

Growing Science Ball in High 1: Special Issues 2015 6th KSBMB Winter Workshop

From ancient times, philosophy has been developed where spare time is available. Science also makes progress and breakthroughs with good ideas that come from, in many cases, outside the workplace and other ordinary places. The Korean Society for Biochemistry and Molecular Biology (KSBMB) Winter Workshop provides both science and extra time. Networking with scientists during this extra time creates a free atmosphere for exchanging ideas and social relations. This year, the 6th KSBMB Winter Workshop was successfully held in 'High 1 Ski Resort' with 370 participants. Twenty outstanding speakers gave talks in the areas of stem cells, proteomics, metabolomics, drug development, molecular probes, and young scientists, and 73 posters were presented at the event.

We have now published the 2nd special issue of BMB Reports for the 6th KSBMB Winter workshop. Seven invited authors from the speakers in the 2015 KSBMB Winter workshop were selected to write these mini-reviews; one review article in each field and two review articles from the Young scientist session.

A review in the stem cell area was by Dr. Sohee Jeon and Prof. Il-Hoan Oh (Catholic University of Korea) by the title of 'Regeneration of the retina: toward stem cell therapy for degenerative retinal diseases.' A degenerative retinal disease that can lead to a loss of vision currently has very limited therapeutic approaches. The authors introduce stem cell-based regeneration of retinal cells and repair of injured retinal tissues. In this aspect, although the transition of exogenous pluripotent stem cells to differentiated retinal cells has been studied, the authors emphasized endogenous retinal stem cell activation approaches for the regeneration of multiple types of retinal cells. Dr. Jeon and Prof. Oh introduce more about the current understanding of the cellular identity of these candidate retinal stem cells.

A proteomics review of 'Antioxidant enzymes as redox-based biomarkers' by Prof. Tae-Hoon Lee (Chonnam National University) describes the thiol modification on the antioxidant enzymes and related functional proteins. Antioxidant enzymes catalyze oxidation/reduction processes on the proteins with sulfur-containing amino acids, mostly cysteine and some methionine, and therefore can serve as redox state biomarkers in various diseases involved in redox imbalances such as cancer, ischemia and reperfusion injury as well as normal aging. In the cellular environment, the antioxidant properties of these redox regulators are all connected and thus need to be understood within in a network. Prof. Lee introduces this important con-

cept and explains thiol redox biology in the context of disease.

A metabolomics review of 'Technical and clinical aspects of cortisol as a biochemical marker of chronic stress' by Dr. Man Ho Choi (Korea Institute of Science and Technology) deals with cortisol, which is a steroid hormone of the glucocorticoid class, and is known to be released in response to stress and low blood glucose. Although cortisol is a relatively acute response steroid in our bodies, long-term measurement of cortisol might shed light on the monitoring of stress related chronic disease. Dr. Choi introduces the technical and clinical aspects of the analysis of cortisol in 'hair,' which can be a good method of long-term average measurement of cortisol in the body.

A drug development review by Prof. Keun Hur (Kyungpook National University) in this issue introduces 'MicroRNAs: promising biomarkers for diagnosis and therapeutic targets in human colorectal cancer metastasis.' Metastasis predicting biomarkers are also an unmet need in colorectal cancer, since metastasis is a major cause of death in this disease. Some miRNAs are known to be involved in tumor progression, and thus, finding the miRNAs involved in various aspects of cancer metastasis might help for the diagnosis and prognosis of colorectal cancer. Prof. Hur gives good examples of miRNAs found to serve as biomarkers of this cancer and as potential therapeutic targets.

This year, among five presenters, two Young scientists wrote reviews. One is about 'Drosophila blood as a model system for stress sensing mechanisms' by Prof. Jiwon Shim (Hanyang University). In the field of genetics and developmental biology, *Drosophila*, commonly known as the 'fruit fly,' is used as a good model organism. Since the mechanism of *Drosophila* hematopoiesis in the lymph gland is well established, recent studies on the *Drosophila* lymph gland also show novel insights about stress sensing mechanisms and blood cell fate decisions in this organ. Prof. Shim introduces how the *Drosophila* hematopoietic system utilizes developmental signals as sensors for stress and environmental changes. Another Young scientist review was written by Prof. Jong-Woo Sohn (Korea Advanced Institute of Science and Technology) titled 'Network of hypothalamic neurons that control appetite.' Two important appetite-regulating neurons are dealt with in this review, one appetite-suppressing POMC neuron and another appetite-increasing NPY/AgRP neuron. Obesity or starvation may come from the disturbance of these two neuronal circuits. Prof. Sohn discusses more detail about the history and recent research updates of these two neuronal circuits in relation with the understanding of anorexia and orexia.

Received 1 April 2015

A molecular probe review by Dr. Kyun Heo (National Cancer Center, Korea) introduces aptamers in 'Therapeutic aptamers: Developmental potential as anticancer drugs.' As a counterpart to protein antibodies used for diagnostic and therapeutic purposes, 'aptamers' are usually oligonucleotide molecules, although 'peptide' aptamers that bind (or fit) to a specific target molecule do also exist. Aptamers are usually created through selecting from large random sequence pools. Although the binding strength and specificity seem to be lower than antibodies produced by B-cells, these aptamers, with their low immunogenicity and toxicity, have the potential to be attractive molecules in anticancer therapeutics. Dr. Heo presents current clinical developments of aptamer-based anticancer drugs targeting Nucleolin and CXCL12 that are currently undergoing two clinical trial cases. He discusses the strong and weak points of aptamers in anticancer therapeutics.

The 2015 6th Winter workshop of KSBMB was immensely successful, drawing great interest of participants during the sessions, and the 2nd launch of special issues of the workshop review articles will make great impact on the biochemical and molecular biology societies. I am sure that Professor Jong-Il Kim in the College of Medicine of Seoul National University will lead a successful 2016 7th Winter Workshop of KSBMB as new chairman.

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