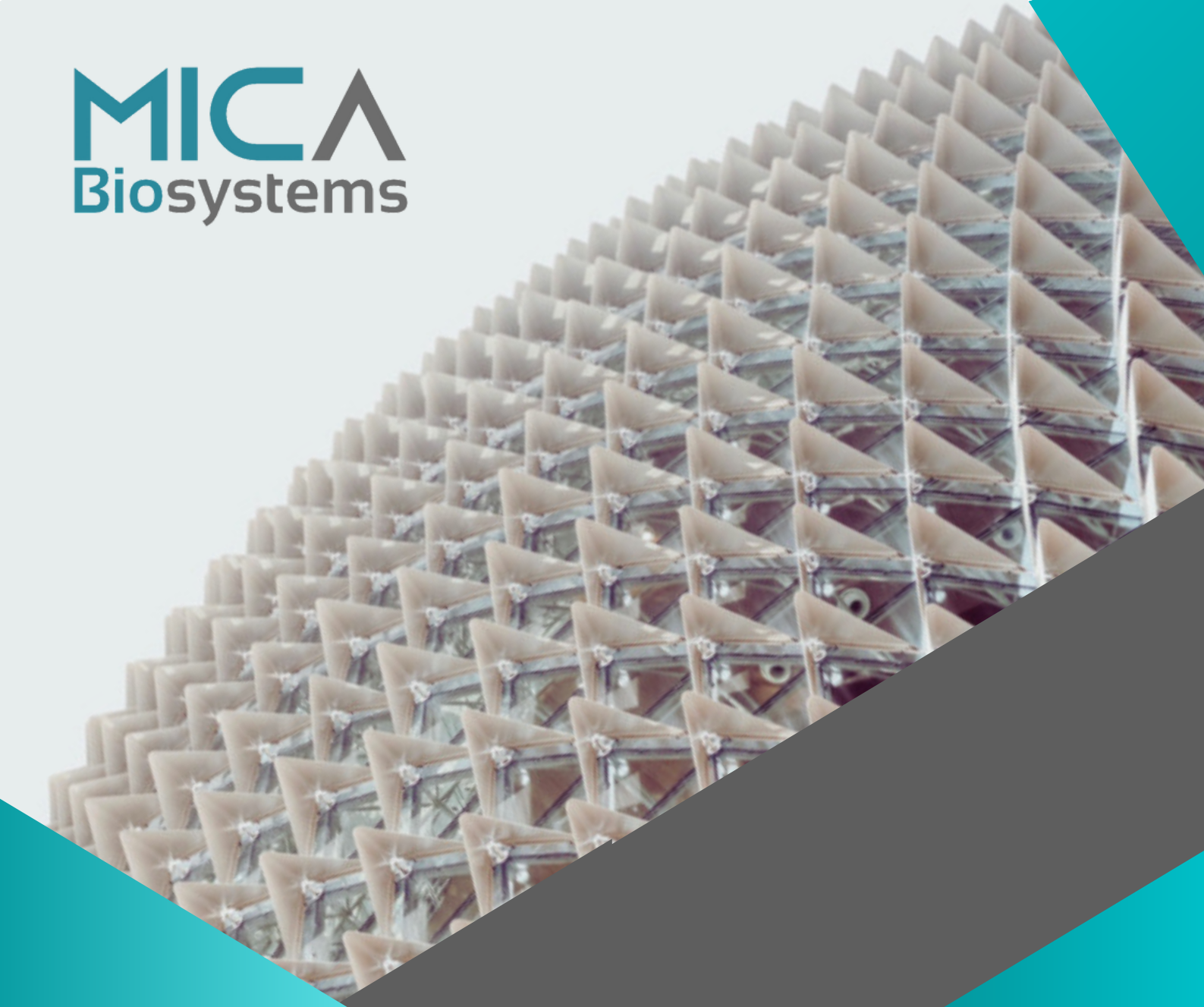


MICA BIOSYSTEMS

DynaGrow™

Statement of Confidentiality

MICA Biosystems, including its related products Dynagrow™ and Dynascreen™, are protected by seven worldwide patents.

INTRODUCTION

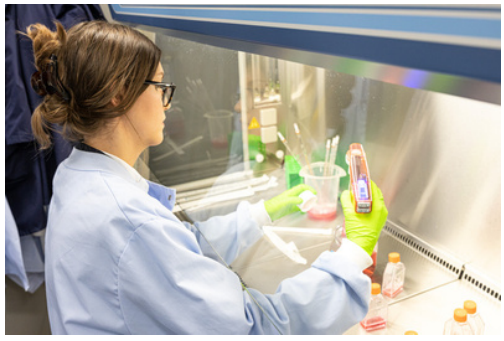
About Us

ABOUT THE COMPANY

MICA Biosystems is preclinical biotech founded in 2010 by world-leading scientists in the fields of regenerative technology and tissue engineering - Professors Alicia el Haj and John Dobson. Through our DynaGrow platform we use cutting-edge nanotechnology to enable researchers around the world to push further this frontier of science & medicine.

OUR AIM

MICA Biosystems will enable a new approach to controlling cell behaviour with applications in tissue engineering, regenerative medicine, stem cell research, pharmaceutical screening and therapeutic applications.



OUR MISSION

MICA Biosystems' mission is to unlock the potential of nanotechnology and stem cell therapies in both the clinical and research fields by allowing for controlled cell differentiation and mechanical stimulation, both *in vivo* and *in vitro*.

DYNAGROW™

Applications

DynaGrow is perfect for research in several areas: examining cellular mechanics, ion channel activation kinetics, tissue engineering and regenerative medicine. There are many further potential applications, talk to our technical experts to see how DynaGrow technology can be used in your research.

Cell Activation

DynaGrow's magnetic nanoparticles can be linked to specific ion-channels, cell receptors and mechanoreceptors of a wide range of cell types and then manipulated by an external, controllable, magnetic field.

Cell Culture & Tissue Modelling

DynaGrow can provide fully configurable mechanical cues to simulate the production of functional tissue matrices to allow for the development and growth of both 2D and 3D *in vitro* models.

DYNAGROW™
Functionality

The DynaGrow system can serve as an addition to your current procedures without a radical overhaul of your current operations - it's compact enough to work on a tabletop, or fit inside your current incubators.

Alignment

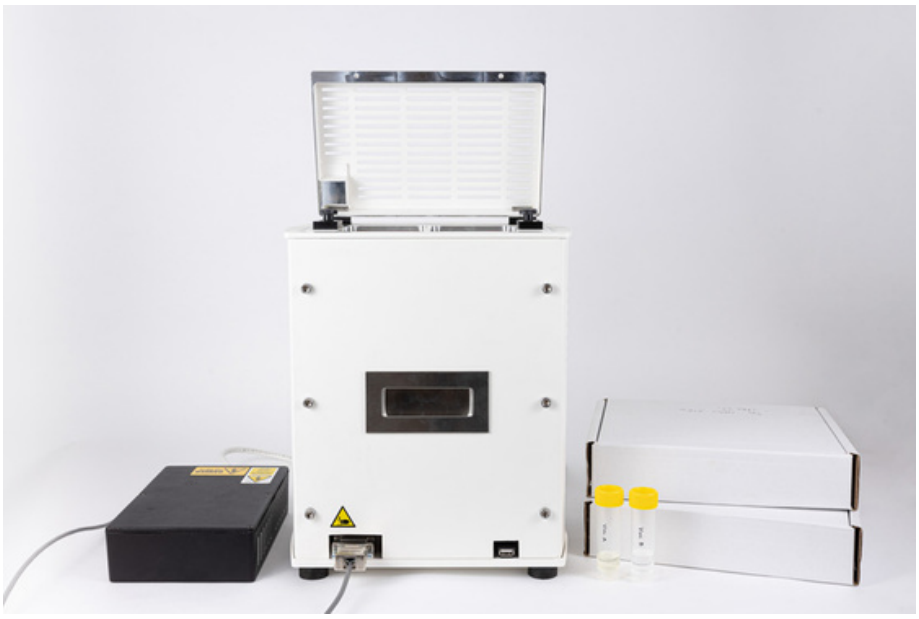
DynaGrow can can be totally aligned with routine cell culture practice.

Commonality

There is no need to transfer cells or constructs from their culture vessel to specially designed units in order to apply the magnetic field. Instead, the instrument allows for cells cultured in standard tissue culture vessels (6, 24 and 96 well plates) to simply be secured within designated slots for subsequent magnetic stimulation.

Sterile

Two plates can be stimulated under sterile culturing conditions (37 ℃ and 5% CO2) at any one time by placing the instrument within an incubator unit.



DynaGrow bioreactor unit and included accessories (power unit and wires, vials of nanoparticles and boxes of magnetic plates).

DYNAGROW™
Cell Activation

DynaGrow can be totally aligned with routine cell culture practice. There is no need to transfer cells or constructs from their culture vessel to specially designed units in order to apply the magnetic field. Instead, the instrument allows for cells cultured in standard tissue culture vessels (6, 24 and 96 well plates) to simply be secured within designated slots for subsequent magnetic stimulation.

Precise

DynaGrow can precisely target and activate individual ion channels or surface receptors on specific cells within a culture.

Control

DynaGrow technology can be used to manipulate and remotely control specific cellular components to provide clinicians and scientists with a powerful tool for investigating cell function and molecular signalling pathways. DynaGrow has also proven success for influencing the growth and differentiation characteristics of stem cells.

Functional

The DynaGrow system can serve as an addition to your current procedures without a radical overhaul of your current operations - it's compact enough to work on a tabletop, or fit inside your current incubators.

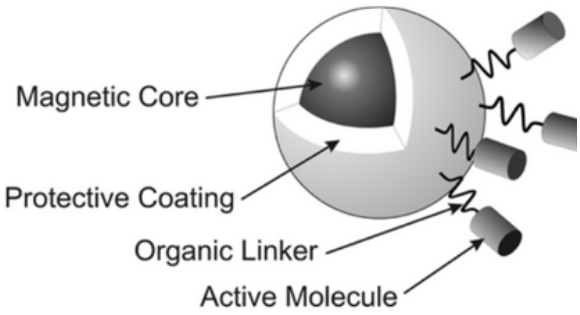
Potential

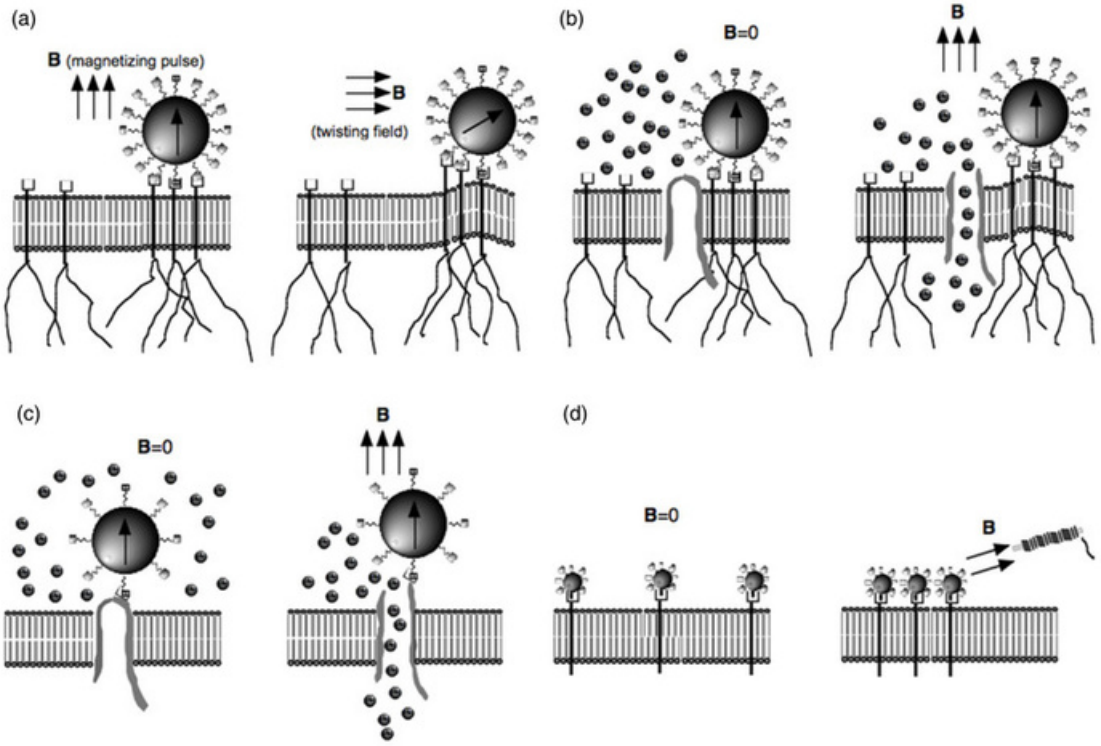
DynaGrow can be used in the investigations of cell mechanical properties, mechanosensitive ion channel signalling pathways, targeted activation of specific ion channels and mechanical conditioning of cells for regenerative medicine applications.

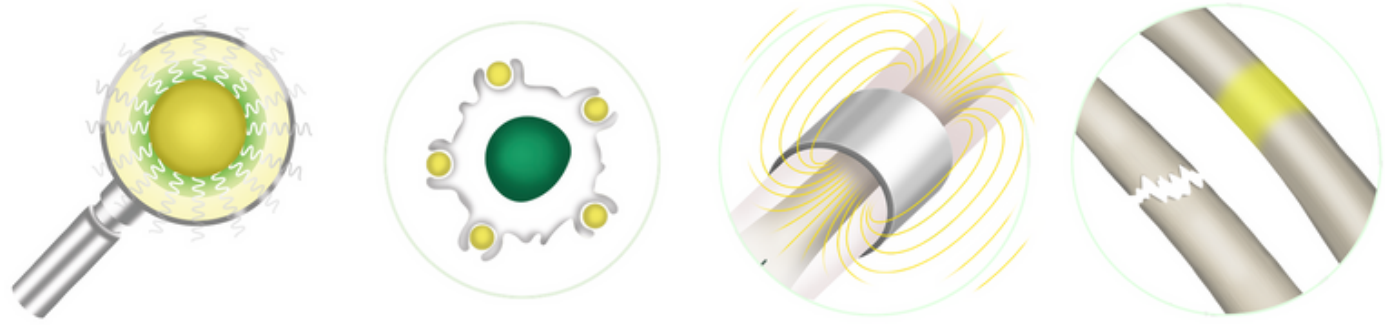
DYNAGROW™

Cell Activation

magnetic nano-particle







Bind Inject Activate Monitor

DYNAGROW™

Cell Culture & Tissue Modelling

DynaGrow has been successfully used to upregulate genes relating to bone and cartilage formation in osteoblasts, chondrocytes and MSCs, as well as initiate and promote bone matrix mineralisation *in vitro* (Kanczler *et al.* 2010).

Many tissues need mechanical conditioning in addition to biochemical cues in order to grow and develop. Mesenchymal Stem Cells (MSC) in particular, need mechanical cues to direct differentiation into bone, muscle or connective tissues.

DynaGrow can provide fully configurable mechanical cues to simulate the production of functional tissue matrices to allow for the development and growth of both 2D and 3D *in vitro* models. Controllable magnetic forces can also create dynamic organoid models that better replicate *in vivo* tissues, for example gut peristalsis.

The precision that the DynaGrow platform provides, allows for certain cell types in a heterogeneous culture to be magnetically labelled, allowing you to control the growth and development of one cell type in a population. This is beneficial for the development of accurate 2D and 3D *in vitro* models.

DynaScreen

If you are interested in a dynamic gut model that replicates peristalsis for more accurate drug permeability screening, see our innovative DynaScreen product. Contact us for more information on how DynaScreen can benefit your current and future research.

MICA BIOSYSTEMS

Contact Us

If you would like to receive any additional information about any of our platforms, or find out more about how they could be of benefit to you and your research, please don't hesitate to get in touch.

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