Cancer stem cells: know thine enemy

December 21 2007

Stem cells -- popularly known as a source of biological rejuvenation -- may play harmful roles in the body, specifically in the growth and spread of cancer. Amongst the wildly dividing cells of a tumor, scientists have located cancer stem cells. Physician-scientists from Weill Cornell Medical College are studying these cells with hopes of combating malignant cancers in the brain.

"Some patients' brain tumors respond to chemotherapy and some don't," says Dr. John A. Boockvar, the Alvina and Willis Murphy Assistant Professor of Neurological Surgery and head of the Brain Tumor Research Group at NewYork-Presbyterian Hospital/Weill Cornell Medical Center. "We believe cancer stem cells may be the cause."

Dr. Boockvar is capturing and classifying these cancer stem cells in order to determine how they react to certain available drug therapies. Doing so will lead to more accurate and specific cancer diagnosis, allowing for tailored drug treatments. Results explaining the techniques used to harvest normal neural and brain-tumor-derived stem cells will be described in the January 2008 edition of the journal Neurosurgery.

"Cataloging brain tumor stem cells will be an enormous tool for patient diagnosis," explains Dr. Boockvar, "but it will also help to create a library of knowledge for the scientific community to understand how brain tumors form and to test and develop new drugs."

To stave off cancer stem cell growth in the brain, Dr. Boockvar is studying the use of two drugs already available for cancer treatment.

Tarceva -- approved for the treatment of lung and pancreatic cancer -- works by stopping the growth and spread of cancer cells. Avastin -- approved for the treatment of colorectal cancers -- is also being studied for inhibiting cancer cell growth and works by stopping the growth of blood vessels (angiogenesis) that feed the tumor.

Preliminary results from these trials have shown that some patients' cancers are wiped out, whereas others remain resistant. Dr. Boockvar believes that these patients' drug resistance might be due to a class of stem cells resilient to available treatments. Finding biomarkers that distinguish these stem cells from those that are destroyed by known drugs might help researchers formulate new drugs.

"Determining a patient's cancer stem cell profile will take a lot of the guessing out of choosing a course of treatment," says Dr. Boockvar. "It will save money, medical resources and precious time for the patient."

Source: New York- Presbyterian Hospital