



ASSAY SYSTEM FOR ISOLATION OF BIOMARKERS IN ARTERIOSCLEROSIS / DENTAL PLAQUE

The emergence of arteriosclerosis is closely associated with defined flow conditions within the vascular system. During the process of atherogenesis, the flow profile influencing the endothelial cells plays a critical role. With the aid of the BioTech-Flow-System (BTF) it is possible to simulate *in vitro* the *in vivo* predominant flow conditions which are very close to reality. These flow conditions can lead to multiple changes within the cells (e. g. alterations in mRNA expression, protein expression and composition of the cell membrane), which may constitute possible points of eventual therapy for arteriosclerosis.

Human or animal cells (e. g. endothelial cells) can be exposed to very clearly defined flow profiles with the help of BTF. It is therefore possible to identify the target genes and signal transduction pathways in cells, which primarily contribute to the emergence of "arteriosclerosis-endangered" endothelial phenotypes.

Unique Feature

The BTF system is based on flow generation with the cone-plate-method. This specifically constructed system is uniquely designed. Through the cone-geometry, the system is capable to generate an array of flow profiles, and therefore can simulate *in vivo* conditions precisely. The BTF system represents a level of technology which allows examination of flow-induced cell differentiation, in various cell types including endothelial cells, tumor cells and stem cells.

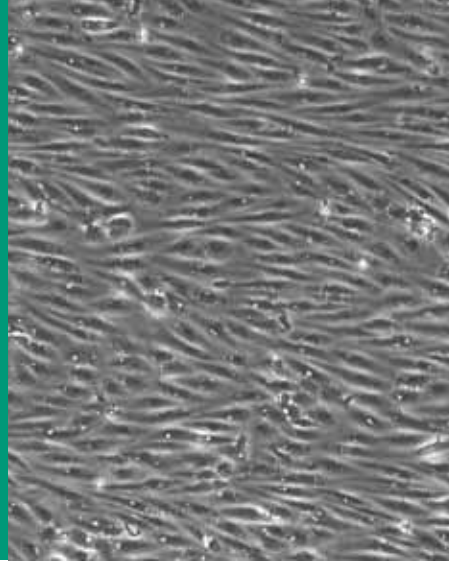
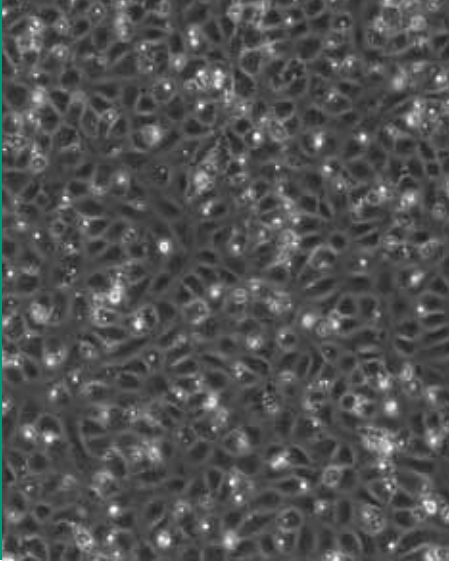
Fraunhofer Institute for Cell Therapy and Immunology IZI

Perlickstraße 1
04103 Leipzig
Germany

Contact

Dr. Andreas Schubert
Department of Immunology
Vascular Biology Unit
Phone +49 341 35536-5105
andreas.schubert@izi.fraunhofer.de

www.izi.fraunhofer.de



A significant advantage of the BTF system in comparison to other flow systems is that the cells can be continuously observed with the microscope during flow application.

Methods

The cells under investigation will be cultivated on a substrate and upon reaching a confluency of approximately 70 percent they are exposed to a defined flow profile. Subsequently, the preparation of RNA, proteins or membrane is carried out for further analysis. Additionally, immunohistochemical investigations of the cells can be carried out on the substrate.

Selected Applications

Using the flow equipment, anti-arteriosclerotic substances and drugs can be tested on endothelial cultures under defined flow conditions. Furthermore, RNA, membrane fractions and proteins can be assayed under specific flow conditions.

Reference Project

Under application of the BTF system several genes, which had been selectively activated through a pro-atherogene flow profile have already been identified. Furthermore, the promoter sequences of those genes have been more accurately analyzed. In the process transcription factor binding-sites have been identified, through which the gene activation may take place.