**Changing Cancer Cells' Surface Sugars Can Inhibit Tumor Growth**

The key to halting cancer cells may lie in their sugary coats, scientists say. Carbohydrate molecules surround all cells and help them to identify and interact with one another. Now new research, published today in the Proceedings of the National Academy of Sciences, indicates that altering some of the surface sugars associated with cancer cells can control tumor growth. The findings suggest that the sugars could one day serve as targets for new anti-cancer therapies.

Previous research had suggested that certain features of the polysaccharide sugars surrounding tumor cells might indicate either the stage or aggressiveness of the cancer. Whether changes to the coating were a cause or a consequence of the disease, however, remained unclear. To investigate the control a cancer cell's sugar jacket exerts over its growth, Ram Sasisekharan and colleagues at the Massachusetts Institute of Technology employed two enzymes capable of cutting the sugar heparan sulfate in different places. They injected cancerous mice with both the enzymes and the two sugar fragments they produce. Injection of heparinase 1 (hep 1) or its corresponding sugar fragment promoted growth of melanoma tumors in the mice. Injection of heparinase III (hep III) or its product, in contrast, inhibited tumor growth and prevented spread of the disease to other organs.

The researchers also investigated the mechanism by which the two sugar fragments act on cancer cells and determined that the sugars bind to, and hence disrupt, the activity of certain signaling molecules involved in tumor activity. The opposing effects that the two molecules have on tumor growth suggest that cancer could involve a biological balancing act. "Tumors might be kept in check by the body's production of specific enzymes that in turn release sugar fragments that keep tumor cells dormant," Sasisekharan explains. "Or, perhaps in response to pathophysiological changes, a tumor cell releases different enzymes that enable the tumor to grow more rapidly." ◆Sarah Graham