

Award to UCSD to Fund Novel Approaches to Detecting Cancer

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Top-scoring award part of NIH initiative to detect cancer by targeting sugar molecules

The potential role of molecular glycans, or sugars, as biomarkers for the early detection of cancer will be the focus of a new research project at the University of California, San Diego (UCSD) School of Medicine, funded by a \$2.3 million grant from the National Cancer Institute (NCI).

Ajit Varki, M.D., Distinguished Professor of Medicine and Cellular & Molecular Medicine at UC San Diego, and Richard Schwab, M.D., Assistant Professor at the Moores UCSD Cancer Center, will head a project focusing on the early diagnosis and prognosis of lung, pancreatic and ovarian cancers. The NCI grant is part of a nation-wide initiative to develop new approaches to detecting and treating cancer through glycobiology – the study of the structure, biosynthesis and biology of complex sugar chains called glycans, found on the surfaces of all cells and many proteins in nature.

Varki, the founder and co-director of UCSD's Glycobiology Research and Training Center, is a pioneer in the field. His research focuses on a family of sugars called the sialic acids, and their roles in biology, evolution and disease. Schwab is a clinician-scientist with a special interest in the role of glycan antibodies in disease.

The UCSD project will target lung, pancreatic and ovarian cancers, which are associated with high mortality and very low five-year survival rates, according to Varki. The project seeks to expand on Varki's research which shows that human cancers express glycans containing a non-human sialic acid called Neu5Gc. When humans digest red meat or milk, this non-human sialic acid is selectively concentrated in the cancers, even while the body produces antibodies against these structures.

"Despite many years of work by many investigators, there are no blood or urine markers that can reliably detect such cancers early enough in their course to make a difference in survival," said Varki. "Our studies have unveiled a promising new approach to this problem, which takes

advantage of the unusual propensity of human cancers to accumulate this non-human molecule from dietary sources and generate antibodies against it.”

Numerous studies comparing normal and tumor cells have shown that their glycan structures change with cancer development. Only recently have advances in technology allowed a systematic study of these structures. In August, the NCI announced funding of seven Tumor Glycome Laboratories in the United States, including the UCSD project. Theirs was the top-ranked proposal from among the seven centers selected by NCI out of 29 applications.

Additional project researchers include Anup Datta, Ph.D., Director of the Glycotechnology Core Resource at UCSD, Yu-Tsueng Liu, Ph.D., project scientist at the Cancer Center, and Xi Chen, Ph.D., assistant professor of bioorganic chemistry at UC-Davis.

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