Use of UBA7 and its Regulated Genes as Novel Biomarkers in Treating Human Cancers

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BACKGROUND

Human Ubiquitin-like modifier-activating enzyme 7 (UBA7) is a protein is involved in protein modification, specifically involving the pathway for protein ubiquitination. The modification of proteins with ubiquitin is an important cellular mechanism for targeting abnormal or short-lived proteins for degradation. Ubiquitination involves at least three classes of enzymes: ubiquitin-activating enzymes, or E1s, ubiquitin-conjugating enzymes, or E2s, and ubiquitin-protein ligases, or E3s. UBA7 encodes a member of the E1 ubiquitin-activating enzyme family. Moreover, ubiquitination and ubiquitin-like post-translational modifications (PTMs) regulate activity and stability of oncoproteins and tumor suppressors.

Biomarkers are very important as companion diagnostic tools to guide clinical practice in treating human cancers, especially for targeted therapies. In the era of precision medicine, it is important for development companion diagnostic tools that can guide clinical practice for treating human cancers using targeted therapies.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have observed the tumor suppressive effect of UBA7 in preclinical mouse models. By analyzing cancer transcriptome and related clinical information, they observed UBA7 and its regulated genes have prognostic value in human cancers. Therefore, UBA7 or a combination of UBA7 and its regulated genes (CXCL9, CXCL 10, CCL5 and PML) can serve as biomarkers to guide clinical practice in some of currently used cancer therapies as well as UBA7/USP18 targeted therapies in the future.

APPLICATIONS

Use as companion diagnostic tools by measuring UBA7 expression or a combination of UBA7 with any of a group of listed genes (CCL5, CXCL9, CXCL 10, CXCL 11, PML) to guide clinical practice in treating human cancers.

STATE OF DEVELOPMENT

Current stage: working prototype stage. The researchers have analyzed UBA7 expression in melanoma patients based on RNA sequencing and observed that UBA7 expression is predictive of therapeutic response and patient survival in these patients. Expression of UBA7 is associated with a panel of genes, which are predictive of therapeutic response to cancer immunotherapies. Therefore, UBA7 or a combination UBA7 with any of a group of its related genes are novel biomarkers for cancer immunotherapies.

INTELLECTUAL PROPERTY INFO

The invention is patent-pending and is available for licensing and collaborations

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Companion diagnostics. Biomarkers, human cancers, cancer immunotherapies, cancer transcriptome, protein ubiquitination, E1 ubiquitin-activating enzyme family

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Cancer
  - Therapeutics

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