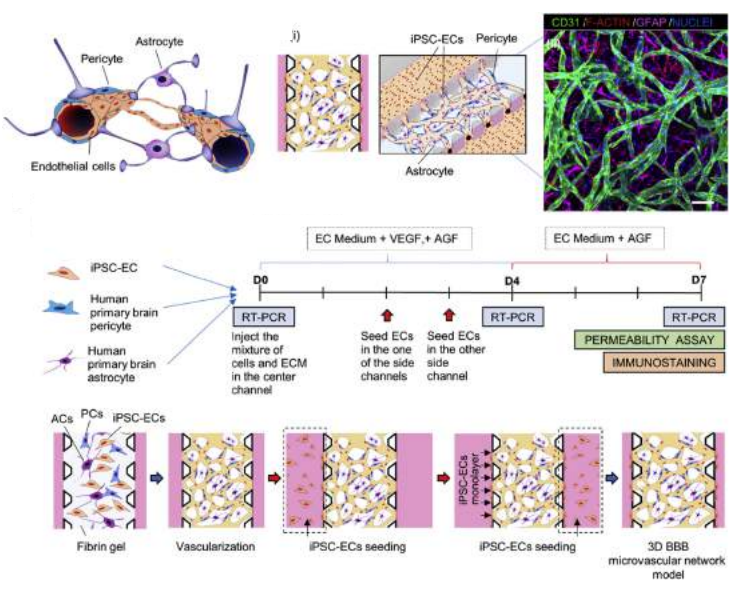
AIM biotech

▶ 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.



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More information >>

Blood-Brain Barrier protocol 확인 >>

▶ AIM chip – Ready-to-use microfluidic chip

Microfluidic devices for cell culture

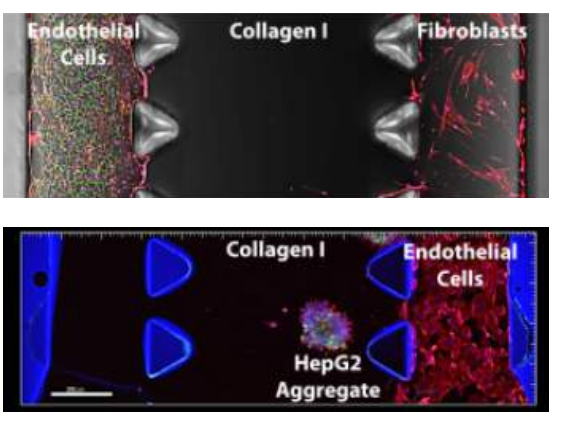
Using microfluidic technologies for 3D cell culture brings additional benefits:

- 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 chan-nels/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 signal-ling between cell types to take place. the movement of cells between different channels (or within an individual chan-nel) can be easily observed & tracked.
The growth and/or migration of cells within gel can often cause gel shrinkage or degradation. This problem is mitigat-ed by the use of posts in AIM chips. The posts help to stabilize the gel and increase cell culture duration before the matrix collapses.

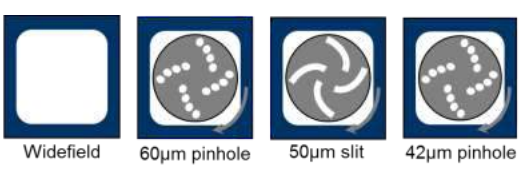


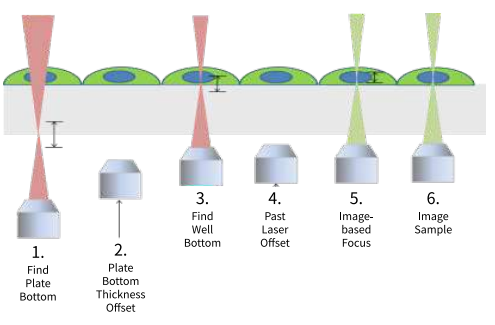
AIMchip with ImageXpress

MOLECULAR DEVICES

ImageXpress Micro Confocal

High-Content Imaging System

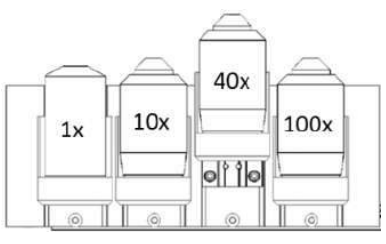




Hardware Options:
- Environmental Control (Temperature, Humidity, CO2)
- Transmitted Light with Phase Contrast (PhL, Ph1, Ph2)
- Fluidics for online pipetting with disposable pipette tips

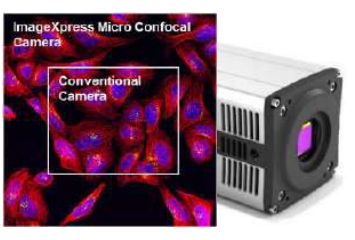
Confocal Modes:
- 50um slit (most HTS applications)
- 60um pinhole (most reserach applications)
- 42um pinhole (special research applications)

Laser and Image-based Autofocus:
- Ultra-fast laser autofocus that adapts to any plate type, slide, or dish
- Image-based focus for adjustments of variant distances from the well bottom to the sample.

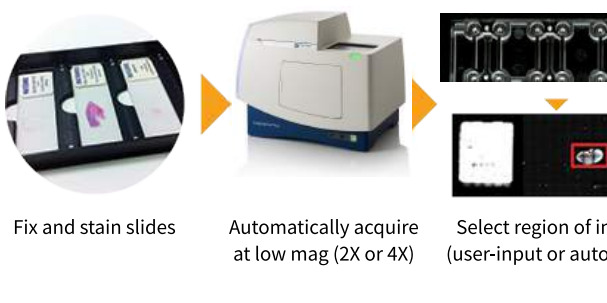


Objectives:
Wide selection of ELWD and SWD objectives (air and oil, phase contrast) from 1x to 100x magnification with high numerical apertures (user changeable).

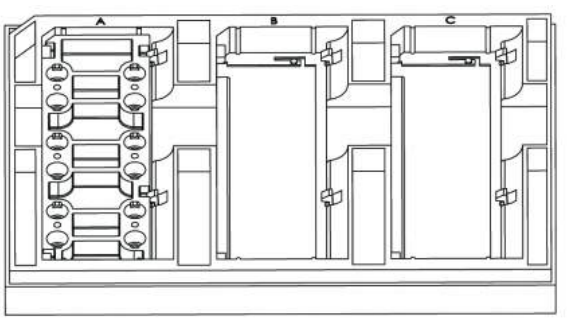
Light Source and Filters:
Super-bright fibre-coupled solid state light engine (long life >20000h). High quality filters (user changeable) in 8-position emission wheel and 5-position dichroic wheel.



Camera:
4.2 megapixel sCMOS camera with 82% peak quantum efficiency covering more than 3 times the area of a conventional camera. This increases throughput and often eliminates the need for images stitching. Images are saved in 16-bit Tiff format.



or



Molecular Devices의 ImageXpress는 high-contents imaging system으로 software를 이용하여 실험실 밖에서도 full-automation으로 사용하실 수 있는 장비입니다. MD만의 Laser and image-based dual-autofocus로 사용하시던 culture plate도 바로 적용이 가능하며, 분석 전용 soft-ware인 MetaXpress를 통해 자동으로 data를 분석합니다.
AIMchip은 slide glass 크기와 동일하게 제작되며, AIMchip의 holder는 96 well plate와 동일한 규격으로 제작됩니다.
MD ImageXpress의 slide-holder와 96-well plate holder를 이용하여 직접 디자인하신 랩-온-어-칩을 imaging과 동시에 분석해보세요.