TECHNOLOGY

Giant obscurins and their uses in cancer prognosis and therapy

OVERVIEW

Approximately 20% of cancer patients diagnosed annually in the US have metastatic cancer, which is associated with much poorer prognoses compared to patients with localized disease. Accurately determining which patients are at risk of developing metastases is a major clinical challenge. Giant obscurins, encoded by the single obscn gene, are multi-domain proteins involved in adhesion and signaling. They are abundantly expressed in normal human breast tissue but nearly lost from breast cancer biopsies and breast cancer cell lines. Depleting obscurins in non-tumorigenic breast epithelial cells increases their stem-like characteristics, such as their migratory and invasive properties, while ectopic expression of these proteins suppresses the tumorigenic, migratory, and invasive potential of metastatic breast cancer cells, supporting the role of giant obscurins in metastasis.

UMB researchers have outlined methods for evaluating the potential for invasiveness, metastasis, or recurrence of an epithelial cell cancer based on the detection, expression, and distribution profiles of giant obscurins in a tissue sample containing tumor tissue of the cancer and cell tissue surrounding the tumor. Decreased levels or altered distribution of giant obscurins, compared to a control or to a previously collected sample, is indicative of the metastatic potential of epithelial cell cancers, including breast cancer. This patented technology also includes a method to improve the response to cancer therapies by restorating obscurin activity in metastatic cancer cells by either administering giant obscurins or an agent that enhances their expression. Obscurin expression may also be used to monitor tumor response to treatment.

APPLICATIONS

Obscurins have been shown to play a role in epithelial cell cancers, suggesting they may be used in the prognosis or treatment of many types of cancer. The largest epithelial cell cancer market is breast cancer, with approximately 329,000 new cases diagnosed in the US each year, of which 64,000 are localized cases. There are currently four single biomarkers used regularly in the clinical setting to characterize breast cancer: estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor 2 (HER2), and Ki67. ER, PR, and HER2 are used to guide targeted therapies, which Ki67 has modest prognostic power in distinguishing between normal and cancerous epithelial cells. There is no single biomarker assay capable of assessing metastatic risk in breast cancer. This technology provides a simple, fast, and low-cost assay for a prognostic biomarker and, potentially, may also be used as a therapeutic approach to improve response to treatment.

ADVANTAGES

May be used to assess risk of metastasis, and monitor and improve treatment responses in epithelial cell cancers

STAGE OF DEVELOPMENT

This method and its uses have been tested in vitro and in in vivo mouse models of lung and breast cancer.

(JP- 2/7/18)

LICENSING POTENTIAL

Available for licensing
Available for sponsored research

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PATENT STATUS

US 9,739,784 (Issued on 8/22/2017)

LICENSE STATUS

Available for licensing and commercialization

CATEGORIES

- Biomarker
- Therapeutics
- Biologics

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ATTACHMENTS

- Download AK-2013-059 Market Summary 1-30-18.pdf

EXTERNAL RESOURCES

- Loss of giant obscurins from breast epithelium promotes epithelial-to-mesenchymal transition, tumorigenicity and metastasis
- Loss of the obscurin-RhoGEF downregulates RhoA signaling and increases microtentacle formation and attachment of breast epitheli

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