

# Durable ECM coating for cell culture through functionalization of extracellular matrix

## Field of application

An extracellular matrix forms the natural environment of cells in biological tissue. It is involved in various cellular processes, for instance signal transmission, reproduction and adherence of the cells to surfaces. The composition of an ECM largely depends on the cell type it was secreted from. These tissue-specific matrices differ in the composition and proportional quantity of their biomolecules. Thus, depending on the origin of an ECM, it can e.g. either promote or maintain the differentiation of stem cells. This makes it an interesting potential candidate for use in special cell cultures.

The *clickECM* coating according to the invention allows for the simple production of a stable and application-oriented substrate, consisting of functionalized ECM, e.g. for cell culture vessels.

## State of the art

Conventional cell culture dishes are made of polystyrene and undergo plasma treatment to promote cell adhesion and growth. For primary cell growth, ECM proteins are normally physisorbed on the surface, supported by previous plasma technology, if required. Methods for equipping surfaces with proteins via covalent bonds are used in current state-of-the art, but are not suitable for a coating with complex matrices. So far, coatings with complex ECM have only been performed via physisorption. Although the results obtained confirm the high biological activity of the ECM, the technology can only be used with certain materials. A particular disadvantage of such applied ECM coatings is their lack of stability, as the biomolecules only adhere to the surface via physisorption. These coatings can be washed off the substrate quickly and easily or might dissolve in other ways.

## Innovation

Until now it was very difficult to coat an artificial material with the components of the extracellular matrix. In the invention, a small, non-toxic reactive molecule is incorporated into the extracellular matrix. This enables the biological extracellular matrix to be bonded chemically to the surface of the cell culture dish. The coating process according to the invention not only promotes adhesion of the cells, but also strengthens cell growth. The *clickECM* only distinguishes itself from a natural ECM through its functional groups. With the help of the click-groups introduced, the *clickECM* can be stably and site-specifically immobilized on the surface of the likewise functionalized carrier. The fixed bonding obtained through the click reaction also ensures that the *clickECM* coating withstands extensive washing. A main advantage of *clickECM* is that it can be used to coat various new, innovative materials.

## Your benefits at a glance

- ✓ Coating with complex ECM possible
- ✓ High stability of coating
- ✓ Strong adhesion to various materials
- ✓ Increased cell growth
- ✓ Cost-effective production, as there is no elaborate purification, isolation or sterilization required



Figure 1: In-vitro production of the *clickECM*

## Technology transfer

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

## Patent portfolio

German patent application and PCT application pending.

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