Flow Cytometry Resource Group (A0102)

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Flow and image cytometry are two major approaches to analytical cytology, which has been defined as the measurement and characterization of cells and cellular constituents for biological and medical purposes.

The flow cytometry lab is multidisciplinary and provides superb resources, both personnel and equipment, in quantitative cytchemistry, cytophysics, cell biology, fluorescence microscopy, electronic and mechanical engineering, computation and statistics, and cell culture work.

Major activities of the group have been devoted to:
- service measurements, instruction, education, and advice on a routine basis;
- collaborations with scientific merit;
- instrumentation development with special emphasis on personal computer data processing and analysis;
- organization of the annual Heidelberg Cytometry Symposium.

In detail, analytical duties referred to:
- analysis of cell cycle phases and degree of culture synchrony
- analysis of apoptosis combined with cell cycle phase distribution
- analysis of DNA index and degree of polyploidization
- analysis and electronic sorting of cells
- live-dead cell discrimination combined with estimation of cell cycle phases
- laser beam irradiation of cells incubated with photosensitive agents
- quantitation of immunofluorescence (cell phenotyping)

We made progressive development and expanding an 80386 and higher processor environment based on MS-DOS, the C programming language and some FORTRAN routines.

So, the flow cytometric data processing system is extremely versatile, user friendly, and user programmable. The current achievement comprises a complete 4-parameter system for acquisition, real-time display, storage, retrieval, analysis, and documentation of cytometric data.

Additionally, a foreign file handler has been developed and established to read cytometric data files from instruments of various manufacturers and convert the data to be read from text and graphic processing programs under windows 3.xx and higher.

Thus, flow cytometric data can be integrated into text processing routines as doc, bmp, pcx, tif or other file formats. These facilities provide access to cytometry instrumentation, are operative on a service basis, supply instructions for independent and easy use of cytometry equipment and to all conflicts and questions of cytometry in general, and are intended to develop new techniques and expand the area of cytometry applications in biomedical research at DKFZ.

Cooperations:
Short term collaborations are the mayor demand to be fulfilled for various research groups in the DKFZ in order to standardize the setup and follow-up of their experiments by cytometric parameters (cell cycle phase situation and/or apoptosis, expression of immunological markers).

Long term collaborations:
1. Principal investigator: Ingrid Grummt, DKFZ
Application of electronic cell sorting to enrich mamalian nucleoli for the detection and isolation of nucleolar proteins.
2. Principal investigator: Jörg Langowski, DKFZ
Cell cycle and apoptosis analyses to study the chromatin distribution and dynamics resulting from cell cycle position, treatment by chemicals or radiation in vivo.
3. SFB 405:
Utilization of the expertise and personnel of the cytometry group at the DKFZ to build up, manage, and operate a cell sorting unit in the priority program 405 (Immune Tolerance and its Disorders) of the DFG (German Research Foundation).

Publications (bold = group members, * = external co-author)

Patents: