RAD51C

The *RAD51C* gene is a tumor suppressor gene. Tumor suppressor genes slow down cell division, repair DNA mistakes, or tell cells when to die. When they don't work properly, cells can grow out of control, which can lead to cancer. The primary role of *RAD51C* is to work together with the RAD51 family of genes to repair damaged DNA.

Like most genes, each person has two copies of the *RAD51C* gene: one inherited from each parent. A mutation in a single *RAD51C* gene inherited from either parent is known to increase risk of ovarian cancer over a lifetime. Some studies have suggested that women with *RAD51C* mutations have an increased risk for breast cancer, while other studies have shown no increase in breast cancer risk.[1] More studies are needed to clarify the possible association between breast cancer and *RAD51C* mutations.

In very rare cases, a person can inherit two *RAD51C* mutations, one from each parent. This causes a blood condition called Fanconi anemia, which is associated with bone marrow failure, physical disabilities, and childhood cancers.

How common are mutations in the *RAD51C* gene?

Mutations in the *RAD51C* gene are rare—the exact frequency is not yet known. Studies to establish the frequency of *RAD51C* mutations are ongoing.

How mutations in this gene impact risk

Women

If a woman has a mutation in the *RAD51C* gene, her chance of developing ovarian cancer is greater than that of the average US woman. This does not mean that she has a diagnosis of cancer or that she will definitely develop cancer in her lifetime

Cancer by age 80	Average US woman[2]	With *RAD51C* mutation
Ovarian	1%	Elevated (9%)[3]

Elevated: Risk is increased, but further research may clarify the exact risk figure.

[1] Blanco A, et al. RAD51C germline mutations found in Spanish site-specific breast cancer and breast-ovarian cancer families. *Breast Cancer Res Treat. 2014* Aug;147(1):133-43.

[2] Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute. 2010-2012. DevCan software (http://surveillance.cancer.gov/devcan) V 6.7.0, Accessed June 2015.

[3] Loveday C, Turnbull C, Ruark E, et al. Germline RAD51C mutations confer susceptibility to ovarian cancer. *Nat Genet.* 2012;44(5):475-6.

Men

If a man has a mutation in the *RAD51C* gene, his chance of developing cancer is not known to be increased.

Screening guidelines

Below is a summary of screening guidelines from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) established by experts at the National Comprehensive Cancer Network.[4] They are for women who have a mutation in the *RAD51C* gene. If you have a mutation in this gene, your healthcare provider may use these NCCN Guidelines® to help create a customized screening plan for you.

Women

Ovarian cancer[5]

- **Starting at age 45-50, or earlier based on family history of ovarian cancer:** Your healthcare provider may discuss a risk-reducing salpingo-oophorectomy (the surgical removal of the ovaries and fallopian tubes) with you to lower the risk of developing ovarian cancer.

Useful resources

FORCE

Providing support, education, research, and resources for survivors and people at increased risk of cancer due to an inherited mutation or family history of cancer.
www.facingourrisk.org

Bright Pink

Focused on the prevention and early detection of breast and ovarian cancer in young women, while providing support for high-risk individuals.
www.brightpink.org

Susan G. Komen

Dedicated to reducing deaths from breast cancer by funding breast cancer research, ensuring access to care through community programs worldwide and supporting public health policies that help people facing breast cancer.
www.komen.org/

Last updated May 15, 2017

[4] Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Genetic/Familial High-Risk Assessment: Breast and Ovarian V.1.2017. © National Comprehensive Cancer Network, Inc 2016. All rights reserved. Accessed September 20, 2016. To view the most recent and complete version of the guideline, go online to NCCN.org. NATIONAL COMPREHENSIVE CANCER NETWORK®, NCCN®, NCCN GUIDELINES®, and all other NCCN Content are trademarks owned by the National Comprehensive Cancer Network, Inc.

[5] National Comprehensive Cancer Network. Genetic/Familial High-Risk Assessment: Breast and Ovarian. *NCCN Guidelines* Version 1.2017. Available at www.nccn.org. Published September 2016.