MedicalXpress

Researchers demonstrate why DNA breaks down in cancer cells

May 3 2011

Damage to normal DNA is a hallmark of cancer cells. Although it had previously been known that damage to normal cells is caused by stress to their DNA replication when cancerous cells invade, the molecular basis for this remained unclear.

Now, for the first time, researchers at the Hebrew University of Jerusalem have shown that in early cancer development, cells suffer from insufficient building blocks to support normal DNA replication. It is possible to halt this by externally supplying the "building blocks," resulting in reduced DNA damage and significant lower potential of the cells to develop cancerous features. Thus, hopefully, this could one day provide protection against cancer development.

In laboratory work carried out at the Hebrew University, Prof. Batsheva Kerem of the Alexander Silberman Institute of Life Sciences and her Ph.D. student Assaf C. Bester demonstrated that abnormal activation of cellular proliferation driving many different cancer types leads to insufficient levels of the DNA building blocks (nucleotides) required to support normal DNA replication.

Then, using laboratory cultures in which cancerous cells were introduced, the researchers were able to show that through external supply of those DNA building blocks it is possible to reactivate normal DNA synthesis, thus negating the damage caused by the cancerous cells and the cancerous potential. This is the first time that this has been demonstrated anywhere.

This work, documented in a new article in the journal *Cell*, raises the possibility, say the Hebrew University researchers, for developing new approaches for protection against precancerous development, even possibly creating a kind of treatment to decrease DNA breakage.

Provided by Hebrew University of Jerusalem