5 Of the Biggest Breast Cancer Breakthroughs Of 2016

This October, we take time to raise awareness about breast cancer. While most of the focus tends to be on prevention and working toward an eventual cure, we tend to lose track of how fun we've already come. Here are five of the biggest breast cancer breakthroughs we've had this year.

1. DRUG COMBO "OBLITERATES" BREAST CANCER TUMORS IN 11 DAYS

In March, researchers at the Institute of Cancer Research in London found that the combination of two cancer drugs, trastuzumab (Herceptin) and lapatinib (Tyverb), resulted in the complete obliteration of all signs of breast cancer in 11 percent of patients in only 11 days, The BBC reported. In 17 percent of the patients, the drug combination caused the tumors to shrink so significantly that they no longer needed chemotherapy.

The drugs work by HER2, a protein that fuels the growth of HER2 Positive cancer tumors — which occur in about one in 10 of all breast cancers. Science Daily reported that, while the research is still preliminary, the results could act as a stepping stone to tailored cancer treatment and a way to fight HER2 positive breast cancer without chemotherapy.

2. BLOOD TEST BREAST CANCER DETECTION

Modern breast cancer detection usually consists of a mammogram exam, possibly followed by an invasive biopsy. However, earlier this year a partnership of Australian and French Scientists got closer than ever before to making a blood test for breast cancer a true possibility.

In a study published last month, researchers successfully discovered that the presence of isotopes carbon-13 and nitrogen-15 in certain proportions in a tissue sample can reveal whether the tissue is healthy or cancerous. According to the study's lead researcher Professor Guillaume Tcherkez, this means that in only a few years, doctors may be able to not only detect breast cancer using a simple blood test, but also monitor it.

3. SCIENTISTS FIGURE OUT HOW INVASIVE HER2 BREAST CANCER WORKS

HER2 breast cancer is particularly difficult to tackle because current treatments can only deactivate cancer cells, which can be reactivated at any time. In some invasive forms of breast cancer, an excess of HER2 leads to the uncontrolled growth of cells, which makes it much harder to treat.

In a recent study, the team figured out exactly what makes current antibody treatments ineffective at destroying HER2, pointing out that it is the RAS protein that is responsible for reactivating the growth signal for HER2 receptors. The team even went one step further and designed a protein compound capable of binding itself to two HER2 receptors and blocking growth signals. According to Andreas Pluckthun, a researcher involved in the study, in a press release, identifying this “achilles heel of HER2 positive cancer cells” may pave the way for more effective, and potentially lifesaving, cancer treatments.

4. DISCOVERY OF 5 NEW BREAST CANCER GENES BRINGS US CLOSER TO PERSONALIZED MEDICINE

In a study published earlier this year, researchers from the Wellcome Trust Sanger Institute and the European Bioinformatics Institute (EBI) sequenced the genomes of breast cancer genes. In doing so, they found five additional genes associated with the disease, as well as 13 new mutational signatures that influence tumor development.

The discovery has far-reaching implications. For example, it helps to reveal new reasons for cancer incidence, and helps explain why the disease strikes certain individuals. In addition, the finding helps to pave the way for precision medicine, a form of medical treatment that is individualized for each specific patient.

"In the future, we'd like to be able to profile individual cancer genomes so that we can identify the treatment most likely to be successful for a woman or man diagnosed with breast cancer,” Dr. Serena Nik-Zainal, a researcher involved in the study, said in a statement.

5. TEEN FIGURES OUT WAY TO TREAT “UNTREATABLE” TRIPLE NEGATIVE BREAST CANCER

Triple negative breast cancer is particularly difficult to treat because it does not have receptors on the cell surface, unlike other forms of breast cancer. Previously, the cancer was treated with a combination of surgery, radiation therapy, and chemotherapy, but even then the prognosis remained poor.

Krtin Nithiyanandam, a 16-year-old from England, figured out a way to stop the cancer cells in triple negative breast cancer from differentiating into a more dangerous form, The Telegraph reported. In addition, Nithiyanandam also figured out a way to suppress tumor growth and consequently make chemotherapy on triple negative cancer tumors more effective. In combination, these two discoveries can be used to develop more effective treatments for this difficult form of breast cancer.