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Researchers awarded $32 mill to study sugar molecules

By Vanessa McMain,
The National Heart, Lung and Blood Institute has awarded each of two groups at the Johns Hopkins University School of Medicine approximately $2.3 million a year for seven years to establish Programs of Excellence in Glycosciences. Gerald Hart, director of Biological Chemistry, and Ronald Schnaar, professor of pharmacology and molecular sciences, will lead these independent efforts to better understand the roles of sugars in the molecular mechanisms of disease, particularly lung and heart diseases.

“These are not sugars in the diet but sugar molecules that are found attached to proteins and other molecules in a cell and contribute to how cells communicate with each other,” Schnaar said.

The lung disease project led by Schnaar will focus on trying to understand the roles of sugar molecules in lung inflammatory diseases, such as asthma and chronic obstructive pulmonary disease.

Sugar molecules on cells in the lungs bind to the immune system’s inflammatory cells turning off the inflammatory response. This team hopes to further investigate the anti-inflammatory properties of sugar molecules and harness this power to develop new treatments for lung diseases. The team collaborating on lung diseases includes Schnaar; Bruce Bochner, director of the Asthma and Allergy Center at Johns Hopkins; Zhou Zhu, an associate professor of medicine at the Johns Hopkins School of Medicine; James Paulson, of The Scripps Research Institute; and Michael Tiemeyer, of the University of Georgia Complex Carbohydrate Research Center.

The cardiovascular disease project led by Hart aims to investigate the short-term protective properties of proteins decorated with sugars, or glycoproteins, from conditions such as heart disease and stroke, and explore why long-term exposure to these glycoproteins may be dangerous. The group will examine the glycoproteins made and released by heart cells and determine how, over time, they can contribute to heart failure. The researchers will also study how certain fats with attached sugar groups can accelerate hardening of the arteries that leads to heart damage and failure.

The team collaborating on cardiovascular disease from Johns Hopkins includes Hart; Subroto Chatterjee and David Kass, both professors in the School of Medicine; Jennifer van Eyk, director of the Johns Hopkins NHLBI Proteomics Center and a professor in the School of Medicine; Kevin Yarema, an associate professor of biomedical engineering in the Whiting School of Engineering; Natasha Zachara, an assistant professor of biological chemistry in the School of Medicine; and Hui Zhang, an assistant professor of pathology in the School of Medicine. Allen Bush, of the University of Maryland, Baltimore County, is also a team member.