Diagnostic Gene Signature For Cancer Vascular Mimicry in Solid Tumors

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BACKGROUND

One of the characteristic trademarks of tumorigenesis is the need for an extensive vascular system to supply blood for the tumor to grow and disseminate from the original node to distant sites via the process of metastasis. This involves the growth of new vessels from existing vessels, as well as the migration of tumor cells through the extracellular matrix (ECM) and into the lymphatic or vascular systems. However, some very aggressive solid tumors can form vascular channels by themselves, which is termed vascular mimicry (VM). Moreover, only certain cells in these tumors have the ability to produce blood-transporting channels, contributing to metastasis. There is growing evidence that supports the idea that VM can be a prognostic factor for poor clinical outcomes in various types of cancer. Currently, VM is identified by a pathologist's evaluation of histological slides, wherein vascular-like structures that do not stain positive for endothelial cells are identified as VM. Thus far, conserved molecular biomarkers that define this phenotype have remained unknown.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a small molecule based methodology for predicting prognosis in a cancer patient by determining the expression level of at least a subset of genes in a VM gene module in solid tumors. This discovery informs a universal set of VM diagnostic biomarkers for improving assignment of patients to therapies, which may be useful for diseases like ductal carcinoma in situ and prostate cancers that are frequently over-treated due to an inability to distinguish indolent from aggressive disease. Furthermore, the work will inform potential therapeutic strategies for combatting VM-mediated metastasis in which increased expression of the genes in the VM gene module is indicative of a poor prognosis.

APPLICATIONS

This invention can be used as a potential diagnostic tool for cancer patients. When a person is diagnosed with a solid tumor, a gene expression test is performed and the state of expression of the genes included in the gene set would be assessed as low or high. If the level of expression is high, a recommendation of a more aggressive treatment regimen and more careful follow-up would be recommended by the treating physician because the patient is high risk for metastasis.

ADVANTAGES

This invention can be used as a potential diagnostic tool for cancer patients with a variety of different solid tumors. It can also be used for patient segmentation and the ability to distinguish indolent from aggressive disease.

STATE OF DEVELOPMENT

The invention has been validated by demonstrating that this gene set was found to be predictive of patient survival in early stages of breast cancer and in 5 other solid tumor types.

INTELLECTUAL PROPERTY INFO

This technology has a published PCT patent and is available for licensing.

RELATED MATERIALS

- 3D collagen architecture induces a conserved migratory and transcriptional response linked to vasculogenic mimicry. Velez DO, Tsui B, Goshia T, Chute CL, Han A, Carter H, Fraley SI. Nat Commun. 2017 Nov 21;8(1):1651. doi: 10.1038/s41467-017-01556-7. - 11/21/2017

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OTHER INFORMATION

KEYWORDS

Solid tumors, vascular mimicry, molecular biomarkers, diagnostic tool for cancer, prostate cancer

CATEGORIZED AS

- **Biotechnology**
  - Genomics
- **Medical**
  - Diagnostics
  - Disease: Cancer

RELATED CASES

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PATENT STATUS

Patent Pending

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