Culture of highly differentiated mammalian cells

SENIOR SCIENTISTS:
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Research Field and Subjects

The research covers different areas of basic cell biology and applications.

A first research team examines control mechanisms of the endocrine pancreas development, both in vivo and by using varied systems of in vitro culture. Factors modulating the proliferation and differentiation of endocrine cells, as well as their sensitivity to diabetogenic insults are analysed.

The culture systems consists in isolated islets of Langerhans, islets neoformed in culture from dispersed cell suspensions, and islet formed in tri-dimensional reconstituted extracellular matrix. Methods are available for rodent and porcine endocrine cells, which may also provide material for transplantation. Molecules like antioxidants, specific amino acids, metals, immunological modulators,… are assayed to improve insulin cell regeneration and decrease susceptibility to diabetes.

A second research team examines control mechanisms of fat cell development in rodent and pig. In addition to in vivo evaluation of adipose tissue cellularity and function, the study involves cultures of fat cell precursors which are induced to proliferate and differentiate into adipocytes. Factors modulating these events involved in hyperplastic and hypertrophic obesity may be tested in these systems.

A third research team analyses mechanisms of early atherogenesis, by means of in vitro models of the blood vessel wall. Endothelial and smooth muscle cells are cultivated on the two sides of a microporous membrane, and may interact with blood cells added in the blood compartment of the co-culture system. The alteration in proliferation of endothelium and myocytes, the phenotypic modulation of smooth muscle cells, the invasion by monocytes, the effects of lipoproteins at different degrees of oxidation are events involved in atherogenesis, which may be evaluated with high precision in this model.

Our co-culture system based originally on porcine has evolved to the use of human cells, in order to provide an easier tool for testing antiatherogenic products, vasoactive and thromboactive substances.

Products and Services

- Culture systems for endocrine pancreatic cells
- Production of islet cells
- Cultures of fat cells and their precursors
- Cultures and co-cultures of cells in the vascular wall
- In vitro analysis of toxicity

Main Equipment

- All types of microscopy, including immuno-cytochemistry, electron microscopy, confocal laser scanning microscopy, etc.
- Image analysis
- Cell culture facilities
- Equipment for biochemical analysis, molecular biology
- HPLC, photometry, isotope counting

Representative references


Partnership

Member of Institut des Sciences de la Vie (ISV), Louvain-la-Neuve, Belgium

STAFF

Total: 15

KEY WORDS FOR R&D

atherosclerosis
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fat cells
myocytes
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