

Chamber device for dynamic cell culture on biomaterials

Experimental system designed for culturing cells on biomaterials under controlled fluid flow, mimicking the physiological environment. The system consists of a device that allows culturing adherent cells on 2D or 3D material samples under dynamic conditions.

Description and essential characteristics

The chamber device has been specially designed for culturing cells on biomaterial samples under flow conditions in a perfusion bioreactor. It comprises an inner vessel that allows the immobilization of 2D and 3D material samples with different physical, chemical and mechanical properties, on which surface adherent cells are seeded. Cells incubated into the chamber are subjected to tangential forces, caused by the fluid flow, which mimic physiological mechanical stimuli.

The cell culture chamber is composed of a base (1) containing a channel (2), through which the fluid passes to perform the incubation in perfusion, which has a set of wells (3) where the biomaterial samples are placed. The chamber has a top cover (6) where there is a fluid inlet (7) and outlet. When the fluid passage is opened, fluid passes through the channel, filling the chamber and bathing the samples in the wells.

The base and top cover are complementary and linked to each other by mean of several attachment points, which allow fixing their relative positions and ensuring the tightness of the chamber closure. The closure of the chamber occurs when the base and the top cover are in contact and their positions are fixed by attachment points. When the chamber is closed, the fluid inlet and outlet from the top cover are connected to the base channel.

Competitive advantages

The primary advantage of this chamber is it allows the culture of cells under perfusion conditions on a broad range of materials with various physical and chemical properties, geometries and thicknesses, including bulk and porous materials. This feature represents a significant improvement over commercially available experimental systems, which only allow the culture of cells on the materials from which the devices are manufactured and not on material samples provided by the user.

The chamber device has been specially designed to be used in a perfusion bioreactor, thereby allowing the study of the effect of different fluid flow rates on the behaviour of cells cultured on biomaterial samples.

The chamber is made of a transparent material that allows non-invasive monitoring of living cells by microscopy

techniques. Furthermore, the chamber is hermetically sealed, thereby maintaining sterile conditions.

Type of collaboration sought

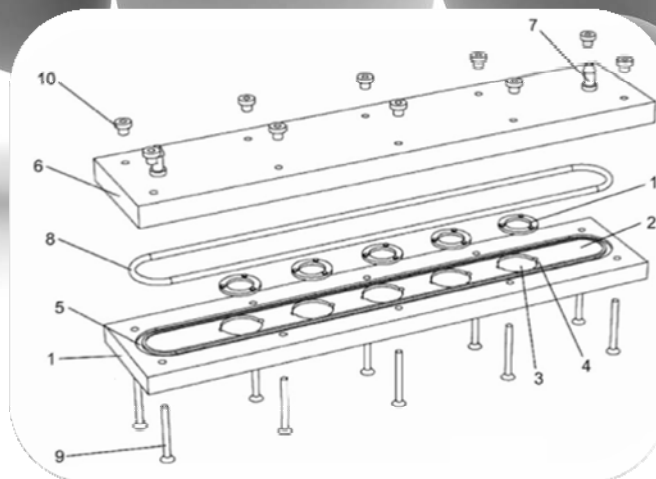
Cooperation is sought with any Party interested in partnering, licensing or investing in the technology, whether it be an investor to fund the project, a partner interested in getting involved in any of the various phases until its placement on the market, a patent licensee, etc. Organisations potentially interested in this technology are those devoted to the manufacture, commercialisation and/or distribution of biomedical devices and implants; as well as universities, hospitals, research centres and all types of institutions interested in biomaterials for manufacturing implants, biomedical devices, etc.

Current stage of development

R&D Phase

Current state of intellectual property

Spanish patent P201330040, granted in September 2015.
 International patent application PCT/ES2013/070819.



Representative chamber device for dynamic cell culture on biomaterial samples

For further information, please contact

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