Research suggests breast cancer cells have discerning tastes

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If detected early, most cases of breast cancer are curable. But if the tumour has metastasized – or spread to a site outside of the breast – cure rates decline. A team of researchers from Lawson Health Research Institute and Western University have received $449,733 from the Canadian Breast Cancer Foundation – Ontario Region to study a rare subpopulation of tumour cells called cancer stem cells (CSCs) in hopes of uncovering the mystery behind metastasis.

Approximately 90 per cent of all breast cancer deaths are caused by metastasis. One reason is that the escaped cells are hard to find until they have grown big. "We have become quite good at treating breast cancer if the tumour is localized to the breast," says Dr. Alison Allan, researcher at the London Regional Cancer Program, London Health Sciences Centre. "However, once cells have metastasized they are very difficult to find until they grow to a certain size and start to interfere with the function of an organ."

Dr. Allan's lab was the first in the world to demonstrate that CSCs from the breast are more metastatic than other cells. "We believe these cells are the bad guys –they are the really aggressive cells and the ones driving tumour growth."

Clinical observation has shown that breast cancer cells preferentially spread to the lymph nodes, lung, liver, bone, and brain. Other primary cancers have different preferential sites of metastasis (i.e., prostate cancer usually metastasizes to the bone, and colorectal cancer to the

liver). Dr. Allan and her lab are focusing their research on CSCs in order to discover why these cells favour these particular sites over others.

One of the theories to explain the spread of tumours is the "seed and soil" theory. It suggests that organ-specific patterns can be accounted for by the needs of the cancer cell (the seed) for a specific environment provided by the organ (the soil) in order to initiate and maintain growth. Dr. Allan likens it to the seeds of a flower or dandelion: "When you blow on a dandelion the seeds scatter; however, they don't grow everywhere they've landed. They need a congenial soil in which to grow. We want to understand what conditions are necessary for metastasis and to decipher which factors are contributed by cancer cells and which are contributed by the different organs or sites."

Their preliminary work has found that breast CSCs tend to migrate to the lung so Dr. Allan's lab is investigating the factors in this micro environment that are contributing to these cells wanting to be there. "We hope that if we can target these individual factors and remove them from the microenvironment, we might be able to reduce the metastatic capacity of the cells," says Dr. Allan.

Provided by Lawson Health Research Institute