Is Ovarian Cancer Linked to Ovulation?

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(Medical Xpress) -- Could ovulation be the link to ovarian cancer? Joanna Burdette of the University of Illinois at Chicago College of Pharmacy thinks it might be, and she's working to find out.

Burdette, assistant professor of medicinal chemistry and pharmacognosy at UIC, is conducting new research to discover if ovulation increases a signaling pathway that transforms cells of the ovary surface or the lining of the Fallopian tubes into ovarian cancer.

Burdette has received a four-year $720,000 grant from the American Cancer Society of Illinois for her research, which focuses on epithelial cells, or surface and lining cells, in this case, of the female reproductive system.

"One of the most confounding issues of ovarian cancer is the concept that the epithelial subtype responsible for the disease is still not completely known," Burdette says.

"Preventing the disease might be attainable, but we first need to find out where the tumors arise," she said. "Past research has concluded that the cancer occurs from either the epithelial cells on the ovary, fallopian tube, or both."

Using three-dimensional cell cultures developed in her laboratory to monitor early cell-signaling pathways responsible for the disease, Burdette is investigating how cells become cancerous and whether hormones are part of the process.

Ovulation is thought to contribute to ovarian cancer, she says, by spurring cell proliferation; by stimulating cell-signaling pathways in response to pituitary hormones; and by damaging DNA, due to the inflammatory oxidative stress that results from release of the egg from its follicle.

Burdette is focusing on one particular signaling molecule, called Akt.

"Akt is one of the most frequently activated pathways in ovarian cancer," Burdette said. The gene that produces the Akt molecule, she says, is dialed up in response to oxidative stress or the hormones that trigger ovulation.

Burdette and her co-workers plan to grow both the ovarian and the tubal epithelium as 3-D organ cultures, transform the normal cells into cancer cells, and determine which signaling pathways are activated by the cancerous transformation. This should confirm whether Akt is activated and whether it thwarts the DNA-repair mechanism differently in ovarian epithelial cells than in cells of the Fallopian tubes. Mutations in that DNA-repair mechanism are often found in women who have ovarian cancer.

Ovarian cancer strikes about 22,000 women in the U.S. each year, according to the Ovarian Cancer Research Fund. A woman's lifetime risk of developing ovarian cancer is 1 in 17, with most cases developing after menopause. Symptoms include bloating, pelvic or abdominal pain, feeling of fullness, or urinary tract issues.

Few treatments were available in the 1970s. Diagnosis was not possible until the cancer was advanced, and few women survived longer than six months. Today, almost half of patients are alive five years after diagnosis.

Burdette hopes her work will further increase the life expectancy of ovarian cancer patients.

"Sadly, the overall incidence of ovarian-cancer death has not changed much in 30 years," she said.

Provided by University of Illinois at Chicago