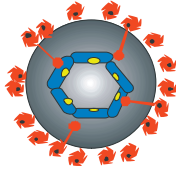


Flocel

A Dynamic In Vitro Blood-Brain Barrier Model



Flocel DIV-BBB System

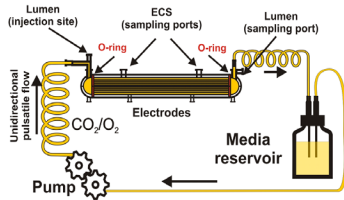


Cross section of lumen



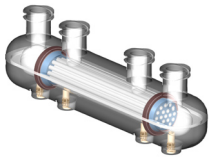
Astrocyte w/ endfoot

Endothelium



DIV-BBB System Diagram

Pharmaceutical companies spend millions of dollars each year to develop and test drugs using in vitro models of the blood-brain barrier (BBB), with many of these drugs failing in vivo. Flocel, Inc. manufactures and markets a more practical, *Dynamic In Vitro Blood-Brain Barrier (DIV-BBB™) Model* that more accurately reflects the true BBB characteristics.



DIV-BBB Cartridge

To date, testing has been done using either static BBB models or animal models. In contrast to these methods, Flocel's DIV-BBB model:

- Enables more accurate pharmacokinetic and toxicological studies
- More accurately reflects in vivo blood-brain barrier properties
- Mimics important endothelial cell-astrocyte interactions
- Electrically measures the integrity of the blood-brain barrier
- Can use real human cells
- Forms tighter junctions than existing static models
- Can substantially reduce drug development costs

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Dynamic In Vitro Blood-Brain Barrier Model

DIV-BBB™ Cartridge

The Flocel system includes the measurement software, the cartridge mounting platform, and required cable, and four DIV-BBB cartridges. The electrodes in the cartridge plug into the mating connectors in the platform.

Features:	Benefits:
<ul style="list-style-type: none">Controlled ratio of luminal to abluminal volume.	<ul style="list-style-type: none">Matches volume ratio found in vivo.
<ul style="list-style-type: none">Small size, only 2.75 inches long.	<ul style="list-style-type: none">Reduces the number of cells required.
<ul style="list-style-type: none">Electrodes built into the cartridge.	<ul style="list-style-type: none">TEER measurements are easily made.
<ul style="list-style-type: none">Low cost.	<ul style="list-style-type: none">One-time use, no rebuilding the cartridge.

TEER Measurement System

The **Trans**Epithelial **E**lectrical **R**esistance (TEER) measurement provides a quick and easy evaluation of the integrity of the Blood-Brain Barrier model. The DIV-BBB model has a TEER closer to that found in vivo, >1000 Ω -cm² as opposed to the monolayer model that typically achieves a TEER of 200 Ω -cm².

Features:	Benefits:
<ul style="list-style-type: none">Impedance measurement at multiple frequencies.	<ul style="list-style-type: none">Characterizes the resistance and capacitance of the BBB.
<ul style="list-style-type: none">Low voltages, 60 millivolts maximum.	<ul style="list-style-type: none">Limits potentially damaging voltages to the BBB.
<ul style="list-style-type: none">Automatic multiplexing of multiple cartridges.	<ul style="list-style-type: none">Can handle up to 4 cartridges simultaneously.
<ul style="list-style-type: none">USB interface.	<ul style="list-style-type: none">Can use either a desktop or laptop PC.

Pulsatile Pump

The Flocel pump provides a small, easily configured, pulsatile pump for four cartridges. Each of the four pumps is individually controlled allowing for independent experiments with the four cartridges.

Features:	Benefits:
<ul style="list-style-type: none">Flow rates and pump rates are independently controlled for four cartridges.	<ul style="list-style-type: none">Allows for four independent experiments.
<ul style="list-style-type: none">External 24 VDC wall plug-in power supply.	<ul style="list-style-type: none">Minimizes heat inside the incubator.
<ul style="list-style-type: none">Receives program commands from the TEER Measurement system.	<ul style="list-style-type: none">Does not need an additional USB port.

Measurement Software - National Instruments LabVIEW™ Application Program

The Measurement/Control Software has been written as a stand-alone program based on LabVIEW. The User Interface, known as the Front Panel in LabVIEW, allows the researcher to program the pumping rate, apply various frequency sine waves to the intrapithelial resistance barrier, measure impedance and record data.

Testing Services

Another component to the business is the testing service. We can provide in vitro BBB permeability testing on a contract basis. The fee structure is set by the number of compounds to be tested and the complexity of the testing.

Ordering Information

For additional information or to answer any questions about the components of the Dynamic In Vitro Blood-Brain Barrier Model, contact sales at sales@Flocel.com or call 216.361.5411.

