



Scientific/Technical offer to licensing

Ref. OTRI

200904R-Celda, B.

Knowledge area

Image Analysis

Cellular metabolism

Collaboration

Technology available to licensing

Other collaborations may be considered

Micro-chamber device for cellular culture monitoring by nuclear magnetic resonance

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Abstract: The present invention comprises a micro-chamber device for cell culture allowing longitudinal long-term monitoring of the cellular system by nuclear magnetic resonance (NMR) and other image techniques. Image analysis and metabolic studies can be performed. Effect of active agents, such as drugs, nanoparticles or biological factors, can be assessed. By using it, a better knowledge of physiological and pathological conditions will be acquired, helping for diagnosis and therapy.

The invention: The object of this invention is a compact (encapsulated) micro-chamber for longitudinal long-term studies of cellular systems by means of nuclear magnetic resonance (NMR). It can be placed in commercially available NMR equipment. It is made with biocompatible and transparent materials, which allows complementary microscopy monitoring, using equipment for other microscopic techniques. It has been designed as a device for an easy use, not requiring laborious manipulation. Image analysis and metabolic studies of different cellular systems, such as stem cells, neurospheres, tumoral cells, cells from the nervous system, etc., can be carried out, using the appropriate conditions for each type of cell. Different channels are built and used for the independent insertion of cells, culture medium, and several sensors to control physical-chemical properties, such as pH, pO₂, pCO₂, pNO, or pSH₂. A uniform distribution of cells is achieved by a diffusion system.

Applications: Image analysis of cells, metabolic studies of cellular systems by means of NMR, assessment of the effect of active agents (such as drugs, trophic factors, nanoparticles or toxics), diagnosis, therapeutic studies and follow-up of treatments.

Advantages: The main advantages of the invention are:

- Biocompatible material: longitudinal long-term studies of cell cultures
- Encapsulated, compact, micro-chamber: appropriate design and size for NMR equipment commercially available
- Transparent material: simultaneously useful for other microscopic technique
- Different channels for the entrance of cells and culture media: good control of the cell number and density, independently of the media flow
- Diffusion system: uniform distribution of cells
- Control of physico-chemical properties of the culture by optic fibre sensors for pH, pO₂, pCO₂, pNO, or pSH₂
- Maintenance of the study optimum conditions
- High resolution
- Easily handle by users

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