Report of the Sysmex Scientific Seminar 2006

— The 29th Sysmex Hematology Seminar —

On 17th June, 2006, "The 29th Sysmex hematology seminar" was held in Tokyo.

This seminar has been held each year since 1978 and has a good reputation as the seminar that provides the latest information in hematology. In recent years, the seminar was held at multi-sites by live telecast using satellite. About 1000 people attend the seminar every year.

This year we had four domestic sites at Sendai, Nagoya, Kobe, and Fukuoka. In addition, the seminar was transmitted to Sydney, Australia with simultaneous interpretation.

It was widely attended by medical technologists, hematologists and clinicians. In addition, customers from Hong Kong attended the Tokyo site and enjoyed the seminar through the simultaneous interpreter earphone.

The theme of the 29th Sysmex Hematology Seminar was "Exploring Blood Diseases from Immunity". In the words of the chairperson, "It would not be proper for persons like us, who are engaged in diagnosis, treatment, education and research concerning blood diseases that often accompany immunopathogenesis, to remain indifferent to recent trends in immunology under the excuse that the subject is very complex." The audience listened diligently to lectures given by four authorities in the field and asked questions. The topics and outline of the seminar were as follows.

The 29th Sysmex Hematology Seminar

Date:	2006/06/17(SAT)
Place:	Tokyo(main)
	Sendai, Nagoya, Kobe, Fukuoka, and Sydney (satellite)
Chair in Tokyo:	Dr. Sigetaka ASANO, M.D., Ph.D.
	Professor of School of Science and
	Engineering, Waseda University, Japan
Local Chair in Kobe:	Dr. Takashi UCHIYAMA, M.D., Ph.D.
	Professor of Department of Hematology/
	Oncology Graduate School of Medicine
	Kyoto University, Japan

*We will publish full texts as the supplement of Sysmex Journal International later.

Immunobiology of Dendritic Cells and Their Application to Immunotherapy

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Dendritic cells (DCs) are the most potent antigen-presenting cells, and thus play a pivotal role in regulating antigen-specific adaptive immune responses. DCs are composed of two subsets: myeloid DCs (mDCs) and plasmacytoid DCs (pDCs). These two subsets of DCs express different combinations of Toll-like receptors, and produce different cytokines in response to pathogens during innate immune responses. Thereafter, the DC subsets induce different types of T cells responses, such as Th1, Th2, and regulatory T cell responses, depending on the type of stimuli they receive. DCs thus perform immunostimulatory as well as immunoregulatory functions as a result of the interaction with different types of environmental factors. Such versatility of DCs and their central role in the immune system can be exploited to develop novel immunotherapies for cancer, infection, allergy, autoimmune diseases, and allogeneic reaction in transplantation.

Pathogenesis of Autoimmune Diseases and Autoreactive T Cells

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Pathogenic autoimmune response targets various tissue-specific antigens, such as platelet surface glycoproteins in patients with immune thrombocytopenic purpura. Autoreactive T cells are thought to play a primary role in autoimmune pathogenesis, but little evidence has been shown in human autoimmune diseases. Recent accumulating findings indicate that autoreactive T cells are a component of normal T-cell repertoire, but are clonally expanded exclusively in patients with autoimmune diseases. Autoreactive $CD4^+$ T cells are considered pathogenic because they help B cells produce autoantibodies with pathogenic activity by exerting cytokine production and expression of co-stimulatory molecules. On the other hand, autoreactive $CD8^+$ cytotoxic T cells are also involved in the pathogenic process by targeting a self-antigen selectively expressed in the affected tissues. These autoreactive T cells are preferential targets for future immunotherapy.

Cellular Immunotherapy for Leukemia

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Recent findings from basic researches and clinical observations have revealed that the effectiveness of chemotherapy against leukemia is limited and the immunosurveillance system is important to achieve cure of hematological malignancies. Cytotoxic T lymphocytes (CTL) undoubtedly play an important role in resistance to cancers, including various types of hematopoietic malignancy. To develop effective cellular immunotherapy of hematopoietic malignancy, the tumor-associated antigens that are recognized by CTL must be identified. Recently, various leukaemia-associated antigens that are recognized by CTL in the context of HLA class I molecules have been identified. These include fusion gene products such as BCR-ABL and ETV6-AML1, proteinase 3, Wilms' tumour gene product (WT1), human telomerase reverse transcriptase, cyclophilin B, and PRAME. In addition, various target antigens associated with other hematopoietic malignancies have been also identified. On the basis of these findings, various clinical trials of immunotherapy against hematological malignancies, including peptide vaccination, DC therapy, adoptive transfer of CTL have been ongoing. Here, the current status and future feasibility of cellular immunotherapy against hematological malignancies are discussed.

Allogeneic Immune Reaction in Hematopoietic Stem Cell Transplantation -Graft-Versus-Host Disease-

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Graft-versus-host disease (GVHD) and rejection have been the primary limitation to the wider application of allogeneic hematopoietic stem cell transplantation (HSCT). GVHD occurs when donor T cells react to host antigens on antigen presenting cells and attack host tissues. Long-term outcomes are adversely affected by chronic GVHD, which has distinctive clinical and pathologic manifestations that mimic autoimmune disease. These processes also produce a beneficial graft-versus-leukemia effect.