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Cornell, Iowa share \$10.6M obesity, hypertension grant

By *Krishna Ramanujan*

A Cornell researcher collaborating with colleagues at the University of Iowa is part of a five-year, \$10.6 million grant to study the role of the brain in links between obesity and high blood pressure.

More than two-thirds of Americans are overweight or obese, and one-third of Americans have high blood pressure, both of which lead to cardiovascular

diseases. Obesity also contributes to diabetes, which further increases risk of cardiovascular disease, according to the National Institutes of Health. While researchers have long recognized the connection between obesity and hypertension, the causes behind these associations are not well understood.

The “program project” grant, from the National Heart, Lung and Blood Institute, part of the National Institutes of Health, funds three separate but synergistic projects that will focus on neural pathways and mechanisms in the brain that lead to obesity and obesity-induced hypertension. Also, each of the studies will examine the effects of two hormones, angiotensin and leptin, and the role they play in the brain to regulate blood pressure and weight.

One of the three projects is led by Robin Davisson, the Andrew Dickson White Professor of Molecular Physiology, who holds a joint appointment in biomedical sciences in the College of Veterinary Medicine on the Ithaca campus and in cell and developmental biology at Weill Cornell Medical College (WCMC) in New York City. The other two project leaders, Curt Sigmund, professor of pharmacology and principal investigator for the program, and Kamal Rahmouni, associate professor of pharmacology and internal medicine, are at the University of Iowa.

“Both obesity and hypertension and the combination of the two are serious health problems worldwide,” said Davisson. “Our studies are going to lend insight into some of the very basic mechanisms that cause those diseases to occur. Ultimately, what we learn could lead to therapeutic interventions that are different than what we do today.”

Davisson will be studying two different mechanisms within brain cells: the role of free radicals, unstable molecules that damage neighboring molecules and affect a cell’s function; and abnormal protein folding in regions of the brain that control blood pressure and body weight, respectively.



Professor Robin Davisson in her lab at Weill Cornell Medical College.

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Specifically, Davisson will take advantage of the varied expertise of colleagues at the Ithaca campus and at WCMC to investigate effects of the hormone angiotensin, which is over-expressed in high blood pressure and obesity and is believed to be an important factor in inducing both abnormal protein folding and increased free radical production. She will also examine the locations in the brain where these disruptive activities occur. Additionally, the hormone leptin may interact with angiotensin in these brain regions to create disease.

At the University of Iowa, Rahmouni will study a family of genes involved in a rare genetic disorder in humans that leads to hypertension and obesity, to provide insights into how these genes and the proteins they express lead to abnormalities. Sigmund will also focus on issues related to abnormal protein folding in obesity and hypertension, but in different contexts and by different mechanisms. The research is based on studies of human disease, but the scientists will investigate them through mice bred for research that may have an existing, inbred or induced disease that is similar to the human condition.

“There are many different scientific strategies – molecular, physiological, neuroanatomical analyses – being brought to bear on these questions,” said Davisson. “Usually these types of grants are given at a single institution, but this is an inter-institutional grant, which is very unusual,” she added.