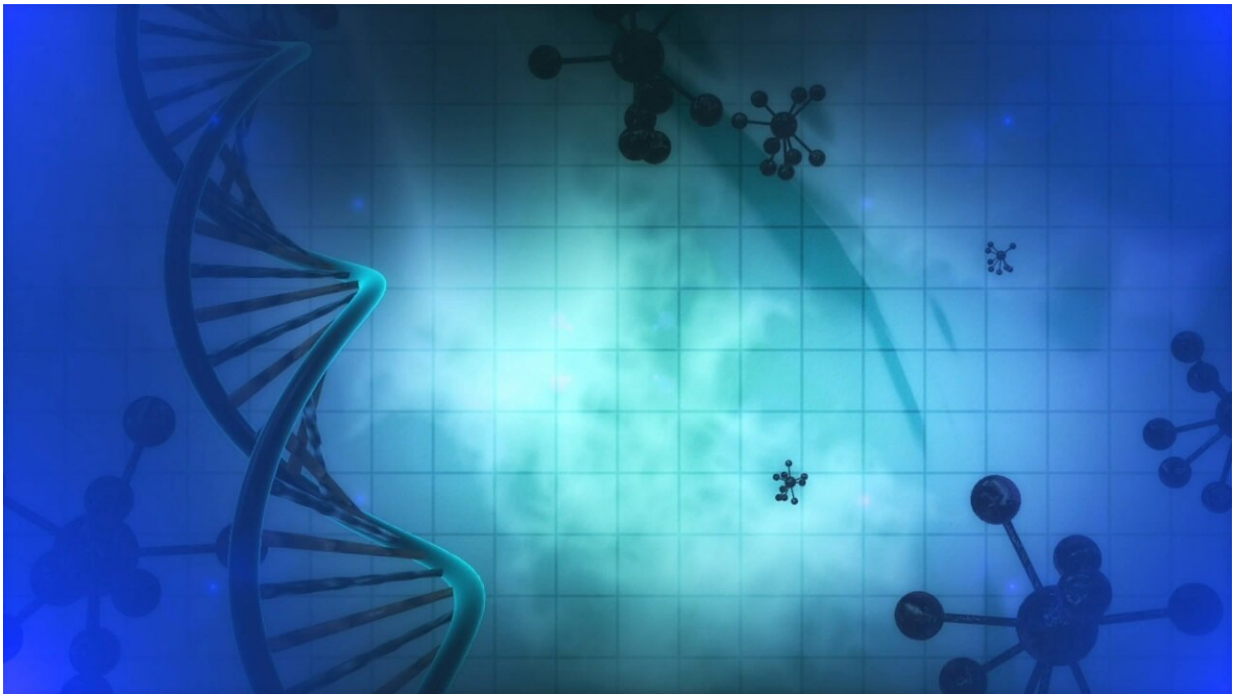


# Key to detecting ovarian cancer early may be in the fallopian tubes

April 4 2022, by Caren Begun

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Credit: Pixabay/CC0 Public Domain

Tennis legend Chris Evert—known for her 18-time grand slam success in the sport—has made recent headlines after revealing an early-stage ovarian cancer diagnosis and speaking out to help others by sharing her personal experience.

According to the American Cancer Society ovarian [cancer](#) is the fifth

leading cause of cancer in women, accounting for more deaths than any other cancer of the female reproductive system. Impacting as many as 250,000 women each year, ovarian cancer is referred to as a silent disease because most women do not experience symptoms until its later stages. But when caught early and before the disease spreads, 90 percent of women can be cured. Late stage ovarian cancer, where the disease has spread beyond the ovaries, is more difficult to treat, and survival rates are low for patients.

Early detection of breast cancer is possible due in large part to screening methods including mammograms, self-breast exams, and annual visits with a doctor. The same holds true for colonoscopies for the prevention of colon cancer. While ovarian cancer is not as common as other women's cancers, a lack of early detection or prevention strategies is a major cause of poor outcomes for patients. For some, knowing [family history](#) and seeking out genetic testing to identify mutations in genes such as BRCA1 and BRCA2 is one way to detect risk for this cancer early. But most people with ovarian cancer do not have a family history or inherited [genetic risk](#), so there is a pressing need for the development of earlier detection methods.

## **Why detection is important**

Catching cancer early often allows for more treatment options and provides patients the best chance for good outcomes. Some cancers have early signs and symptoms, but ovarian cancer does not. While patients undergo regular pelvic exams they may also get transvaginal ultrasounds and a specific blood test (which, while not accurate enough alone, measures the amount of the cancer antigen 125 protein in the blood).

However, there is no formal screening method for ovarian cancer that is equivalent to the pap smear for cervical cancer, which can detect early-stage cancer or even precancerous cells.

Those who know they have an elevated genetic risk due to family history are a step ahead, and can take action to learn about possible mutations or gene errors they may have, along with getting regular screenings. This knowledge can help inform a game plan towards earlier detection that offers an alternative to invasive and disruptive prevention surgery, or waiting for possible symptoms of late-stage disease.

Additional screening methods can help, and ongoing research here at Penn Medicine is looking to catch this cancer early by looking beyond the ovaries.

## **Research toward effective early diagnosis**

Penn Medicine's Ovarian Cancer Research Center (OCRC) serves as a catalyst to promote comprehensive and interdisciplinary research on ovarian cancer. The center is focused on understanding how ovarian cancers begin, and translating those insights into potential approaches for early detection and ovarian cancer therapies. What's more, the OCRC recently received a new \$2.8 million grant from the Department of Defense (DoD) to further these efforts.

In the past, most doctors and scientists naturally assumed that ovarian cancer develops in the ovaries. However, about fifteen years ago, Penn researchers helped make an exciting discovery and found that the most common and deadly form of ovarian cancer, called high grade serous carcinoma (HGSC), actually often begins as tiny groups of abnormal cells in the fallopian tube. These "precursor lesions," called serous tubal intraepithelial carcinomas (STICs), are so tiny that they can only be found by careful, microscopic examination of the fallopian tubes. Ever since this discovery, Penn has been dedicated to studying STICs and how these cells eventually spread to the ovaries where they can quickly form tumors that further spread to the rest of the body.

Learning about STICs lesions themselves is the beginning. Now, with support from the DoD grant, Penn experts are studying how STICs interact with surrounding tissues, and why they form in the first place. This includes building a shared, centralized bank of high-quality STIC specimens to perform studies of STICs and their surrounding tissues; leveraging tissue characterization technologies to examine DNA, RNA, and proteins of all cells located within and surrounding the STIC lesions; and identifying specific chemical changes (biomarkers) that occur that might be used to detect the lesions before they have a chance to progress. Collectively, this will help inform the creation of a test or tests to detect STICs using blood or Pap specimens from patients with lesions as a tool for physicians to help with early diagnosis of ovarian cancer.

"For a long time experts studied the ovaries in the hopes of finding answers to assist with earlier diagnosis and detection of ovarian cancer, so knowing that these tumors start in the fallopian tubes opens up so many possibilities for prevention and detection, which can have a tremendous impact on standard of care for these patients," said Ronny Drapkin, MD, Ph.D., director of the OCRC, an associate professor of Pathology in Obstetrics and Gynecology, and a gynecologic cancer researcher with the Basser Center at Penn. "We're even seeing this in the news today, with Chris Evert's early ovarian cancer diagnosis, which was found in the fallopian tube after she was tested for a BRCA mutation."

Evert has shared that her family history of ovarian cancer is what led her to seek out [genetic testing](#). Through the testing process, she was confirmed to have a BRCA genetic mutation, which led her to her preventive surgery where the cancer was found in her [fallopian tube](#).

Both men and women have BRCA1 and BRCA2 genes, which play a role in controlling and preventing cancer. When there is an error, or mutation, in a BRCA1 or BRCA2 gene, an individual has increased risks for breast, ovarian, prostate, and pancreatic cancers. They can also pass

the mutation on to their children who will then have increased cancer risks in adulthood.

"It's important for individuals with a family history of cancer to get tested. While those who have mutations are considered high risk for developing breast cancer and ovarian cancer, not everyone who inherits these genes will get cancer. Furthermore, once they have this knowledge, patients can make plans to help lower their risk," said Susan Domchek, MD, executive director the Basser Center for BRCA at Penn. "Knowing that there is risk means you can choose different types of surveillance or prevention options to decrease your chances of developing and dying of cancer."

While these [genetic mutations](#) can increase risk, anyone with ovaries is at risk of ovarian cancer. However, some factors, such as a family history, genetic predisposition, increasing age and use of hormone replacement therapy can put one at a higher risk. If you are concerned, learn more about your symptoms and talk to your doctor about [ovarian cancer](#) prevention and screening.

And for those with a family history, like in Evert's scenario, you can reach out to a genetic counselor who can help assess your history and [criteria](#) for testing.

No one can exactly predict whether or not a person will develop cancer. But knowing the factors that increase risk may create an opportunity for prevention or more effective treatment.

Provided by University of Pennsylvania

Citation: Key to detecting ovarian cancer early may be in the fallopian tubes (2022, April 4) retrieved 25 April 2024 from

<https://medicalxpress.com/news/2022-04-key-ovarian-cancer-early-fallopian.html>

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