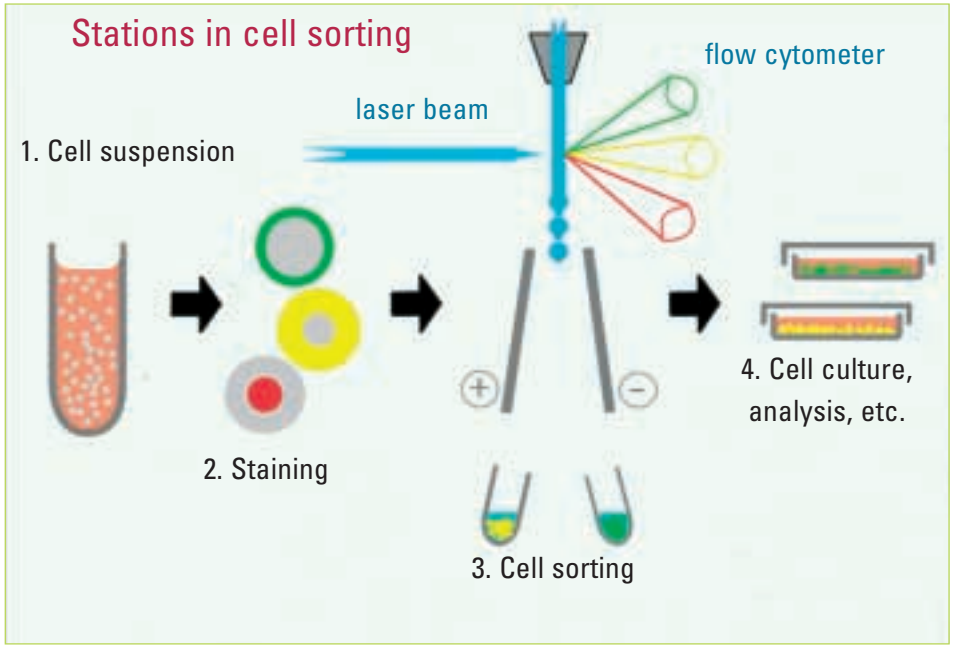
Technology and Know-How for All
The Immune Monitoring Platform of the GSF

Using the latest technologies immune responses of patients treated in clinical studies can be monitored reliably today. In 2004 the GSF Institutes of Molecular Immunology and of Molecular Virology together established an Immune Monitoring Platform for this purpose, which is now open to all Clinical Cooperation Groups of the GSF as well as external clinical partners.

The growing knowledge of the role of the immune system in the development of malignant and infectious diseases has resulted in new approaches to their treatment. Thus, it is hoped today that immunotherapies will soon be able to mobilize the endogenous defense system specifically against viruses and tumor cells. More than half of the Clinical Cooperation Groups established by the GSF focus on this field of research. Their common aim is to develop new immunotherapies and to implement them in clinical applications as well as to identify and quantify immune reactions in patients in clinical studies.

Cell sorting at the Immune Monitoring Platform of the GSF:
Cells which were previously marked with fluorescent dyes are sorted in the cell sorter (photo above) using a breaking jet of liquid. The sorted cells are now available for further experiments or measurements.



For the exact monitoring of these immune responses the GSF created its own immune monitoring platform near the clinics in 2004. Not only do colleagues from the clinic get access to the latest and most powerful technologies. They also always have highly specialized experts by their side, who develop with them tailor-made monitoring processes for their clinical studies.

Method of Choice for Any Requirement

Normally one single diagnostic method is not sufficient to cover the manifold consequences of different therapeutic modulations of the immune system. For what is so special about these treatments is that they are individually adapted to each patient. "We actually need a whole armory of methods from which we choose the methods suitable for each individual case," Prof. Dolores Schendel, Director of the GSF Institute of Molecular Immunology and head of the Immune Monitoring Platform, explains.

On the one hand, established methods are available, on the other hand these methods are continuously developed further and improved. "If, for example, we do not know the antigens in a therapy study, we use T-cell tests, cytokine measurements in the micromilieu and PCR analyses to monitor the course of the immune response," Schendel explains. If, however, the immunogenic antigens have already been defined, but the individual MHC restriction elements are unknown, other procedures are required. And finally: if the specific epitopes and MHC restriction elements are already known, fluorescence-marked MHC peptide complexes are used as markers for monitoring.

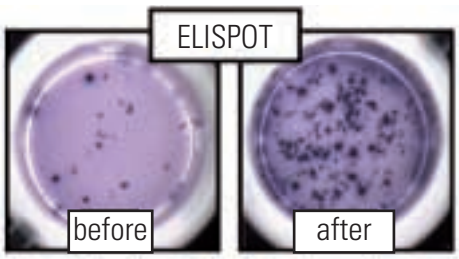
External Clinical Partners Also Benefit

The group around Schendel is an important part of the whole platform technology for translational medicine: a core unit of qualified scientists and technical staff standardizes and validates many different immune monitoring tests, thereby ensuring that the clinical partners can use the latest technologies without having to establish many complicated methods themselves. Of course, this applies not only to the GSF's own Clinical Cooperation Groups, but also to external cooperation partners: the Institute of Medical Microbiology, Immunology and Hygiene of the Technical University of Munich as well as the Laboratory of Tumor Immunology of the Urological Clinic of the Klinikum Großhadern of the Ludwig-Maximilians-University Munich have long been on board.

Apart from providing support for clinical studies, the scientists at the Immune Monitoring Platform also conduct fundamental research, which makes valuable contributions to the basic understanding of the cellular and molecular regulation of the human immune response.

Monitoring method on the GSF platform

- Sterile cell sorting
- T-cell receptor analyses
- Multiparameter cytometry
- Analysis of the T-cell receptor reservoir
- Test for special cell populations by antibody staining
- Typification of cytokines and human leukocyte antigens
- ELISPOT quantification of the immune response of specific T lymphocytes using their cytokine production
- Imaging for live cells



Immune Monitoring
Using ELISPOT and their cytokine production the immune response of specific T-lymphocytes is quantified: a color reaction makes the activated lymphocytes (spots) visible (picture on the right), their number is a measure for the reactivity of the immune system and, thus, allows a standardized assessment of the immune reaction during the course of the therapy.

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