

Kits for cell culture based on hydrogel coatings

CSIC and Complutense University of Madrid have developed new kits for cell culture based on cytocompatible hydrogels coated onto stiff substrates. Due to the excellent adhesion of the hydrogel to these substrates is possible to have mechanically robust platforms, easy to handle as required in a cellular biology laboratory. These new kits have been successfully tested showing an excellent cellular proliferation on the surface of the hydrogel. Besides, this technology allows the detachment of a cell monolayer without the need of chemical or biological agents preserving the viability of cell harvesting.

Industrial partners from the biotechnology with expertise in cell culture are being sought to collaborate through a patent license agreement.

An offer for Patent Licensing

Adhesion to hydrophobic surface without the need of treatments

In cellular biology, traditional methodologies involve the use of aggressive enzymes (most commonly trypsin) or cell scraping. The use of these techniques can damage the harvested cells. The use of thermosensitive systems based on poly-N-isopropylacrylamide (pNIPAm), capable of hosting cells to confluence and subsequent cell sheet detachment, represents a gentler and non-destructive mode of cell harvesting. However, these platforms are difficult to manufacture and economically expensive.

The kits developed by CSIC are obtained in a simple process and consist in a thermosensitive hydrogel (based in vinylcaprolactame) or a non-thermosensitive hydrogel (based in vinylpyrrolidone) beared to a rigid polymer substrate. The polymer substrate can be made of hydrophobic materials such as nylon, polystyrene or polycarbonate without the need of surface treatment. These kits have been successfully tested as support for cell culture (muscular, endothelial, skeletal and neural) allowing cell proliferation and/or differentiation. After hosting cells to confluence, a cell monolayer can be detached and transplanted into another surface.



Top: nylon coated with thermosensitive hydrogel. Bottom: cell monolayer being detached by temperature decrease

Main innovations and advantages

- These kits can be obtained by a simple and industrially scalable method.
- Different types of substrates (e.g. Petri dish or polystyrene multiwell plates) can be used without the need of surface treatments.
- Hydrogel may be dried and rehydrated, which is advantageous in terms of storage under clean conditions and delivery.
- Monolayer cell detachment can be carried out by temperature decrease or by simple mechanical agitation.
- These kits have been successfully tested for common use in cellular biology; however they can be used to manufacture more complex biocompatible constructs by 3D printing or also as thermosensitive mechanical actuators.

Patent Status

Priority patent application with international extension

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