



Biotechnology | Technology Offer

Gentle release of cells from hydrogels using lectins for reversible immobilization

Application area

Cell cultures are playing an increasingly important role in different areas of research, where the focus is on the development of 3D cell culture systems. This requires smooth, quick and gentle immobilization of cells, for example in the 3D cell culture, for 3D pressure (cell-carrying systems), for the cultivation of artificial tissues, for tumor modeling and testing potential substances in immobilized cells. Immobilization of proteins on surfaces is another application area which continues to be of interest. In the medical field, hydrogel systems are used for the treatment of open wounds or the cultivation of stem cells for cancer treatment, for example.

State of the art

Conventional procedures rely on relatively harsh methods for the release of cells from hydrogels, such as temperature increases, the use of UV radiation or enzymes (e.g. proteases). The decomposition of the matrix and enzymatic degradation may result in toxic substances or other unintentional by-products which could damage the cultivated cells or the hydrogel. Another disadvantage of conventional methods is that the separation of the cells from the substrate or their immobilization is very time-consuming.

Innovation

As part of a project funded by the Baden-Württemberg Stiftung, scientists of Ulm University succeeded in developing a method which enables gentle, simple and reversible immobilization of cells and proteins on surfaces with different structures or in macroporous 3D matrices. It has long been known that sugar and sugar-binding molecules play a critical role when it comes to cell adhesion. However, the use of lectin for the functionalization of synthetic substrates for cell adhesion is a modification that has been unknown so far. This innovation describes hydrogels where cells can be separated from or immobilized in a porous 3D matrix in an extremely quick and gentle fashion. This novel and gentle process, which involves the adapter molecule lectin and its sugar-binding properties, requires only a few minutes and does not result in any by-products causing damage to the cells or the active substances. That is what makes the system an interesting solution for research on artificial biological tissues, for basic research on cell systems in their native environment and for flow cell models, for example.

Your advantages at a glance

- ✓ Simple and gentle method for the reversible immobilization or the release of cells and proteins
- ✓ Suitable for surfaces and porous 3D matrices
- ✓ Cells are separated from the substrate within a few minutes or immobilized.
- ✓ No toxic or unwanted by-products that affect the cell system.

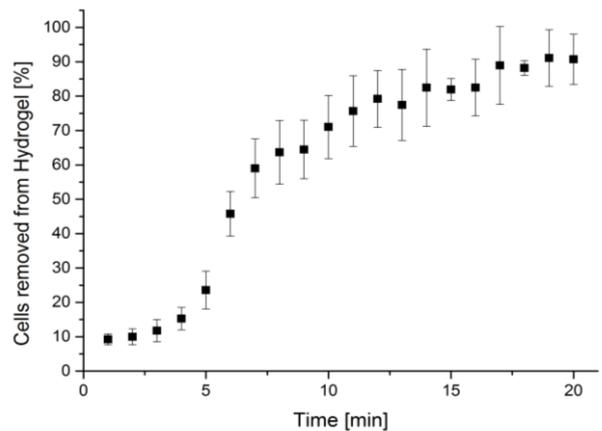


Figure: Release of cells from a hydrogel by means of the present invention over a set period of time.

Technology transfer

Technologie-Lizenz-Büro GmbH is responsible for the exploitation of this technology and assists companies in obtaining licenses.

Patent portfolio

DE and PCT application are pending.

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