Translational Research is a Bridge

Interview with Professor Euiheon Chung

November 22, 2018

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Research in biomedical sciences can be divided into basic research and clinical research. Basic research reveals new knowledge about life, and clinical studies assess the efficacy of new therapies. As clinical physicians can participate in basic research, basic scientists can influence clinical practice with fundamental studies.

In basic biomedical research, scientists conduct experiments to reveal the disease mechanisms and causal relationships of a disease. In clinical research, new treatments are applied to patients, and the efficacy of the treatment is measured without necessarily knowing the detailed mechanisms. To bridge this gap, translational researchers carry out pre-clinical studies that can potentially guide the clinical trials.

Now at the Department of Biomedical Science and Engineering (BMSE) at the Gwangju Institute of Science and Technology, Professor Euiheon Chung explained the concept of translational research, which he learned when he was a graduate student at Harvard-MIT Health Sciences and Technology (HST) Ph.D. program and as a postdoc at Massachusetts General Hospital and Harvard Medical School.

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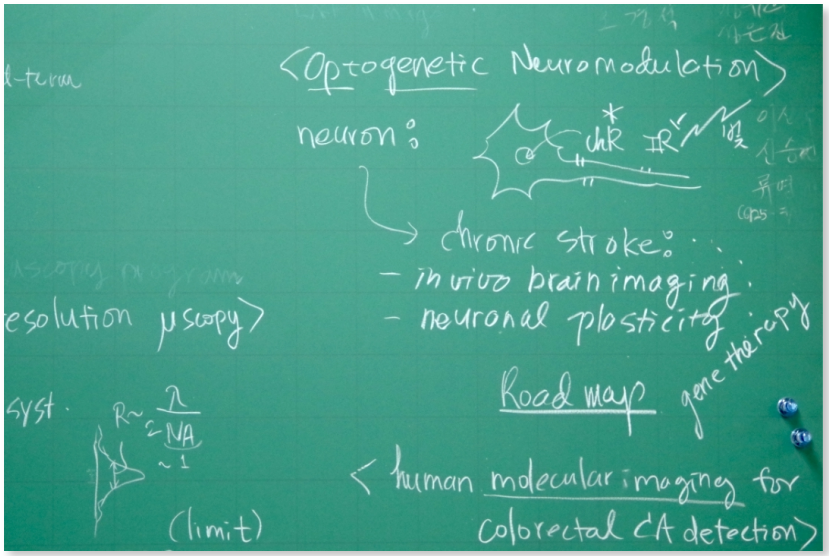

Professor Chung said, "Translational research serves as a bridge between basic research and clinical research. Translational researchers should be able to communicate with clinical researchers and be able to pinpoint their needs. To accurately understand the needs of clinicians, it is necessary to be familiar with medicine and clinical practice. If an engineer does translational research, the engineer has to learn the language of biology and medicine."

Recalling his experiences with Harvard medical students, Professor Chung explained the synergy between basic research and clinical research by saying, "I learned a lot while communicating with medical students. In class, the number of students from basic research was quite low, but the medical students took our questions very seriously. This interaction fused different points of view. Physicians started looking for causes and remedies for diseases, and the engineers and scientists looked to see how their results could be applied to clinical research." He also said that "basic researchers are well trained to solve problems, but they cannot identify good problems. Clinical researchers have a lot of problems to solve, but they do not know how to solve them well. It is translational research that connects the two."

Professor Chung believes that students must learn various disciplines because one can tackle challenging real-world clinical problems more efficiently when multiple disciplines are combined together. For this reason, BMSE teaches biology and medicine to

engineers while teaching quantitative approaches to medical doctors in a merged academic environment.

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As Professor Chung explained, "Quality biomedical research depends on the ability to set up a key hypothesis, to carefully design experiments, and to draw unbiased conclusion by conducting experiments. This systematic experimental process is not yet the standard curriculum of many medical schools."

Professor Chung's BiO-scopy Lab (http://bioscopy.gist.ac.kr/) at GIST studies how to make novel imaging technique, how to regulate neurons by applying light *in vivo*, and how to find, diagnosis, and treat tumors with light. Professor Chung said, "I think that the most interesting secrets that remain are in the brain. We study imaging methods and neural modulation methods by applying light—among various methods—to analyze the brain."