Stopping ovarian cancer by blocking proteins coded by notorious gene

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Ovarian cancer cells are "addicted" to a family of proteins produced by the notorious oncogene, MYC, and blocking these Myc proteins halts cell proliferation in the deadliest cancer of the female reproductive system, according to a presentation by University of California, Berkeley scientists at the American Society for Cell Biology (ASCB) 48th Annual Meeting, Dec. 13-17, 2008 in San Francisco.

In 30-60 percent of human ovarian tumors, MYC is overly active, or amplified, usually as a result of extra chromosomal copies of the cancer-causing gene.

The extra MYC encourages the ovarian cells to manufacture too much c-Myc, a protein that regulates other genes involved in cellular growth and proliferation.

The presence of excessive c-Myc protein drives healthy cells down the cancer development pathway.

Using RNA interference (RNAi) to block c-Myc protein, Berkeley scientists, Tulsiram Prathapam and G. Steven Martin, treated lab cultures of human ovarian cancer cells that contained amplified MYC. RNAi's blocking of the c-Myc protein stopped the cancer cell cycle in its tracks.

But RNAi blocking of c-Myc protein in lab cultures in which the MYC gene was not experimentally amplified did not affect ovarian cancer cell growth.

The scientists suspect that even when c-Myc was blocked in non-amplified cells, other forms of the protein L-Myc and N-Myc likely were present and continued to maintain cell proliferation.

By using small interfering RNA (siRNA) to silence L-Myc and N-Myc, the researchers succeeded in shutting down the growth of the non-amplified MYC tumors.

These therapies also were applied to lab cultures of normal ovarian surface epithelial cells. Blocking all the Myc proteins in the normal cultures did not affect cell proliferation, perhaps because the RNAi and siRNA "therapies" are effective only when the MYC genes are abnormally active.

The scientists hope that their results may lead to a new approach to treating ovarian cancer, the most lethal cancer of the female reproductive system. The American Cancer Society predicts that in 2008, 21,650 new cases of ovarian cancer and 15,520 deaths from this form of cancer will occur. In comparison, cervical cancer will affect almost twice as many new cases -- 40,000 -- but fewer than half as many deaths 7,470. According to the trends in mortality charted by the National Cancer Institute, cervical cancer deaths fell 3.4 percent while ovarian cancer deaths declined by only 0.2 percent from 1996 to 2005.

Source: American Society for Cell Biology