NON-CONFIDENTIAL SUMMARY

INVENTOR(S): **FANG LIU**

CAMH TECHNOLOGY ID: 001-2017

BUSINESS OPPORTUNITY

The Centre for Addiction and Mental Health is seeking partners to either license or co-develop this technology. CAMH is open to various forms of collaboration.

Post-Traumatic Stress Disorder (PTSD) Biomarker and Therapeutic

Market Need

US Department of Veterans' Affairs reports 7.8% of Americans will experience PTSD at some point in their lives, with women (10.4%) twice as likely as men (5%). At any given time in the course of a year, 3.6% of adult Americans (some 5.2 million people) have PTSD. The traumatic events most often associated with PTSD are rape, combat exposure, childhood neglect, childhood physical abuse, and being threatened with a weapon. Treatment costs of PTSD are estimated to be $5,900 to $10,300 for a two year mixed therapy course per victim. The market for PTSD is forecasted to reach $1.2 billion USD by 2028, with a CAGR of 18.7% in the top 7 major markets and 31.1% in the US alone (GlobalData 2019). Given that PTSD treatments to date have poor efficacy, and the increasing diagnosis of the syndrome, a successful pharmacotherapeutic treatment option and pre-PTSD preventative therapy will have a strong chance of achieving market success.

Technology Description

Our scientist, Dr. Fang Liu, has discovered that two proteins, the glucocorticoid receptor (GR) and FK506 binding protein 51 (FKBP51), form a complex that is elevated in peripheral blood from PTSD patients. Dr. Liu's team has also designed a peptide that can disrupt the GR-FKBP51 protein binding and results in the a priori reduction in PTSD-like symptoms in a mouse model of PTSD (Li et al, 2020). The peptide is meant to be used as a treatment post-stress. Another aspect of this technology is its use as a true diagnostic marker. Specifically, a dramatic increase in GR-FKBP51 protein complex was detected in peripheral blood of subjects exposed to a traumatic event that developed PTSD, but not in those that did not develop PTSD or those with major depressive disorder. Therefore, high levels of GR-FKBP51 complex formation is strongly indicative of PTSD, particularly in its sub-clinical, incipient stage. This finding forms the basis of a powerful prophylactic tool capable of screening post-traumatic individuals for those who are likely to develop PTSD. This will greatly increase the efficacy of treatment, and prevent escalation while avoiding the trial-and-error use of a variety of therapeutics.

Stage of Development

- We created a peptide that disrupts the GR-FKBP51 complex. The interfering peptide also significantly reduces freezing time in fear-conditioned mice, an animal model for PTSD, when administrated both immediately after the fear-conditioning training and after the extinction session.
- Next steps – develop a small molecule therapeutic for this target – collaborate on AI-based small molecule screen to identify candidates for development and optimization

Advantages

- Unique preventative treatment of PTSD-like behaviour when administered immediately after trauma exposure. The interfering peptide can also be used in treatment of PTSD after clinical symptoms develop.
- Targets a PTSD causative mechanism, rather than being a generalized psychiatric treatment
- Novelty & safety: targeting of the GR-FKBP51 complex, rather than a ligand targeted to GR
- Preventative diagnosis of non-symptomatic, post-traumatic individuals likely to develop PTSD
- Biomarker allows for the stratification of patients for clinical trials and meaningful endpoint measurement

Notable Publication(s)

Haiyin Li, Kerry Ressler, Fang Liu et al., "The glucocorticoid receptor–FKBP51 complex contributes to fear conditioning and posttraumatic stress disorder" J Clin Invest. 2020; 130(2): 877-889

Intellectual Property

The peptide and its uses are the subject of nationalized PCT applications in US and CA.

FOR MORE INFORMATION CONTACT

Dr. Klara Vichnevetski
Director, Industry Partnerships & Technology Transfer
klara.vichnevetski@camh.ca Tel: 416-595-6056

Centre for Addiction and Mental Health
33 Ursula Franklin Street, Suite 4039
Toronto, Ontario, Canada M5A 2S1
www.camh.ca