UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

Technology Transfer Office

Licensing Opportunity

A cost-effective and rapid cell model to test drug delivery

Overview

Pharmaceutical companies have spent billions of dollars over the past 30 years developing drugs for neurodegenerative disorders, i.e., Alzheimer's disease (AD). Significantly, over 98% of these medicines do not reach therapeutic levels due to their inability to access the site of disease in the Central Nervous System (CNS). The blood-brain barrier (BBB) is a biophysical defence for the brain against toxins, making the delivery of drugs to the brain difficult. The testing of potential drugs from the lab to the clinical setting is difficult as in-vitro models do not accurately stand for the in-vivo barrier conditions. Besides, animal models are costly and ethically concerned for large-scale testing.

Researchers at the University of Limerick (UL) have created a mimetic, rapid and cost-effective in-vitro model of a cell barrier. This model allows testing potential drug candidates capable of diffusing/permeating through the BBB.

Technology

The standard approach to evaluate the effectiveness of a cell barrier is transendothelial electrical resistance (TEER). TEER is a commonly employed method used to evaluate the degree of resistance of in-vitro models to passive, paracellular diffusion. TEER values for the in-vivo biological barrier between the brain and the BBB are commonly measured between 1,500-2,000 $\Omega \cdot cm^2$.

The model developed in the UL can achieve an in-vivo level of TEER (3,000 – 4,000 $\Omega \cdot cm^2$), in a relatively rapid timeline (i.e., 6 days vs. 3 weeks), uses a cost-effective immortalised cell line, and does not require technically challenging fluidic or co-culture models. This model can be used for scalable drug discovery testing or batch testing of drugs.

Benefits

Researchers at UL have developed a cheap and rapid in-vitro cell model that can mimic in-vivo cell barriers (blood-brain barrier, BBB) to screen drugs. The drug's ability can be tested to cross those barriers. The model created can mimic the barriers of animal models meaning this model can replace animal testing to screen drugs. Furthermore, the test can be carried over a relatively abbreviated period (6 days vs. 3-4 weeks).

The method developed for barrier formation resulted in a biological barrier that is 20 times more resistive than the current standard for BBB models (150 $\Omega \cdot cm^2$) and is much closer to the TEER values measured in-vivo, which range from 2000-4000 $\Omega \cdot cm^2$. This method is reliable, reproducible, and cheap.

Applications

The developed method is scalable and can be performed for pharmaceutical studies by automated processes.

Commercial Opportunity

The University of Limerick is interested in seeking partners to exploit the commercial potential of these technologies by entering into licensing agreements. The University of Limerick has filed a provisional patent on a cell model for testing drug delivery. The target market for innovation is the Pharmaceutical sector.

☐Development partner

☐Commercial partner

UNIVERSITY OF LIMERICK OLLSCOIL LUIMNIGH | Technology Transfer Office

Licensing Opportunity

☒Licensing

☐University spin-out

☐Seeking investment

Further IP information, links etc.

Patent Title: Cell model for testing drug delivery

Type: Parent provisional

Country: UK

Status: Filed

Priority Date: 29-July-2021

Application number: 2110959.0

Publication:

Aisling M. Ross, Darragh R. Walsh, Rachel M. Cahalane, Lynnette Marcar, John J.E. Mulvihill, The effect of serum starvation on tight junctional proteins and barrier formation in Caco-2 cells, Biochemistry and Biophysics Reports, 27, 2021, 101096. DOI: *https://*doi.org/10.1016/j.bbrep.2021.101096.

Contact

Dr. Joan O'Sullivan

Technology Transfer Office

University of Limerick

email: joan.b.osullivan@ul.ie