

Human Pluripotent Stem Cell-Based Models for Neural Toxicity Screening

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WARF: P140400US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new platform for neural toxicity testing that combines tissue engineering and bioinformatics, and exceeds 90 percent accuracy.

Overview

There remains a need for models that recapitulate complex human tissues and biological processes, and are suitable for screening potentially hazardous compounds. Animal models are of limited value for predicting developmental neurotoxicity due to poorly understood differences with the human brain.

Human pluripotent stem cells (hPSCs) are a potential alternative. Previous *in vitro* studies have shown the capacity of hPSC-derived progenitor cells to self-assemble in layered neuronal tissues that resemble the neocortex. However, the models to date have lacked critical components of the developing brain such as blood vessels and microglia.

The Invention

UW-Madison researchers have developed 3-D vascularized neuronal tissue models for screening neurotoxic agents. The new constructs are highly uniform and the first to contain every major component of the developing brain: neuronal cells (GABAergic and Glutamatergic), glial cells (astrocytes and oligodendrocytes), interconnected vasculature and mature microglia.

Combined with the modular nature of tunable hydrogels and the power of machine learning tools, the new testing platform enables largescale, quantitative throughput applications.

Applications

• Predictive developmental toxicology screens

Key Benefits

- · First model of its kind to recapitulate the complexity and organization of human tissue
- Comprises physiologically relevant human cells
- Highly sensitive
- System is efficient, reproducible and free of xenogenic material.

Stage of Development

weUsing-global-generexpression-profiles from the tissues, the researchers/developed a machine-learning-protocol that correctly classified delete greater than 90 percent of tests compounds. Several compounds have been classed on your device. See our privacy policy.



Additional Information

For More Information About the Inventors

- James Thomson
- William Murphy
- <u>Charles David Page</u>

Related Technologies

- WARF reference number P140372US02 describes the researchers' method to make endothelial cells for the vascularization of this model.
- WARF reference number P140410US02 describes the researchers' method to make microglia.

Tech Fields

• Pluripotent Stem Cells : Tools

For current licensing status, please contact Andy DeTienne at adetienne@warf.org or 608-960-9857

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