Cell Aging Measured by Telomere Length and Telomerase Activity as a Diagnostic and Prognostic Biomarker of Major Depressive Disorder

Tech ID: 25994 / UC Case 2010-069-0

INVENTION NOVELTY

This invention describes a new way to predict response to antidepressants in patients with Major Depressive Disorder (MDD) and the likelihood of developing the disease by measuring telomere length and telomerase activity.

VALUE PROPOSITION

Currently, choosing an antidepressant drug is found by trial and error. This means that unfortunately only around one-third of patients fully respond to their first antidepressant trial and only around two-thirds of patients have found full improvement after as many as four consecutive trials. There are currently very few clinical tests that can predict who is likely to respond to antidepressants. A predictive test of antidepressant efficacy could save precious time, money, and suffering. This invention identifies cell aging, as measured by telomere length and telomerase activity, as a novel biomarker for depression that can be used to predict response to antidepressant treatment.

Innovative aspects of this invention include:

- A diagnostic/prognostic test for estimating the likely benefit of antidepressant treatment
- Allows for more individualized, personalized medicine
- Helps biochemically track disease progression and treatment effectiveness
- Potential for use during preclinical drug screening in animal models as a readout of drug effectiveness
- Prognostic test for predicting the risk of developing MDD in individuals

TECHNOLOGY DESCRIPTION

This invention measures telomere length and telomerase activity via peripheral blood sampling as a diagnostic and prognostic biomarker of major depressive disorder (MDD). Telomere length is an indicator of “biological age” as it can reflect the number of cell divisions and exposure of the cell to various types of stress, such as oxidative stress. A team of UCSF researchers has shown that whole blood telomere length is significantly shorter in patients with MDD, as well as other chronically stressed individuals. Furthermore, low pre-antidepressant treatment telomerase activity predicted the best response to antidepressant therapy.

LOOKING FOR PARTNERS

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OTHER INFORMATION

KEYWORDS

Depression, Major Depressive Disorder, Antidepressants, Precision Medicine, Telomere, Telomerase, Cell aging, Companion Diagnostics

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Disease: Central Nervous System

RELATED CASES

To develop & commercialize the technology as a prognostic and companion diagnostic test

2010-069-0

STAGE OF DEVELOPMENT

Preclinical

RELATED MATERIALS

- 1. Wolkowitz, O. M., Mellon, S. H., Epel, E. S., Lin, J., Reus, V. I., Rosser, R., ... & Blackburn, E. H. (2012). Resting leukocyte telomerase activity is elevated in major depression and predicts treatment response. Molecular psychiatry, 17(2), 164-172.
- 2. Wolkowitz, O. M., Mellon, S. H., Epel, E. S., Lin, J., Dhabhar, F. S., Su, Y., ... & Compagnone, M. (2011). Leukocyte telomere length in major depression: correlations with chronicity, inflammation and oxidative stress-preliminary findings. PloS one, 6(3), e17837.

DATA AVAILABILITY

Under CDA/NDA

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,732,386	08/15/2017	2010-069

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