Letter of Congratulations on the Inauguration of '*Biomedical Engineering Letters*'

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I am excited to write in the inaugural issue of the *Biomedical Engineering Letters*, the official journal of the Korean Society of Medical and Biological Engineering (KOSOMBE). The initiation of this journal is particularly exciting given the increasing importance of biomedical and biological engineering and its emergence as a platform for multidisciplinary research at the interface between physical and life sciences and engineering. Furthermore, given the outstanding research being conducted in Korea, a journal that can highlight the important advances by the members of the KOSOMBE is of great value.

The field of biomedical and biological engineering has transformed greatly in the past few years. Major advances in bioinformatics, imaging, genomics, systems biology, nanotechnology and materials engineering have opened up many emerging areas of research that promise to revolutionize the way we live. These advances range from how we will one day generate sustainable energy, to how we can engineer artificial organs to treat a range of diseases.

In virtually every aspect of biology, the emergence of technology is changing our ability to manipulate biological systems. Furthermore, our understanding of biological systems is being shaped by the principles of quantitative sciences and engineering. One key example of this shift in thinking is the increased appreciation about the role of genetic and proteomic regulatory networks on affecting cell behavior. It is now well appreciated that the complexity in biology requires the ability to analyze and manipulate complex systems. The sequencing of increasing number of genomes of humans and other species has opened up great opportunities that could

benefit from the work of biomedical and biological engineers.

Another field that will continue to be an exciting research area is that of regenerative medicine. The ability to engineer artificial tissues for treating various ailments holds great potential. However, there are still many challenges in realizing the full potential of this field, such as a suitable cell source as well as the ability to recreate proper vascularization and function in the engineered tissues. To address the problem of cell source, stem cell biologists and biomedical engineers are teaming up to decipher the native cues that regulate stem cells *in vivo*. Much of what is involved in the native cellular environment is highly complex and regulated in both time and space. Thus, the ability to recreate such aspects of the microenvironment appears to be a highly important future area of research. Much has been understood about stem cells by the work of engineers and scientists in altering materials chemistry and mechanics and enabling systemic or combinatorial studies of the cellular microenvironment. Another enabling technology in regenerative medicine has come from the intersection of microfabrication and nanotechnology with biomedical engineering. Much research remains to be done to fully benefit from the use these techniques with biological systems. This is a particular area of opportunity for Korean researchers as these areas have been an area of particular strength in Korean industry.

The development of low cost medical solutions is yet another area of increasing importance. It is clear that the diseases that are prevalent in the developing world are often treatable. Yet due to the lack of cheap and effective diagnostic or therapeutic interventions such diseases lead to fatal outcomes. Biomedical and biological engineers are starting to make an impact in the area of global health. In particular, the development of cheap and portable devices that can be used in decentralized medical facilities are becoming highly important. Such devices range from microfluidic systems that can be used to detect red blood cell counts in HIV/AIDS

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patients, to low cost imaging devices to detect cancer. The development of such low cost devices promises to make a significant impact in human health worldwide.

There are many other areas where biological and biomedical engineers could make an impact, the discussion of which is beyond the scope of this letter. However, it is clear that this journal could have significant impact in disseminating important finding to the biomedical and biological engineering

community. The journal will also be of particular importance to highlight the leading research in Korea to the rest of the world. I am confident that under the leadership of the editors and the editorial board that many outstanding issues will be put forward to the scientific literature. More importantly I am confident that by enabling further advances in science that this journal will contribute in making an impact in the world.