MedicalXpress

Yale scientists to study DNA repair in cancer cells

October 25 2007

Yale School of Medicine researchers have received $8.4 million to study how cancer cells mend their own chromosomes and DNA after damage caused by radiation and chemotherapy.

The study funded by the National Institutes of Health (NIH) is the next step in developing targeted cancer therapies, said the lead researcher, Peter Glazer, M.D., chair of therapeutic radiology and leader of the radiobiology research program at Yale Cancer Center.

“We have put together a program to target protein and DNA repair enzymes that fix the DNA,” Glazer said. “We feel this could create an ‘Achilles heel’ for cancer cells that would make them more vulnerable to traditional cancer therapies.”

Cancer therapies such as radiation and chemotherapy work by damaging the cancer cells’ DNA, which carries the information, or blueprint, for cell replication.

Glazer said the four NIH funded Yale studies combine basic and translational research and may lead to new therapies for use with conventional radiation and chemotherapy.

“It is our hope to be able to offer novel therapies derived from this research to our patients at the Yale Cancer Center,” he said. “The overall program represents a significant commitment of the Yale School of Medicine and the participating investigators to studies that have direct

relevance to cancer biology and therapy."

In one research project, Alan Sartorelli, professor of pharmacology, will develop new cancer prodrugs that become activated in the low-oxygen conditions in which tumor cells can thrive. Once activated, the drug sets in motion the destruction of a resistance protein that repairs certain DNA lesions.

Glazer will lead a study of the cancer DNA repair genes, RAD51 and BRCA1, in cancer cells. His goal is to devise strategies to render cancer cells vulnerable to therapies that target interconnected repair pathways. RAD51 creates a protein that performs DNA repair and BRCA1 is a tumor suppressor associated with breast cancer.

Joann Sweasy, professor of therapeutic radiology, will study how DNA repair occurs in the normal human population and in tumors. She will examine how deficiencies in DNA repair can be used to guide the design of new cancer therapies.

Patrick Sung, professor of therapeutic radiology and of molecular biophysics and biochemistry, will focus on the repair genes BRCA2, FANCD2, and RAD51, and how their repair pathways are regulated at the level of protein-protein interactions.

Source: Yale University