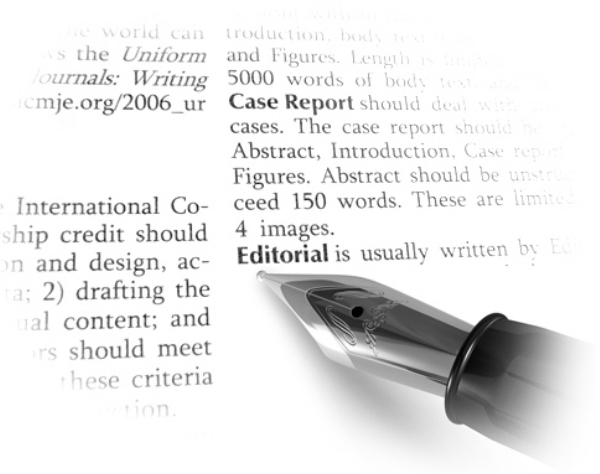

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Editorial

Blood Research: hematology and beyond

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This issue marks the change of the **Korean Journal of Hematology (KJH)** to **Blood Research**. This change reflects the rapid ongoing changes in the science, medicine and hematology. It was not long ago when hematology involved only the study and treatment red blood cell, platelet, granulocyte, monocyte and lymphocyte disorders and was focused on anemia, hemoglobinopathies, transfusion, coagulation, leukemia and lymphomas. Most of us who are trained or are interested in hematology are now working in a much border field. In fact, the artificial boundaries that were once used to define many fields of medicine such as hematology are disappearing.

Advances in the understanding of hematopoietic stem cells, immunology and histocompatibility led to the birth and rapid growth and advancement of hematopoietic stem cell (HSC) transplantation. HSC transplants involving HLA-compatible siblings and unrelated subjects are now routinely preformed worldwide. Further understanding of transplant biology and immunology led to the realization that the graft-versus-tumor immune responses are very important to the successful treatment of leukemia by transplantation. HSC grafts can now be processed to isolate CD34+ cells while leaving precise quantities of CD3+ cells to reduce the incidence of graft-versus-host disease while retaining graft-versus-tumor effects. Immunotherapy is, in fact, becoming an important part of HSC transplantation. Clinical investigators are now testing the use of leukemia specific T cells to prevent disease relapse following transplantation and viral specific T cells to treat post-transplant infections.

The growing field of immunotherapy of cancer is becoming similar in many ways to HSC transplantation [1]. Many cancer immunotherapy protocols that make use of adoptive T cell therapy now include pre-therapy leukoreduction to reduce the levels of circulating T regulatory cells and to increase levels of serum cytokines which enhance the survival of the transfused T cells and to improve clinical outcomes. Some protocols are even combining pre-treatment leukoreduction chemotherapy with total body irradiation and autologous CD34+ cell rescue to further improve clinical outcomes [2]. Clinical investigators are now also using genetically engineered T cells expressing anti-CD19 chimeric antigen receptors (CAR) to treat B-cell leukemias and lymphomas and other types of CAR T cells are being developed to treat cancers. Autologous T cells engineered to express high affinity T cell receptors directed to tumor antigens and cancer testis antigens such as NY-ESO-1 are also being used to treat many different types of cancers [3].

Hematologists investigating HSCs have become some of the leaders in the new field of induced pluripotent stem (iPS) cells. These investigators are not only working on questions related to the biology of iPS cells but they are working to differentiate iPS cells into HSCs and mature blood cells that can be used for transfusion. The reprograming principles developed in the iPS cell field are now being used to reprogram T cells to produce memory stem T cells (T_{SCM} cells) which in preclinical studies have been shown to be more proliferative, have a longer lifespan and are more potent for adoptive cellular therapy [4].

Blood banks and blood centers no longer just collect RBCs, platelets and granulocytes. They now collect G-CSF-mobilized peripheral blood stem cells (PBSCs) by apheresis for transplantation and peripheral blood mononuclear cells (PBMCs) to treat leukemia relapse. They also collect PBMCs to make dendritic cells for use as cancer vaccines. The blood processing, storage, labeling and shipping skills developed by blood banks and blood centers have been used to develop cell processing facilities that process HSC grafts and manufacture gene corrected HSCs, cultured and expanded natural killer and T cells, dendritic cells and genetically engineered T cells. Some of these cell processing facilities are now making bone marrow stromal cells to treat acute graft-versus-host disease and for regenerative medicine applications [5]. These facilities will likely soon be manufacturing, expanding and differentiating iPS cells for clinical trials.

This merging of hematology, oncology, immunology, molecular biology and stem cell biology has fundamentally changed what a hematologist is and does. These changes are not restricted to a single country or single region of the world; they are occurring globally. All regions of the world are contributing to these changes. Journals are an important vehicle for change and an important part of advancing science and medicine. Effective journals can no longer be bound by specific areas of study or geographic regions; they must be open to many areas of study and global in scope. The open access format of **Blood Research** allows it to be effective in the new global scientific and medical arena. Its new name welcomes a wide variety of work and welcomes manuscripts from around the world. **Blood Research** will play an important role in the advancement of science and medicine.

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