OVARIAN CANCER

Genetics and Ovarian Cancer

How does genetics relate to ovarian cancer?

Every cell in a woman's body contains genes that serve as a blueprint for all the different functions of her body. A change in the genetic material is called a "mutation." Some types of mutations can make cells cells grow and divide too rapidly or in an uncontrolled way, which leads to cancer.

Some genetic mutations can be inherited (where mutated genes are passed from mother and/or father to children) and some mutations are random (where a single cell can go awry). Random mutations cannot be predicted but researchers seek to identify these mutations and how different factors can cause or prevent them and cancer.

The greatest risk factor for ovarian cancer is having a family history of ovarian cancer. This familial risk is likely due to shared genes, environments and behaviors. Importantly, up to 1 in 4 women with ovarian cancer have a hereditable mutation found through genetic testing. For these families, a genetic mutation leads to a high risk of ovarian and other cancers. For this reason, it is recommended that all women with ovarian, fallopian and primary peritoneal cancer recieve genetic counseling and be offered genetic testing.

What inherited genetic mutations increase a woman's risk for ovarian cancer?

The most common inherited genetic mutation that causes ovarian cancer is an inherited mutation in one of two genes called breast cancer gene 1 (BRCA1) and breast cancer gene 2 (BRCA2). Mutations in these genes increase a woman's risk of breast, ovarian and other cancers. This hereditary syndrome is found in about 1 in 7 women with ovarian cancer and is even more common in women with ovarian cancer who are Azhkenazi Jewish.

Another known hereditary genetic link to ovarian cancer is called Lynch Syndrome. Lynch Syndrome increases a woman's risk for colorectal, endometrial, ovarian and other cancers. Lynch Syndrome is found in about 1 in 33 women with ovarian cancer. There are other rare inherited genetic factors linked to ovarian cancer, and scientists are actively looking for new genetic mutations that may be causing hereditary cancers.

If a woman has an inherited genetic mutation, will she definitely get cancer?

No. Just because a woman inherits a genetic mutation does not mean that she will develop cancer. Because it is not yet possible to determine which women with the mutations will develop cancer, everyone with a mutation should consider increased surveillance and/or undergo preventive measures.

Why would a woman want to know if she has an inherited genetic mutation?

Knowing if she has a mutation would help her determine her risk for developing ovarian cancer. Her doctor could then help her decide which approach to take to manage her risk, including survelliance or risk-reducing surgeries.

One option a doctor may recommend a specific surveillance plan where she would receive frequent clinical exams and blood testing. Additionally, some women consider risk-reducing surgery to remove the ovaries and fallopian tubes. Research is also being conducted around other treatments to reduce risk. Finally, there are new treatments called PARP inhibitors available for advanced ovarian cancer patients with a known BRCA mutation.

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1101 14th Street NW, Suite 850 Washington, DC 20005 www.ovariancancer.org 202-331-1332

How would a woman know if she might have an inherited genetic mutation?

A personal or family history of ovarian, breast or colon cancer could indicate that a woman carries an inherited genetic mutation. Women should know whether any family members on either side have had these cancers and the age when they were diagnosed. In addition, there are specific patterns of ovarian, breast or colon cancer in a family that may be signs of a hereditary cancer. Using this information, a woman's health care professional can then help her decide if genetic counseling and testing might be appropriate for her.

Signs that a woman may be carrying an inherited genetic mutation may include, but are not limited to:

- Pre-menopausal breast cancer in herself or a family member (typically before age 50).
- Breast cancer in both breasts at any age (also known as bilateral disease).
- A woman (or women) in her family had both breast and ovarian cancer.
- Two or more family members have had ovarian cancer and/or breast cancer.
- Men in her family have had breast cancer.
- Ashkenazi Jewish heritage with any family member with breast and/or ovarian cancer.

Researchers have developed a set of criteria known as the Amsterdam II Criteria to help identify Lynch Syndrome in families. These criteria look at how many people in a family have Lynch Syndrome related cancers, such as colon cancer; what their relationship is; how many generations are affected; and the age at which they were diagnosed. However, about 40% of families with Lynch Syndrome do not meet the criteria. As a result, doctors now recommend that anyone diagnosed with colon cancer be tested for Lynch Syndrome.

What should a woman do if she thinks she carries an inherited genetic mutation?

All women with ovarian cancer should talk with their health care provider about being refered for genetic counseling and testing.

If a woman without cancer thinks that she might carry an inherited genetic mutation, she should talk with her doctor and be referred to a clinical genetics professional, such as a genetic counselor. These professionals will conduct a thorough evaluation of a woman's personal and family history of cancer and determine her risk and options for testing. They will also:

- Provide information about inheritance, management, prevention and resources for hereditary cancers.
- Promote informed decision making about whether to proceed with genetic testing.
- Explain the genetic testing procedure.
- Revivew the risks and benefits of genetic testing as well as the possible test outcomes.
- Discuss the genetic test results and implications for her family.
- Discuss cancer screening and prevention strategies based on her family history and test results.

To find a board-certified genetic professional and learn more, please visit:

- The National Cancer Institute provides a directory of professionals at (800) 4-CANCER (422-6237) or at www.cancer.gov/search/geneticsservices/.
- The National Society of Genetic Counselors also has an online directory at www.nsgc.org (select "cancer" under "area of specialization").
- Facing our Risk of Cancer Empowered (FORCE) at www.facingourrisk.org.

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