that affect cell behavior and play a role in several types of cancer. The findings eventually could guide the development of new treatments.

Radiation oncologist Timothy Chan

Both studies, published February 15 online in the journal *Nature*, investigated changes in a gene called *IDH*. This gene produces a protein that plays a critical role in cell metabolism.

Mutations in *IDH* have been found in several types of cancer – including colon cancer, prostate cancer, some leukemias, and brain tumors known as intermediate-grade gliomas – but the connection between these mutations and cancer has been unclear.

“These studies started from very different directions and with very different goals,” remarks neuro-oncologist Ingo Mellinghoff, who was an author on both papers. “The fact that the studies are being published at the same time is a great example of the research synergy at Memorial Sloan Kettering. This type of collaboration requires an interactive research environment and is a lot of fun.”

Exploring Epigenetics

One of the studies was headed by radiation oncologist Timothy Chan and Dr. Mellinghoff. They found that, in glioma cells, mutations in *IDH* cause changes in the epigenome — the molecules that control how genes behave.

Reconfigurations in the epigenome are a hallmark of cancer. They do not alter the genetic code of DNA, but can nevertheless influence the behavior of a cell by turning genes on or off. The team showed that by introducing *IDH* mutations into human cells, they could re-create the epigenetic changes observed in glioma cells. These changes helped alter the differentiation state of the cells.

The second study was overseen by Memorial Sloan Kettering President and CEO Craig Thompson. That research showed how changes to histones, proteins that help package DNA in a cell’s nucleus, might lead to the reorganization of the epigenome. Specifically, the investigators looked at the effects of *IDH* mutations on histone methylation, an epigenetic change that can silence genes.

“Both of our studies have implications for developing new therapies,” Dr. Chan explains. “Because epigenetic modifications are reversible, using drugs to target mutations in *IDH* could allow us to reverse the effects of *IDH* mutations that may lead to cancer.”