SUCCESS STORY

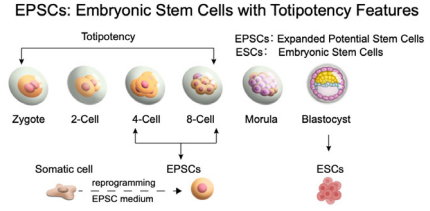
Building a pathway to stronger anti-viral drug development

The development of a new type of human cell model with heightened sensitivity to anti-viral drugs has the potential to improve the efficacy of multiple anti-viral vaccines.

The Platform was developed by Prof. Pengtao Liu (In the middle) from the Li Ka Shing Faculty of Medicine and Dr. Degong Ruan (On the right) and Prof. Fang Liu (On the left) from the Centre for Translational Stem Cell Biology, HKU

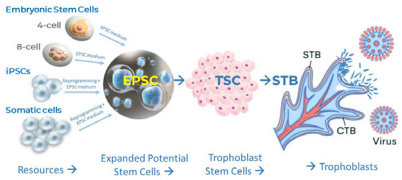
The experience of SARS-CoV-2, also known as Covid-19, put the spotlight firmly on the need for more effective anti-virus drugs. The vaccine industry has been working hard behind the scenes to try to develop better and more nuanced drugs, and so have researchers. The idea is that if cell models with increased sensitivity can be created to test a virus, then a more effective remedy, or anti-virus, can be invented. This thinking has now culminated in a successful development by a research team from the University of Hong Kong, which has made an important advance in the field that is likely to be of immense benefit to anti-viral drug development

EPSC: Stem cells with Totipotency Features



The team is led by Professor Pengtao Liu of the Li Ka Shing Faculty of Medicine, and Dr Degong Ruan and Professor Fang Liu of the Centre for Translational Stem Cell Biology at the University of Hong Kong. Together, they have developed the Novel Stem Cell-based Platform for Antiviral Discovery, Vaccine and Healthy Natural Products. This is a new type of human cell model that features heightened sensitivity to anti-viral drugs and improved efficiency.

EPSC-TSC-STB Platform



The invention centres on the creation of Expanded Potential Stem Cells (hEPSCs), which are used to create trophoblast stem cells (TSCs) and early stage of syncytiotrophoblasts (eSTBs). These feature high levels of the same host factors that are found in SARS-CoV-2 and are also highly susceptible to viral infection. In fact, the eSTBs are 1,000 times more sensitive to antiviral drugs. This hypersensitivity makes the TSC-eSTB platform particularly suited as a human cell model for viral production and for carrying out antiviral discovery. In particular, the platform can be used to identify antivirals that may be effective in fighting SARS-CoV-2, MERS as well as variants of both viruses. They can also be used for FDA-approved anti-virus drugs and natural products.

The Expanded Potential Stem Cells have totipotency features, meaning that an individual cell has the possibility of subdividing to produce most of the different kinds of cells in a single organism. For example, cells from the skin, nerves, bones, muscles, liver and thyroid may be produced. Advanced stem cells of this type have the potential to be used for studying human development and biology and for regenerative medicine.

The novel cell-based platform also has potential for use in anti-viral and anti-ageing drugs, in organoid bank production and in cell banks for vaccine production, among other possibilities.

Products and Customers

The invention was awarded with a silver medal at this year's Geneva 48th International Exhibition of Inventions.

The TTO helped the team by arranging for their participation at the Geneva 2023 Exhibition, assisting with patent filing and organising various business development activities.