

Procedures to analyze the effects of drugs/active molecules on primary human endothelial cells

Study of the effects of drugs/active molecules on endothelial cells

INFLAMMATION

DRUG/ACTIVE MOLECULE

ENDOTHELIAL CELLS

CYTOTOXICITY

Assessment of in vitro effects of drugs, active ingredients and neo-synthesis molecules on primary cultures of human endothelial cells (Human Umbilical Vein Endothelial Cells and adult Vein Endothelial Cells) through monitoring i) cellular proliferation/migration, ii) eventual cytotoxic effects or iii) protective/therapeutic results in course of inflammation. The assays developed by LTTA exploit new technologies that allow reliable and reproducible results in short term, saving materials and reducing analysis time compared to conventional methods. Especially interesting for Companies that produce drugs or active compounds whose possible role in vascular physio-pathology needs to be studied and for preclinical studies of pharmaceuticals or medical devices in the early stages of development.

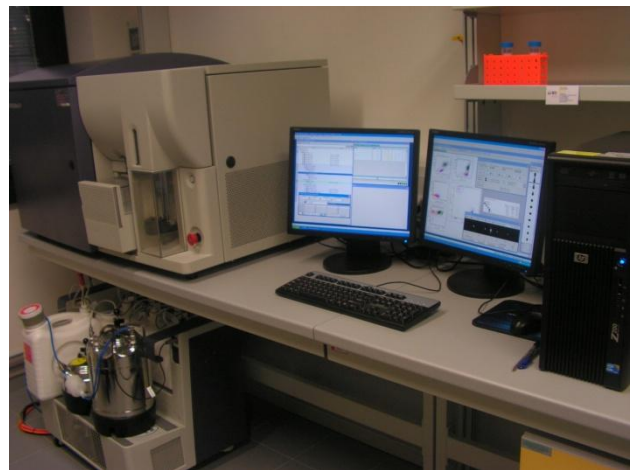
Application fields

Basic pharmaceutical products and pharmaceutical preparations

Platform

Life Sciences

Cell sorter for endothelial cells purification and characterization



LTTA Laboratory

Contacts

Rebecca Voltan - rebecca.voltan@unife.it
Elisabetta Melloni - elisabetta.melloni@unife.it
Paola Secchiero - paola.secchiero@unife.it

LTTA



Laboratorio per le Tecnologie
delle Terapie Avanzate

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PRODUCT DESCRIPTION

Endothelial cells are available at the Laboratory thanks to cell purification from venous explants and subsequent cellular expansion, the phenotypic characterization and the cryo-preservation methods carried out jointly by LTTA's Biobank and Cytofluorometry/Cell sorting Services. Since these cells in vivo line the internal walls of vessels and perform a range of physiological tasks (e.g. controlling blood coagulation and inflammation status), they represent the ideal in vitro model to study new pharmaceuticals/molecules/active principles with potential therapeutic or toxic effects in vascular physio-pathology. The procedures developed by the Laboratory make it possible to monitor cellular proliferation and migration in response to treatments with the molecules being analyzed, to assess their cytotoxic effects or, on the contrary, their protective/therapeutic effects following inflammatory states induced in vitro.

INNOVATIVE ASPECTS

The assays developed by LTTA exploit new technologies that allow reliable and reproducible results in short term, saving materials and reducing analysis time compared to conventional methods. Specifically, continuous monitoring of cellular activity and kinetics is available through the analysis of electrical impedance variation, by which any change in the cellular status is measured in real time as Cell Index. Moreover, the Laboratory takes advantage of the Luminex technology for the analysis of panels of cytokines/chemokines or other biomarkers, simultaneously analyzing dozens of molecules in small volumes. Furthermore, state-of-the-art cytometers and cell sorters allow a fine analysis of the purified cells and their monitoring in vitro, using multi-parametric analyses of surface and intracellular markers.

POTENTIAL APPLICATIONS

Since the system is highly versatile, it offers the possibility to analyze any molecule with potential effects on the human endothelium. This may be especially interesting for Companies that produce pharmaceuticals or active compounds whose possible role in vascular physio-pathology needs to be analyzed, but also to study pharmaceuticals or medical devices in the early stages of development whose potential cytotoxic effects need to be assessed.



One of the laboratories for the purification of primary cells

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APPLICATION EXAMPLE

Assessment of the potential anti-inflammatory effects of two active ingredients

DESCRIPTION OF THE APPLICATION

To assess the potential anti-inflammatory effects of two active molecules, primary endothelial cells of pathological origin were purified and used for in vitro assays. After proving that these cells release in vitro a high number of inflammatory cytokines, also present in patients' plasma, and therefore are an excellent working model, the cellular cultures were treated with the individual compounds or their combinations in order to assay their potential therapeutic effect. The data were obtained through the analysis of the effects obtained from cellular proliferation, modulation of surface inflammation markers, cytokine/chemokine release and the activity of intracellular proteins involved in specific signal transduction pathways.

INVOLVED PARTNERS

Laborest
University Hospital of Ferrara

IMPLEMENTATION TIMES

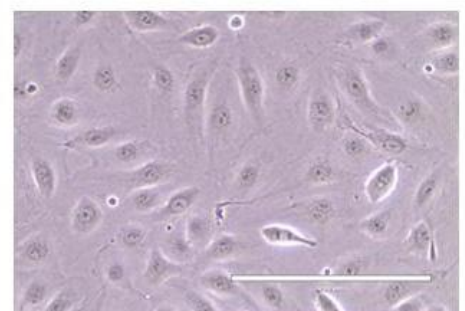
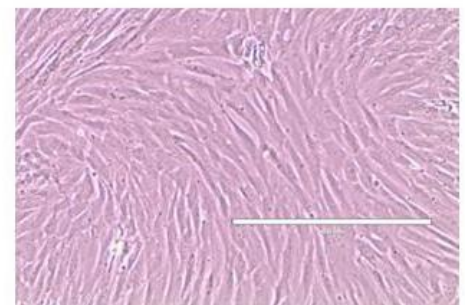
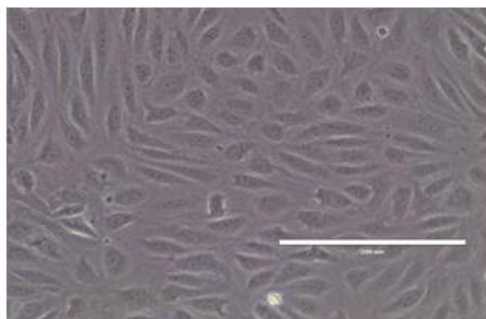
12 MAN MONTHS

12 MAN MONTHS

The data have proved that the two compounds are able to significantly reduce the basal release of several inflammatory cytokines. Furthermore, it was possible to identify the intracellular pathway involved in the pharmacological action for each compound.

EXPLOITATION

The value of the Service was enhanced by LTTA users' loyalty and by publishing an article on a scientific journal of international importance. To further enhance the value of the Product/Service, the Laboratory seeks to expand its network of contacts with other pharmaceutical and biomedical Companies, as well as with other emerging concerns connected to the production of homoeopathic and phyto-therapeutic remedies.



Cultures of purified primary cells from the Biobank Service



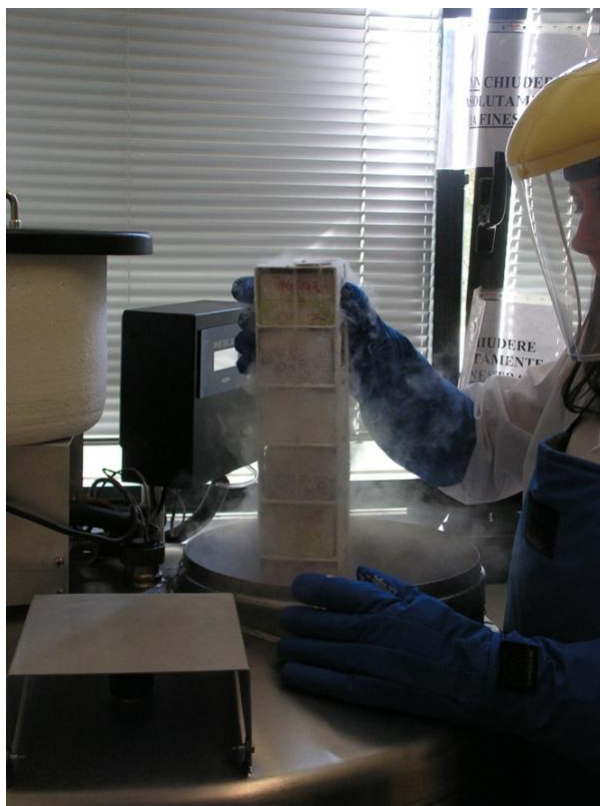
DESCRIPTION OF THE LABORATORY

LT TA is based on the coordinated activities of laboratories with complementary skills and strongly focused on innovation and technological transfer in the field of Life Sciences and Health Technology. LT TA mainly deals with primary human cells to study - for application purposes - mechanisms of tissue differentiation and regeneration and perform genomic and proteomic analyses in high-impact care diseases. "Preclinical testing" on in vitro and in vivo systems stand out among LT TA's most significant activities. LT TA makes use of 7 highly qualified Services (Animal facility, Biobank, Bioinformatics, Cytofluorometry/cell sorting, Molecular interactions, biomarkers and delivery, Advanced Microscopy, Clinical Research) which, by using modern methodologies and instrumentation, interact with Companies mainly in the biomedical-biotechnological, pharmaceuticals and hospital sectors.

REFERENCES

University Hospital of Ferrara
Molise University
IRCCS Burlo Garofolo of Trieste
Cremona Hospital
Udine Hospital
Laborest Italia SpA
Gemib Srl
Alfa-Omega Srl
Chiesi Farmaceutici SpA
Remembrane Srl
Sorin Group

**Cell
cryopreservation in
nitrogen vapour at
the Biobank
Service**



<http://lta.tecnopoloferrara.it/>

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