Report of the Sysmex Scientific Seminar 2008

— The 31st Sysmex Scientific Seminar, Japan —

On 5th July, we, Sysmex Corporation, held "the 31st Sysmex Scientific Seminar" in Kobe and Tokyo, as a part of celebratory events for Sysmex 40th anniversary. What is the Sysmex Scientific Seminar? Here is a brief introduction.

Sysmex has established a long history of providing scientific and educational information in Hematology. As of 2007, the Sysmex Hematology Seminar has been held over 30 times. This seminar has been given a new face and a new name, the Sysmex Scientific Seminar. The Sysmex Scientific Seminar will broaden its focus and will now provide useful information not only in hematology, but in various fields of IVD. Our goal is to bring this seminar into the 21st Century by establishing a new-style of seminar based on the concept of "Disease Management". To achieve our future goal, we organized a strong new Sysmex Scientific Seminar program committee. The committee members are famous professors in fields such as, regenerative medicine, oncology, hematology, immunology and laboratory medicine. Prof. Masao TOMONAGA from Nagasaki University serves as the chairman.
The Sysmex Scientific Seminar was set in two venues, Kobe and Tokyo. Two different lecturers were invited to each of the venues. The lectures in each venue were simultaneously broadcasted to the other venue by a satellite broadcasting system. In the past, the satellite broadcasting system was used during the Sysmex Hematology Seminar, but the system was not interactive and the participants in sub-venue felt like they were watching an all day movie. This changed with the new Sysmex Scientific seminar. The satellite broadcasting system used for the 31st Sysmex Scientific Seminar made the participants feel like they were at a live presentation. Today's technology allowed for participants in both venues to interact in active discussions after the lecture regardless of their location.

Q&A Session
Both sites had the Q&A session in unison.

Tokyo site (left): *The speaker discusses a question with the moderator of Tokyo in front of participants at the Tokyo site, while the screen shows the moderator of Kobe via satellite.*

Kobe site (right): *The screen showed the speaker who was at the Tokyo site. The moderator of Kobe joined the discussion by asking a question of the speaker in Tokyo via the satellite broadcasting system.*

The reason for the favorable opinion is not only the new seminar style, but also its excellent content. The main theme of the 31st seminar, which was shaped by the tremendous effort of the committee, was "Intersection of Medical Science and Laboratory Medicine from the Viewpoint of Disease Management - Medical Science of Bone Marrow -". Four lectures were presented. Prof. Masao TOMONAGA gave the kick-off lecture himself. He summarized the situation of standardization on bone marrow aspiration and trephine biopsy. The second lecture was given by Prof. Kazuya SHIMODA. It focused on JAK2 mutation in CMD. The third lecturer, Prof. Toshio SUDA, brought us a speech on the cell cycle of the stem cell and its maintenance in the bone marrow. And the last lecturer, Prof. Tomoki NAOE, who is also a program committee member, lectured on the latest findings of cancer and leukemia stem cells. Every lecture was very engaging and informative.
We will publish the proceedings as a supplement of Sysmex Journal International. You could get more information in the proceedings.

Outline of the 31st Sysmex Scientific Seminar

Date: 5th July (Sat), 2008
Venue: Kobe (Kobe International Conference Center Main Hall)
Tokyo (Shinagawa Intercity Hall)
Chair in Kobe: Masao TOMONAGA, M.D., Ph.D.
Dean, Nagasaki University Graduate School of Biomedical Sciences, Japan
Tomoki NAOE, M.D., Ph.D.
Professor, Department of Hematology and Oncology, Graduate School of Medicine, Nagoya University, Japan
Chair in Tokyo: Shigetaka ASANO, M.D., & D.M. Sci
Professor, Faculty of Science and Engineering, Waseda University, Japan

Expansion and Evolution of Bone Marrow Examination: A Guideline Prepared by Working Party of the International Council for Standardization in Hematology (ICSH)

Masao TOMONAGA

Dean, Nagasaki University Graduate School of Biomedical Sciences, Japan
Professor, Department of Hematology, Nagasaki University Hospital of Medicine and Dentistry, Japan

In 2007 International Council for Standardization in Hematology (ICSH) started a working party to establish and publish a guideline for the standardization of bone marrow examination. The working party reached a consensus that aspirate and trephine biopsy must be simultaneously performed and the final diagnosis should be described by integrating pathologic findings derived from both examinations. Aspirate examination mainly provides morphological details of bone marrow cells and trephine biopsy histological details of bone marrow architecture and distribution of bone marrow cells. In the era of rapid expansion of medical science, basic knowledge on bone marrow structure and function also expands, thus evolution of bone marrow examination for laboratory diagnosis of hematological diseases is urgently needed. Principal points of draft paper by the working party are presented in this seminar to accept debates with specialists of laboratory hematology in Japan to improve it.

JAK2 Mutation in Chronic Myeloproliferative Diseases

Kazuya SHIMODA

Professor & Chairman, Department of Gastroenterology and Hematology, Faculty of Medicine, University of Miyazaki, Japan

The World Health Organization's category for "chronic myeloproliferative diseases" includes chronic myelogenous leukemia (CML), polycythemia vera (PV), essential thrombocythaemia (ET), primary myelofibrosis (PMF), chronic eosinophilic leukemia/hypereosinophilic syndrome (CEL/HES), and chronic neutrophilic leukemia (CNL). CML is due to the production of the fusion gene BCR/ABL, and a substantial number of HES cases occur by the creation of the Fip1-like 1 (*FIP1L1*) - platelet derived growth factor receptor (*PDGFR*) alpha fusion gene. In 2005, several groups reported that a single somatic mutation in the protein tyrosine kinase JAK2 could cause PV, ET, and PMF. The JAK2 mutation is found in >95% of PV patients, and about half of ET or PMF patients. The mutation occurs in the pseudokinase domain (JH2 region) of JAK2, replacing the valine at residue 617 with a phenylalanine (V617F). The expression of JAK2 V617F but not wild-type (WT) JAK2 in an IL-3 dependent cell line, Ba/F3, leads to the autophosphorylation of JAK2 and growth factor independent cell growth. About half of the transgenic mice having JAK2 V617F developed CMPD; about 20% mice showed polycythemia and 35% mice showed thrombocythemia. The expression level of JAK2 V617F in PV-like mice was higher than that in ET-like mice or CMPD-free mice, and the Hb value moderately correlated with the expression level of JAK2 V617F. *in vivo* expression of JAK2 V617F results in PV-like, ET-like and PMF-like diseases, and higher expression of JAK2 V617F would favor thrombocytosis.

Maintenance of Stem Cells in the Bone Marrow

Toshio SUDA

Professor, Department of Cell Differentiation, the Sakaguchi Laboratory of Developmental Biology, Keio University School of Medicine, Japan

Stem cells are "the cells which has capability to generate the stem cell as itself (self-renewal) and to differentiate themselves into a variety of types of cells (differentiation)". They play a critical role of maintenance and reproduction of the tissues and organs by continuously supplying daughter cells through the lifetime of an individual. Proliferation and differentiation of the stem cells in organs of an individual are not fully autonomously controlled, but are regulated by the interaction with adjoining cells and organs. This environment which surrounds these stem cells is called "stem cell niche". Here, I will show that hematopoietic stem cells maintain the quiescent state in cell cycle through the interaction of niche cells in the endosteal niches of the bone marrow.

What Does the Study of Cancer Stem Cells Enable?

Tomoki NAOE

Professor, Department of Hematology and Oncology, Graduate School of Medicine, Nagoya University
Chairman, Internal Medicine, Graduate School of Medicine, Nagoya University, Japan

The study of the molecular biology has enabled us to understand leukemia or cancer as a control failure such as constitutive signal transduction, transcription deregulation, and abnormal survival. There, however, were few people who thought of the differentiation hierarchy among neoplastic cells. Nearly 10 years ago, a distinct fraction of human leukemia cells were shown to be transplantable into immunodeficient mice, whereas other fractions were not. The fraction had a CD34+38- phenotype, which was the same as those of normal hematopoietic stem cells. After this report, the xeno-transplantable fraction has been identified for breast cancer, lung cancer, and brain tumor one after another, and these findings attract attention as "a cancer stem cell". There are many problems that should be settled how such a fraction is controlled or whether it is associated with maintenance of cancer. From a clinical aspect, leukemia stem cells are important as to residual cells after therapy and targets of therapy.