

MICA BIOSYSTEMS

DYNASCREEN™

INFORMATION PACK

CONTACT US

Website: www.micabiosystems.co.uk

LinkedIn: <https://www.linkedin.com/company/mica-biosystems>

Email: info@micabiosystems.co.uk

MICA
Biosystems

Introduction

MICA Biosystems (MICA) uses cutting-edge, First-in-Class nanotechnology to enable researchers around the world to push further this frontier of science and medicine. MICA Biosystems, including its related products Dynagrow™ and Dynascreen™, are protected by seven worldwide patents



OUR COMPANY

MICA CELL THERAPY

We use nanoparticles and an induced magnetic field to actively and accurately control the differentiation of stem cells *in vivo*, in a highly location-specific, minimally-invasive procedure.

Dynascreen™

Dynascreen™ provides mechanical stimulation to cells in a permeability assay as a bolt-on addition to existing instrumentation and methodologies.

Dynagrow™

We use nanotechnology and magnetic forces to provide mechanical stimulation to cell cultures, facilitating 3D structure and organoid cell cultures, using our patented instrumentation.



PROBLEM

Drugs are often screened out due to the permeability assessments using Caco-2 assays. Drug discovery and development is a long, costly, and high-risk process:

Typical length: 10-15 Years
Typical cost: \$1-2 Billion

Preclinical studies account for 32% of drug discovery costs.

SOLUTION

Dynascreen is a bolt-on device to the standard Caco-2 assay, with oscillating magnetic fields. These create mechanical movement in the cell lining, which has been previously tagged with MICA's magnetic nanoparticles (MNPs).



Them

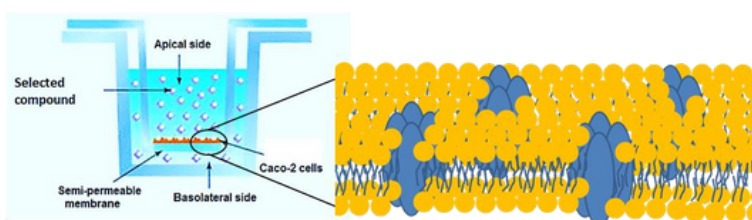
The standard Caco-2 assays are static. That is an inaccurate representation of the *in vivo* intestinal environment which is subject to constant movement.

Us

Movement drastically changes the membrane permeability.

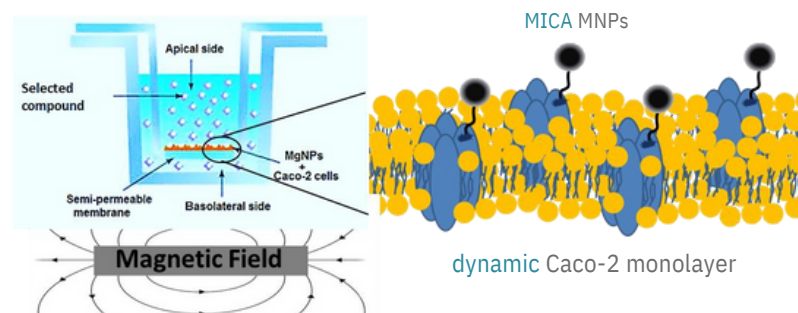
We provide that movement.

Conventional assay



static Caco-2 monolayer

MICA dynamic assay



dynamic Caco-2 monolayer

Dynascreening in practice

Dynascreen is a bolt-on device to the standard Caco-2 assay

add labelling solution containing **MNPs** to the apical region of each well



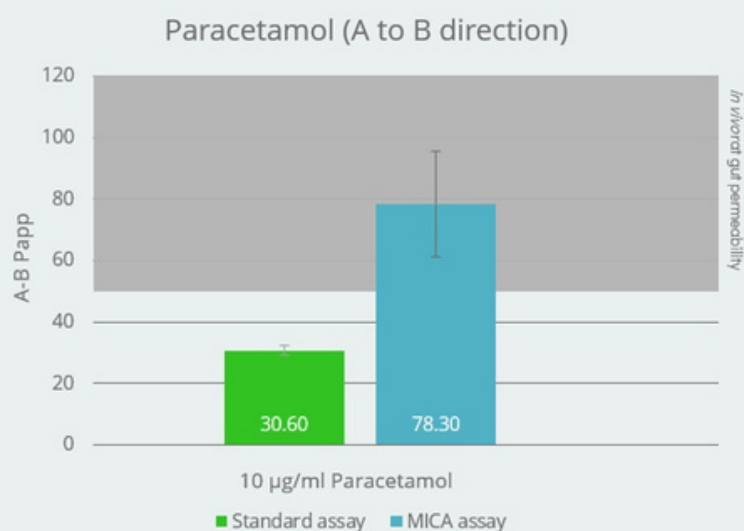
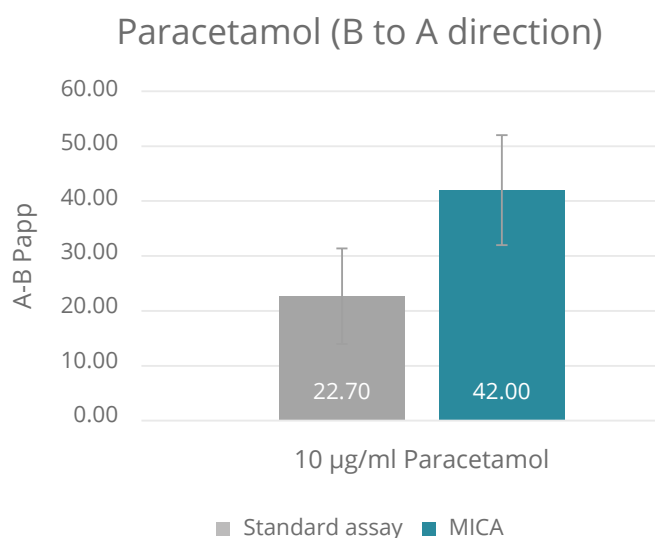
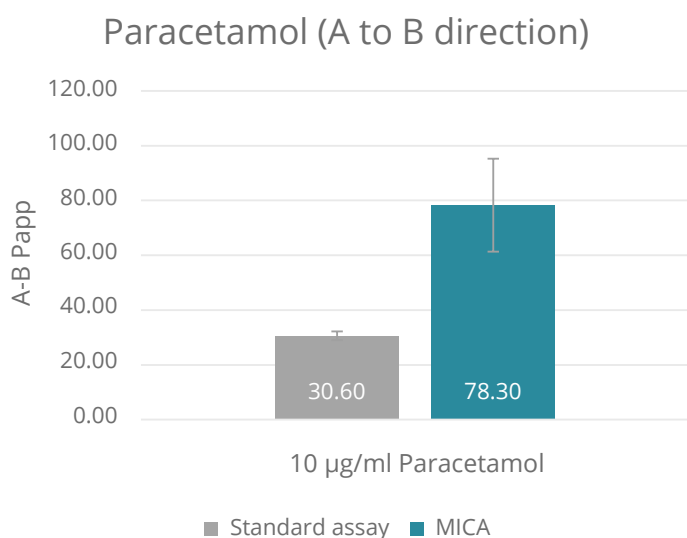
place plates directly onto the **magnetic plate** and incubate for 30min

add drug solution to the assay as per usual

incubate **labelled cells** for 2hrs at 37°C with **magnetic stimulation**



Data - paracetamol permeability



Our target

In vivo rat intestinal permeability measured at 50-200 x 10⁻⁶ cm/s

These levels are similar to **MICA Dynascreen** assay compared to lower static levels

Compound	Permeability Direction	Papp standard assay (nm/s ±S.D.)	Papp Dynamic assay (nm/s ±S.D.)	% of Papp increase from standard to dynamic assay
Paracetamol (Class III)	Apical to Basolateral	30.6 ± 1.6	78.3 ± 17	156%
	Basolateral to Apical	22.7 ± 8.7	42 ± 10	85%

Dynascreen™ package

1. BIOREACTOR UNIT

this instrument provides a **dynamic or static magnetic force** to biological material labelled with **MICA MNPs**

unit comes with a power box, magnetic plate and software

2. ASSAY BOX

containing **MICA MNPs** sufficient for 330 wells (13 x 24-well plates) and vials for an optional QA step



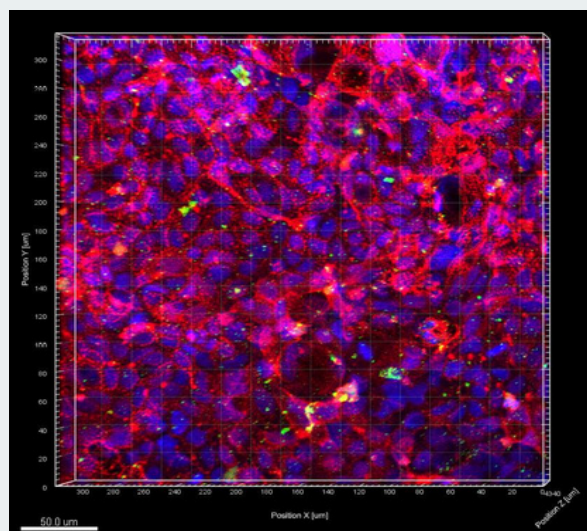
summary



Dynamic drug absorption in Caco-2 cells can be up to 150% greater than static absorption assays

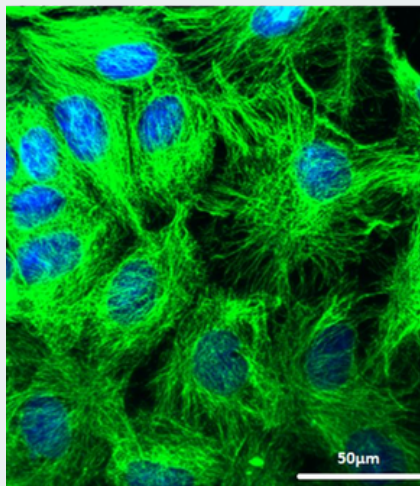
Class IV compounds which showed limited absorption in static assays show absorption in our Dynascreen™ assays

Dynascreen™ is the first dynamic Caco-2 drug screening assay of its kind to accurately predict *in vivo* human drug absorption rates



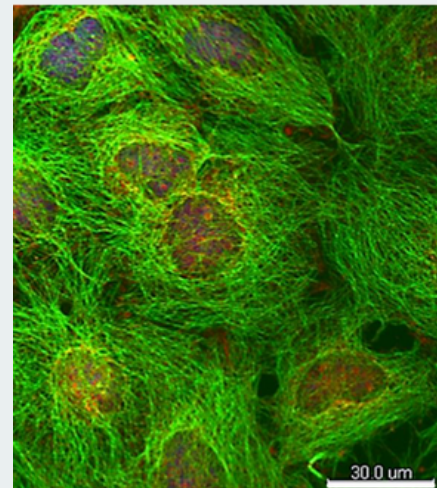
■ Cell nucleus ■ Cell membrane ■ MNPs

Caco-2 without MNPs



■ β-Tubulin ■ DAPI ■ MNPs

Caco-2 labelled with MNPs



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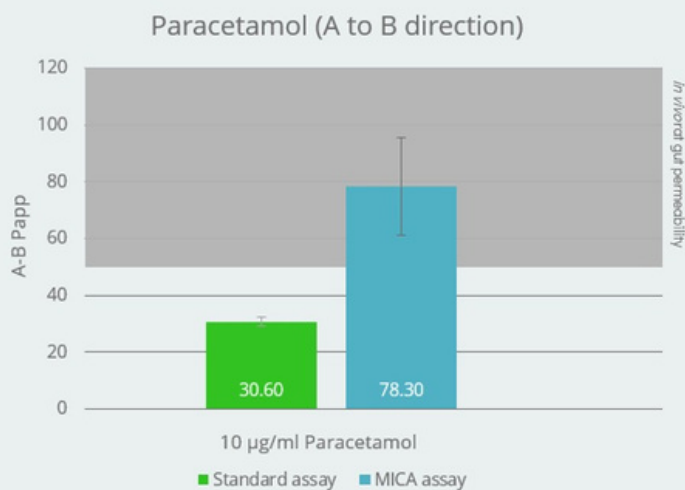
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MICA Biosystems

COMPANY NUMBER 07237355

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