Unique Organ-specific Metastatic Human Breast Cancer Cell Lines

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Technology description

ABSTRACT

A history of clinical observations has demonstrated that breast cancer metastases are capable of sustained deadly growth in several vital organs, such as, lung, brain, and liver as well as bone/marrow, ovaries, adrenals, lymph nodes, and skin. In order to study the biology and treatment options of organ-specific breast cancer metastases, we have generated unique organ-specific human metastatic breast cancer cell lines. Obtaining these cell lines directly from organ-of-origin explants maintained important cellular interrelationships and extracellular matrix interactions, which has likely resulted in metastatic breast cancer cell lines with specific molecular and biological characteristics that define each metastatic tumor. Our observations indicate that each cell line is phenotypically distinct and ultimately have unique genetic, biochemical, and metabolic differences, which will provide insights into target therapeutics.

FEATURES

To the best of our knowledge, the human metastatic breast cancer cell lines described here are unique in that they disseminated from an orthotopic site of initiation to distal sites of growth. Thus, the metastatic lesions that progress in this model system mimics what occurs to patients and were not brought about by artificially seeding an organ of interest, which is what has been the state-of-the-art for other reported breast cancer metastatic cell lines. In addition, we have generated these cell lines directly from organ-of-origin explants during a relatively long term culturing process. In this manner we have minimized introducing artifacts that may occur during harsher multistep single cell isolation protocols. The latter are the state-of-the-art, which may introduce changes to the cancer cells as stress coping pathways are induce and bias the final selection to those cells that have survived or adapted to all of the processing. In contrast, during our protocol known important cellular interrelationships and extracellular matrix interactions that are naturally in place in vivo were maintained for an extended period of time rather than shocking the cells to immediate growth on an artificial plastic substrate. Our goal has been to generate metastatic breast cancer cell lines that may maintain a higher percentage of the cell-type characteristics that define each metastatic tumor site. Finally, we have generated metastatic cell lines that represent all clinically relevant metastatic sites, i.e., adrenals, brain, bone (pelvis, spine, sternum, and tibia/femur), liver, lung, lymph node, muscle, and ovary, as well as kidney and pancreas, which is in contrast to the limited reported artificially generated metastatic breast cancer

cell lines of lung, brain, bone, and lymph node.

DESCRIPTION DETAILS

This technology is a set of unique human breast cancer metastatic cell lines that represent all clinically relevant metastatic sites, i.e., adrenals, brain, bone (pelvis, spine, sternum, and tibia/femur), liver, lung, lymph node, muscle, and ovary, as well as kidney and pancreas. These metastatic cell lines are triple negative receptor, i.e., loss of expression of estrogen, progression, and HER2 receptors, cell lines and such represent the clinical variants of this cancer that have been the most difficult to treat as they lack the standard expression markers used during targeted therapies. Thus, our cell lines can be used as model systems of their most deadly clinical counterparts. As such, this technology provides clinically relevant biological sources of metastatic disease. The utility of this technology will be sources of metabolic, genetic, biological, and biochemical information that are unambiguously unique for each metastatic cell site and will provide organ-specific metastatic signatures and hence the rationale for selected testing of targeted therapeutics.

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