New test may predict breast cancer metastasis

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(PhysOrg.com) -- In a finding that could change the way breast cancer is treated, researchers at NewYork-Presbyterian Hospital/Weill Cornell Medical Center have identified a new marker for breast cancer metastasis.

The marker, actually a group of three cell types, together called tumor microenvironment of metastasis (TMEM), is associated with the development of distant organ metastasis via the bloodstream -- the most common cause of death from breast cancer.

The researchers reported their findings in the March 24 online edition of the journal *Clinical Cancer Research*.

"Currently, anyone with a breast cancer diagnosis fears the worst -- that the cancer will spread and threaten their life," said Joan G. Jones, professor of clinical pathology and laboratory medicine, director of anatomic pathology at NewYork-Presbyterian Hospital/Weill Cornell Medical Center and one of the study's authors. "A tissue test for metastatic risk could alleviate those worries, and prevent toxic and costly measures like radiation and chemotherapy."

In earlier research, co-author John S. Condeelis of the Albert Einstein College of Medicine identified a link between blood-borne or systemic metastasis and a three-part association between invasive carcinoma cells, white blood cells called macrophages and the endothelial cells that line vessel walls.

Building on this research, the Weill Cornell team developed a way to simultaneously identify all three cell types, together labeled TMEM, in human breast cancer samples.

The researchers then analyzed tissue samples from 30 breast cancer patients who developed systemic, distant-organ metastases and compared them with samples from patients who had only localized disease.

They found that TMEM density was more than double in the patients who developed systemic metastases compared with the patients with only localized breast cancer. Offering further evidence in support of the TMEM concept, they found that in well-differentiated tumors, which are less likely to metastasize, the TMEM count was low.

"Traditionally, the likelihood of breast cancer metastasis is estimated based on tumor size, tumor differentiation -- how similar or dissimilar the tumor is compared to normal breast tissue -- and whether it has spread to the lymph nodes. While these are useful measures, TMEM density directly reflects the blood-borne mechanism of metastasis and, therefore, may prove to be more specific and directly relevant," said Jones.

The next step will be to validate the findings in a larger sample group, the researchers say. They also seek to identify a threshold TMEM density for metastasis risk and streamline the process for measuring TMEM.

"If patients can be better classified as either low risk or high risk for metastasis, therapies can be custom tailored to patients, preventing over-treatment or under-treatment of the disease," said co-author Brian D. Robinson, a resident in anatomic pathology at NewYork-Presbyterian Hospital/Weill Cornell Medical Center.

Breast cancer is the most prevalent malignant disease of women in the developed world, apart from non-melanoma skin cancers; approximately one in eight women in the United States is diagnosed with breast cancer at some time in her life.

An estimated 40 percent of breast cancer patients relapse and develop metastatic disease. About 40,000 women die of metastatic breast cancer every year.

Provided by Cornell University (news : web)