensive agents already on

the market - including statins and angiotensin antagonists - are known to block some aspect of inflammation. Angiotensin antagonists, for example, block production of angiotensin II, which constricts blood vessels and increases IL-6 production. "There may be a good reason to prescribe these types of drugs to obese people," Dong said.

A 2010 study in the *Journal of the American Medical Association* said about half the 70 million Americans with high blood pressure were keeping it under control by taking medicine and nearly half the people with high blood pressure are obese. Twenty percent have diabetes, typically associated with obesity.

Provided by Medical College of Georgia