GENE REGULATION AND MOLECULAR THERAPIES LABORATORY

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Major position/appointments and professional training

- Scientific researcher I in ICBP (since 2014)
- Member of the Scientific Council of ICBP
- Member of the Doctoral School of the University of Bucharest
- Member of the Romanian Society for Cell Biology
- Visiting scientist: University of Lausanne, Switzerland (1997-1998), University of Crete Medical School, Greece (2002-2007), University of Debrecen, Hungary (2007), University of Patra, Greece (2008)

MAJOR RESEARCH INTERESTS

- **Gene expression and gene regulation**
- **Cellular and molecular therapies for non-communicable diseases**

TECHNICAL EXPERTISE:

Molecular biology (PCR, RT-PCR, and Real Time PCR, cloning, sequencing, ChIP, 3C, transfection), biochemical assay (protein and nucleic acid assays, enzymatic activity, electrophoresis, chromatography, Western Blot, ELISA, etc.), adenoviral and lentiviral transduction, cell culture (primary, cell lines, mesenchymal stromal cells), optic and fluorescence microscopy, radiolabelling, flow cytometry, animal experimentation (treatment, surgery, transgenic mice, etc.), computer operating skills.

PUBLICATIONS

30 original ISI scientific articles (Scopus, > 850 citations), 9 articles in other databases, one book chapter.

- **Isolation, characterization and immortalization of endothelial cells**
- **Plasmalemmal domains of endothelial cells**
- **Receptors involved in endocytosis and transcytosis**

Work in collaboration with Dr. Constantina Heltianu (former head of Radioizotopes laboratory), Dr. Felicia Antohe, Dr. Victor Jinga, Alexandrina Burlacu, Mihaela Stanescu, Geo Serban and Mircia Toderici.

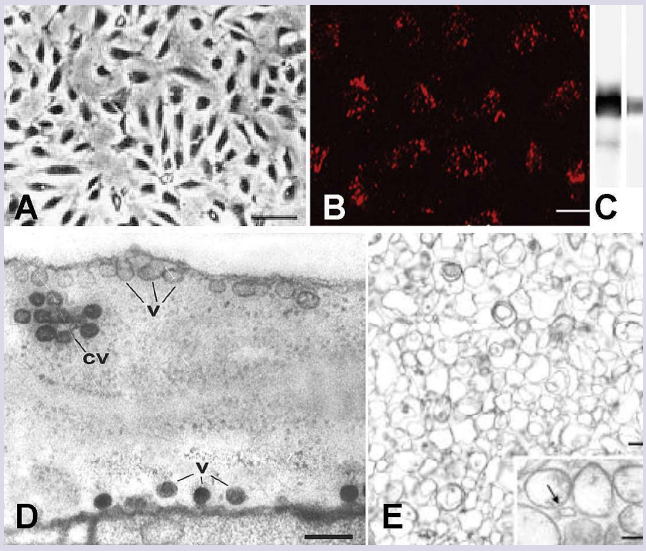
A human placental endothelial cell (EC) line was established and characterized for the cell morphology and for the expression of different markers (Jinga et al., 2000). Placental EC were immortalized by transfection with a plasmid encoding SV 40 large T antigen (Gafencu et al., 2001). This cell line was used for the characterization of the immunoglobulin G (IgG) receptors that play an important role in the transfer of antibodies from the mother to the foetus. IgG receptors expressed by the human placental EC were determined and IgG binding and internalization in these cells was characterized. The results obtained in this project showed that, beside neonatal Fc receptor (FcRn), a novel receptor for IgG is responsible for the IgG transfer from the mother to the foetus (Antohe et al., 2001; Gafencu et al., 2003). Data obtained showed the distribution of this receptor in the EC as well as some of its biochemical features. These data led to a new concept for the

maternal/foetal transfer of the antibody.

Different microdomains were isolated from a highly purified endothelial cells (EC) apical membrane fraction and identified by their protein markers. The caveolar membrane fraction was morphologically and biochemically characterized (electron microscopy -EM, protein and lipid assays). The results obtained revealed the distribution of different proteins and fatty acids between caveolar and non-caveolar domains(Gafencu et al., 1998).

The intracellular route of transferrin receptor (TfR) in EC was studied in cells transfected with a plasmid encoding TfR linked to HRP, as a reporter; by EM, TfRs were found in various intracellular structures (Heltianu et al., 1997).

The placental endothelial cell line obtained represents an important tool for the study of trans-endothelial transport of different molecules (drugs, anaesthetics, proteins, etc), which is a very important process that confers selectivity of the trans-placental transfer (Simionescu et al., 2002).



Transcytosis of IgG through placental endothelial cells. *(A). Primary culture of human placental endothelial cells (HPEC). (B) IgG endocytosis by HPEC, (C) Identification of a novel IgG receptor and FcRn in HPEC. (D) Electron micrography of IgG transcytosis through HPEC (E) Caveolae isolated from endothelial cells.*