MedicalXpress

New biomarker predicts effectiveness of breast cancer drugs

December 7 2006

University of Cincinnati (UC) researchers have identified a new way to predict when anti-estrogen drug therapies are inappropriate for patients with hormone-dependent breast cancer.

The team's leader, Erik Knudsen, PhD, says the findings could help physicians more accurately predict which tumors will respond to anti-estrogen therapy and improve long-term survival for breast cancer patients.

"If we know upfront that a patient's cancer will resist traditional anti-estrogen therapies," Knudsen says, "physicians can immediately begin treating the patient with alternative drugs that are more likely to succeed."

The UC researchers found that when a pathway controlling cell growth known as the retinoblastoma (RB) tumor suppressor is disrupted or "shut off," the tumor resists anti-estrogen drugs and the cancer continues to grow in spite of the therapy. They report their findings in the January edition of the Journal of Clinical Investigation.

Anti-estrogen drugs such as tamoxifen (Novaldex) are a standard treatment for hormone-dependent breast cancer. They work by blocking the estrogen action, which is required for the proliferation of most breast cancers. Although these drugs are effective in the beginning, says Knudsen, many patients who initially respond to this treatment eventually develop a resistance to it.

“Since evidence shows anti-estrogen drugs will fail in a many patients with estrogen-receptor-positive breast cancer,” says Knudsen, “our research suggests that physicians should examine both estrogen receptor status and RB tumor suppressor status during the initial diagnosis, in order to prescribe the most effective therapy for that specific patient’s cancer.”

According to the National Cancer Institute, about two-thirds of women with breast cancer have estrogen-receptor-positive breast cancer, in which tumor growth is regulated by the natural female hormone estrogen. Previous research has shown that estrogen promotes the growth of most types of breast cancer.

“The RB tumor suppressor is a fundamental regulator of cell proliferation in the body, so we can use its actions as a biomarker for how tumors will respond to anti-estrogen therapy,” explains Knudsen. “It could become the basis for deciding how patients with estrogen-receptor-positive breast cancer are treated clinically.”

In this one-year laboratory study, Knudsen and his team used a specialized technique to disrupt the RB suppression pathway in breast cancer cells and analyzed the impact on tumor growth using animal models. The researchers then compared their results with a large patient record database to determine if the same phenomenon was occurring in patients with estrogen receptor-positive breast cancer. Studies supported their hypothesis that RB may be a critical determinant of whether a tumor will respond to anti-estrogen therapy.

Knudsen stresses that comprehensive clinical research is needed before this new method for predicting the success of anti-estrogen drugs is applied in daily patient care.

Source: University of Cincinnati