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¹³C and ¹H NMR metabolic markers of therapeutic response upon signal transduction inhibitors in lymphoma cells and *in vivo*

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The lecture will deal with how NMR methods can be used to detect metabolic changes arising from signaling inhibitor drugs to cancer cells and translational possibilities to be used in the cancer patients.

Signaling inhibitor drugs are the major targets of research in the basic science and in the clinic. Early finding out whether the targeted drug is working or not to individual patients is a much sought-after but not yet met need. Detecting altered metabolism after targeted drugs can be a promising strategy to solve it. We are studying metabolism upon signaling inhibitors to mammalian target of rapamycin (mTOR) and bruton tyrosine kinase (BTK) in lymphoma cells and *in vivo* models. Changes in lactate (glycolysis), glutamate (TCA cycle) and alanine (glutaminolysis) were detectable by ¹H and ¹³C NMR. In a drug resistant cancer cell line, decrease of lactate was accompanied by rebound of glutamate and alanine which suggests metabolic rewiring. On the other hand, in the drug sensitive cell line, all of the above metabolites decreased after the signaling inhibition. Time course ¹³C NMR data allowed calculating absolute fluxes in the individual metabolic pathways. We have a ¹H MRS lactate imaging technique for cancer patients. Applying the technique to patients being treated with targeted drugs are our ongoing efforts. Challenges and future directions will also be presented.

Biography

Lee has completed his PhD from KAIST, Korea and postdoctoral studies from the Korea Basic Science Institute and the University of Pennsylvania. He is currently a research assistant professor of radiology at the University of Pennsylvania. His research areas are ¹H, ³¹P and ¹³C NMR of cancer cells, xenograft models and patients for prediction and detection of therapeutic response. He has published ~20 papers in the peer reviewed journals.

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