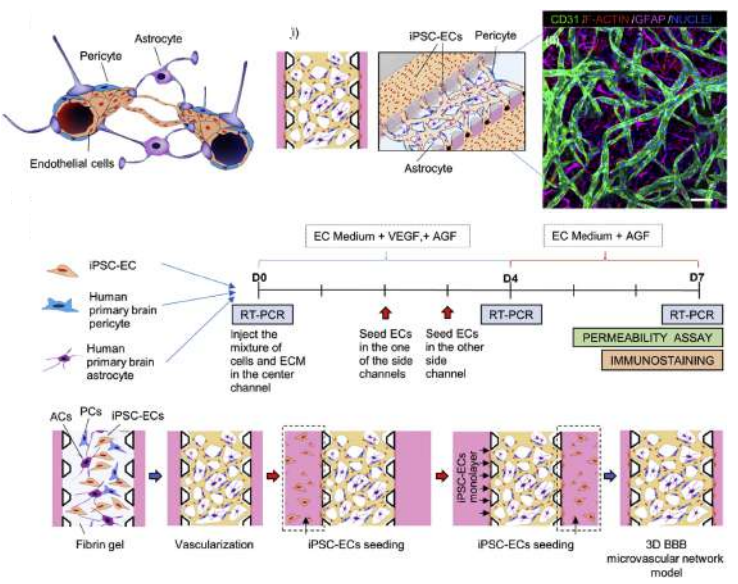
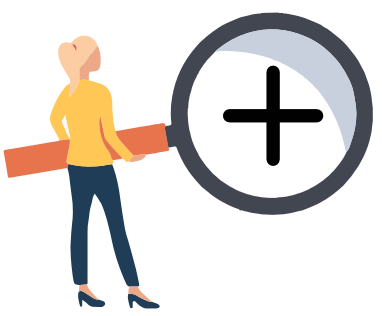
AIM biotech

3D BBB microvascular network model

뇌를 대상으로 하는 약물 전달 과정을 연구하고, 각종 질병의 병리학적 neurovascular fucntion을 이해하는데 있어 BBB 모델은 효과적입니다.
하지만, in vivo 동물 BBB model의 복잡성과 비싼 비용에도 불구하고, 동물 실험을 허가한 약물 후보자들 중 80%는 임상 실험에서 실패하고 있습니다. 따라서, 예측 가능하며 비용적으로도 효율적인 in vitro BBB 모델이 필요합니다. 이런 문제를 해결하기 위해, microfluidic 기술을 사용하여 iPSC 유도 endothelial cell(EC), brain pericyte(PC), astrocyte(AC)의 co-culture를 통해 3D BBB 모델을 만들 수 있습니다. 이 모든 human cell은 vascularization을 통해 fibrin gel 안에서 미세 혈관 네트워크를 구축할 수 있습니다. 이렇게 만들어진 BBB 모델은 tight junction protein 과 같은 생리적으로 유사한 구조를 나타낼 뿐만 아니라, 투과성이 동물모델 뇌에서 측정한 생체 내 값에 필적할 수 있습니다. 따라서 이 in vitro BBB 모델은 뇌 대상 약물을 검사하거나 neurovascular function을 연구하는 데 사용될 수 있습니다.





More information >>

Blood-Brain Barrier protocol 확인 >>

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AIM chip – Ready-to-use microfluidic chip

Microfluidic devices for cell culture

Using microfluidic technologies for 3D cell culture brings additional benefits:

- Microfluidic devices require small volumes of culture media and small quantities of cells, leading to reduced running costs. Studies can be conducted in cases where the cell source is limited (e.g. clinical samples)
- Microfluidic devices have Low space requirements given their small footprints, making it possible to scale up experimental throughput
- Compartmentalisation of cells into different channels/zones & live cell imaging analysis enable experimental designs with spatiotemporal elements

The underside of a microfluidic chip showing the size of its channels (250 microns deep). The chip is 25mm wide, measured from the edges shown above.

Multicellular culture made possible, with meaningful organization into models of biological systmes

The multi-channel design of AIM 3D Cell Culture Chips enables the co-culture of different cell types in distinct compartments in the device, yet allowing paracrine signalling between cell types to take place. the movement of cells between different channels (or within an individual channel) can be easily observed & tracked.
The growth and/or migration of cells within gel can often cause gel shrinkage or degradation. This problem is mitigated by the use of posts in AIM chips. The posts help to stabilize the gel and increase cell culture duration before the matrix collapses.