The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a simpler, more reproducible in vitro model of the blood-brain barrier for drug screening.

OVERVIEW

Accurately reproducing the blood-brain barrier in an in vitro setting has been a longstanding challenge. Current methods require the independent isolation of multiple cell types, and the quality of these preparations varies.

THE INVENTION

UW-Madison researchers have developed a simpler, more reproducible in vitro model of the blood-brain barrier. Most existing models include primary brain microvasculature endothelial cells (BMECs), which form the blood-brain barrier in vivo, and the corresponding primary astrocytes, which affect the barrier. The improved model consists of primary BMECs on a permeable membrane support. Embryonic neural progenitor cells (NPCs), which can be stimulated to differentiate into each of the major brain lineages that help govern the blood-brain barrier, are co-cultured with the BMECs.

Adding differentiating NPCs to the BMEC model results in more realistic and in vivo-like properties, including increased trans-endothelial electrical resistance, reduced permeability and rearranged tight junctions. Alternatively, NPCs that have differentiated into a mixture of astrocytes, neurons and oligodendrocytes can be co-cultured with the BMECs to “tune” the model for specific applications.

APPLICATIONS

• Drug screening

KEY BENEFITS

• More accurately predicts in vivo behavior than current models, including astrocyte co-
culture
• Less labor intensive than current models
• Reproducible and reliable
• Because embryonic NPCs are easily isolated and expand rapidly, a large, relatively homogeneous cell stock can be obtained.
• NPCs survive cryopreservation, making possible multiple uses of the same NPC stock over a long period of time.
• The relative percentages of neurons and astrocytes differentiated from NPCs can be controlled to create designer mixtures of brain cells that can be co-cultured with the BMECs.

ADDITIONAL INFORMATION

Tech Fields
Drug Discovery - Disease models

CONTACT INFORMATION

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854.