

# Two research groups find link between gene mutation and resistance to estrogen cancer therapy

November 4 2013, by Bob Yirka

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(Medical Xpress)—Two teams of researchers, both made up of members from a wide variety of research institutions in the U.S. have independently come up with the same findings: a gene mutation in ESR1 (a gene that encodes estrogen receptors [ERs]) may be linked to resistance to estrogen therapies given to women to treat breast cancer. In their papers, both published in the journal *Nature Genetics*, the two teams describe their research and findings and how what they've found might help lead to new ways to treat breast cancer in the near future.

Breast cancer is the most common kind of cancer in women, and approximately seventy percent of such cases are sensitive to ER inhibition. One very common way to treat breast cancer is to use therapies that temporarily block ER activity or to prevent the creation of estrogen in the body at all. Unfortunately, over time, some types of breast cancers in some women become resistant to such treatment, especially if the cancer spreads to other parts of the body. In this latest effort both teams have been conducting research to find out why this is, and to try to find out if there is a way to prevent it from happening or to come up with different ways to apply the therapy to help prevent resistance from occurring.

Both teams enlisted the assistance of women who had a recurrence of breast cancer which had also metastasized. Tumor samples were taken and analyzed. Both teams found an increase in the incidence of

mutations (14 of 80 cases in one study, 6 out of 11 in the other) in the part of the ESR1 gene responsible for causing ER to recognize estrogen. The mutations, the researchers note, allow the cancer to grow and spread in the absence of estrogen.

The [mutations](#) did not prevent current [estrogen](#) therapies from working, the researchers noted, but instead made it so that more of it was needed to stop the tumors from growing or metastasizing—in some cases so much so that using such therapies became impractical.

Now that the ESR1 [gene mutation](#)'s connection to [breast cancer](#) has been made, doctor's can screen patients for the mutation, alerting them to the need to switch to other therapies. It should also lead to new research to find out why the mutation occurs and to see if there is a way to prevent it from happening.

**More information:** ESR1 ligand-binding domain mutations in hormone-resistant breast cancer, *Nature Genetics* (2013) [DOI: 10.1038/ng.2822](#)

Activating ESR1 mutations in hormone-resistant metastatic breast cancer, *Nature Genetics* (2013) [DOI: 10.1038/ng.2823](#)

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