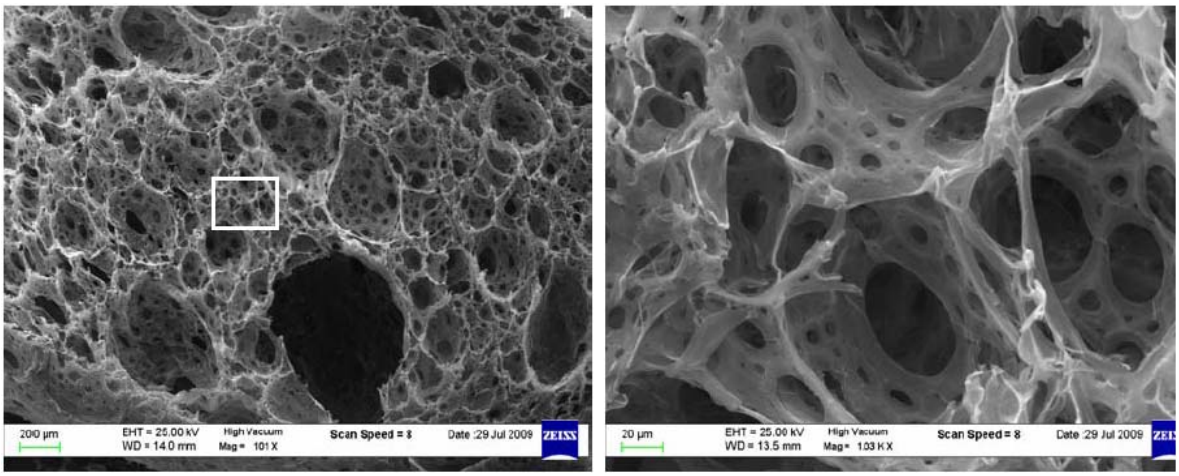
ExCel Matrix Biological Devices P. Ltd.
Hyderabad

3D Cell Culture
Microcarrier Culture
Cell Culture Bio-Assays
ExVivo Organ Model
Tissue Engineering

ECM Analog® Technology

Extracellular Matrix for 3D Cell Culture



Porous Scaffolds of Extracellular Matrix

Cell culture in extracellular matrix (ECM) exhibits many *in vivo* like features that cannot be observed in monolayer cultures[1]. 3D growth, long term differentiated function and culture of fastidious cells are typically missed in conventional 2D monolayer culture.

Monolayer cultures in flasks are merely attached cells on rigid plastic surface that are surrounded by liquid medium rich in serum. Both interfaces (plastic and serum) skew cells to rapid multiplication specifically without much consideration toward maintenance of differentiated functions.

With increasing research in cell therapy and tissue engineering, it is likely that a scalable and consistent biomaterial platform will have significant impact through the understanding of cell behaviour during research, and animal trial stages. Systematic study of transplanted cells fate is imperative from regulatory point of view[2].

There is no biomaterial platform available commercially for tracking, retrieval and analysis of transplanted cells *in vivo*[2]. As many aspects of tissue microenvironment can not be replicated *in vitro, in vivo* cell culture is necessary at times. ECM Analog® can be used for immobilization of cells during *in vivo* incubation.

ECM Analog® technology is consistent with typical *in vitro* and *in vivo* cell culture requirements due to customizable ECM mimicry that can be scaled-up for clinical application, if required.
ECM Analog® Technology is further rendered as novel 3D cell culture devices for a range of cell culture requirements. Ready to use 3D cell culture Petri dishes, porous microcarriers, 3D culture inserts and *in vivo* cell culture scaffolds. Perfusion based long-term 3D cell culture devices are also under development.

1. Yamada Kenneth M. et al. Cell 130, 2007 pp 601-610,
2. Linda Griffith, Acta Mater. 48, 2000, pp 263-277.

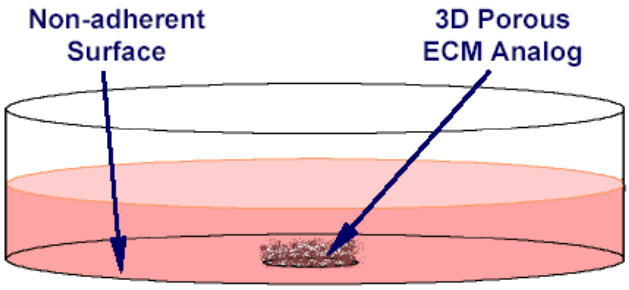
3D cell culture technology and products development are funded under Small Business Innovative Research Initiative scheme of Department of Biotechnology, Government of India

ExCel Matrix Biological Devices P. Ltd.
Hyderabad

3D Cell Culture
Microcarrier Culture
Cell Culture Bio-Assays
ExVivo Organ Model
Tissue Engineering

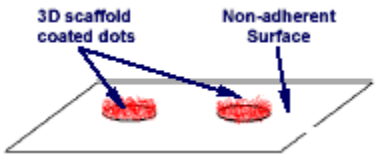
Products for 3D Cell Culture*

ECM Analog® Technology



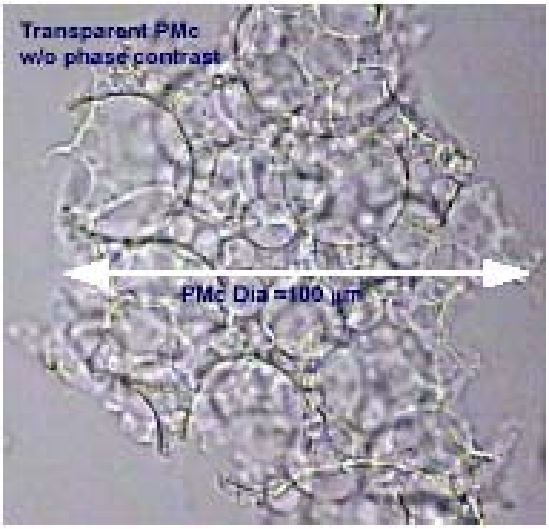
- A convenient 3D cell culture.
- Customizable extracellular.
- Customizable scaffold features.
- Handling is identical to monolayer culture.
- Cells do not grow as monolayer on scaffold free area.

Confo-Cult®



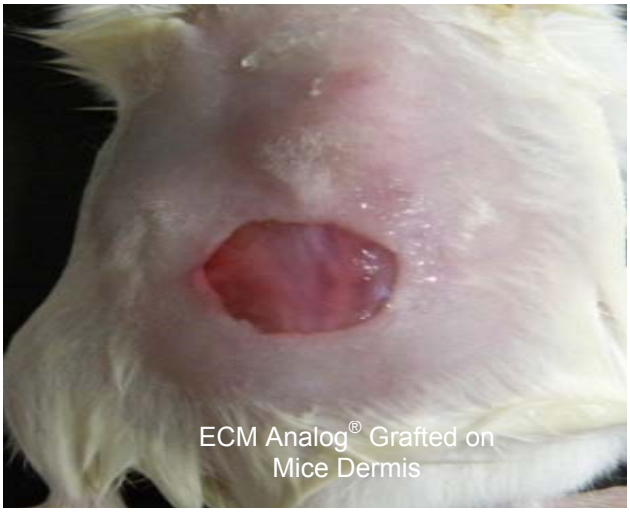
- 3D cell culture for Confocal Microscopy.
- Customizable Extracellular matrix.
- Customizable scaffold features.
- Handling is identical to monolayer culture.
- Cells do not grow as monolayer on scaffold free area.

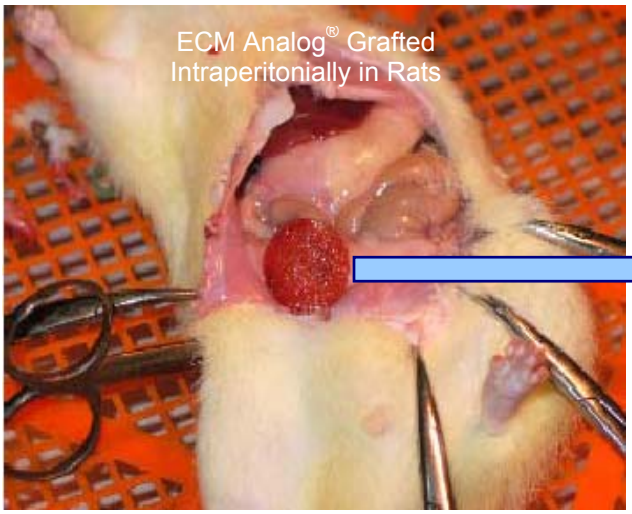
Porous Microcarrier PMc®

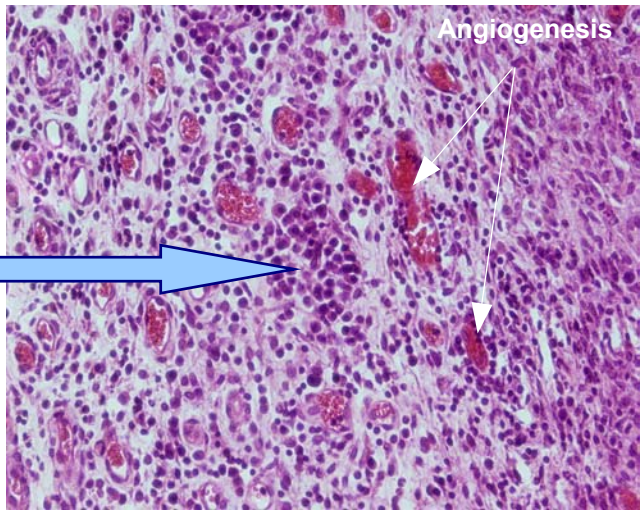


- PMc® is made of extracellular matrix.
- High surface to volume ratio for maximum cell growth/ support.
- High density culture with perfusion.
- Cell harvesting by trypsin in 3 minutes.
- PMc® is transparent for easy microscopic observation.
- PMc® is suitable for primary cell culture in spinner bottles.
- PMc® density can be <1, hence,
- PMc® can float in medium without agitation. Patent

In Vivo Culture Scaffolds







- ECM Analog® disks can be used to graft cultured cells in animals.
- ECM Analog® can be used for cell immobilization during *in vivo* culture.
- ECM Analog® is biodegradable *in vivo* within 6 to 10 weeks.
- Transplanted cells cultured *in vivo* on ECM Analog® scaffold allow eventual retrieval and analysis of grafted cells.
- ECM Analog® allows host cells to infiltrate and interact with grafted cells.

ExCel Matrix Biological Devices P. Ltd.
Hyderabad

3D Cell Culture
Microcarrier Culture
Cell Culture Bio-Assays
ExVivo Organ Model
Tissue Engineering

Three-Dimensional Cell Culture

Expert Opinion

"It's time to move away from technology that predates the past century. Quantitative biology requires *in vitro* culture (3D culture) systems that more authentically represent a cell's environment in a living organism. In doing so, *in vitro* experimentation can truly become more predictive of *in vivo* systems.

(Commentary: "Beyond the Petri dish", Nature Biotechnology, Vol. 22, no. 2, 151-152)

"….3D culture can provide a better model for what happens in the body, it might allow researchers to reduce their use of experimental animals ….3D culture will allow a lot of basic questions to be answered before having to turn to whole animal research"

(*News Features: "Biology's New Dimension" Nature, Vol. 424, 2003, 870-872)*

"... biologists starting to explore the merits of culturing cells in three dimensions...have been stunned by the difference that it makes to the way cells behave that is much closer to their behavior *in vivo*"

(Editors: "Goodbye, Flat Biology?," Nature, Vol. 424, 2003, 861)

"….biologists ….will have to bid the Petri dish farewell in the next decade if they are to continue being taken seriously"

(*Editors: "Goodbye, Flat Biology?" Nature, Vol. 424, 21 2003, 861)*

Awareness of 3D tissue culture among scientists is far too low. But the benefits of the technique are so self-evident that little marketing will be needed to persuade the uninitiated to move up a dimension, just as soon as the issues of convenience are resolved.

(Editors: "Goodbye, Flat Biology?," Nature, Vol. 424, 2003, 861)

"Culturing cells in 3D is neither convenient nor cheap …. But it is only a matter of time before 3D techniques become standardized and cost-benefit ratios become irresistible in many areas of biology"

(*Editors: "Goodbye, Flat Biology?" Nature, Vol. 424, 2003, 861)*