University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

9:45 a.m. Tuesday, March 20 • 331 Smith Hall

Carrie Haskell-Luevano

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The Melanocortin Obesity Syndrome: The Perspective of a Medicinal Chemist

Research interests focus on the understanding of peptide hormone endocrine systems in the brain, and their involvement in feeding behavior, exercise, diabetes, and obesity. She utilizes multidisciplinary approaches including chemistry, chemical biology, biochemistry, molecular biology, pharmacology, physiology, and neuroscience to study endocrine systems.

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Abstract

Obesity (body mass index, BMI >30) afflicts millions of people in the United States and other countries, and is a major risk factor for type 2 diabetes, stroke, heart disease, hypertension, cancer, and morbidity. In industrialized countries, overeating, a high fat content diet, and a lack of exercise compound the problem of obesity. The last few years have seen the characterization of more than 30 neuroendocrine pathways that have been identified to regulate energy homeostasis. The melanocortin pathway includes five genetic factors that have been demonstrated to mediate weight homeostasis. These are the melanocortin agonists derived from the proopiomelanocortin (POMC) gene transcript, the only two known endogenous antagonists of G-Protein coupled receptors (GPCRs), Agouti (ASP) and Agouti-related protein (AGRP), and the brain melanocortin-4 receptor (MC4R), and the melanocortin-3 receptor (MC3R) proteins. Modification of any one of these five genes results in changes in obesity.

Our research focuses on understanding the molecular interactions between the ligands and receptors using chemistry, medicinal chemistry, molecular biology, receptor pharmacology and other multidisciplinary approaches. Ligand design strategies include receptor selective peptides, small molecules, and peptidomimetics as molecular probes to study the in vivo physiology in normal and knockout mice. Additional studies focus upon the discovery of ligands that can restore functional activity to human MC4R polymorphisms identified in obese humans that do not respond normally to the endogenous receptor agonists.

Host: Professor Michael Bowser
Refreshments will be served prior to the seminar.