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강연 제목: 마이크로 물방울을 이용한 진단과 치료

Biomedical Diagnostics and Therapeutics using Water Microdroplets

Abstract:

We developed a new technique utilizing the unique physicochemical properties of water microdroplets, which we named microdroplet chemistry. In this talk, I will present the biomedical applications of the microdroplet chemistry technique. The interfacial electric field formed at the water interface induces the generation of reactive oxygen species (ROS). We showed that microdroplet ROS are highly effective as a green disinfectant for various pathogens. Other biomedical applications include cancer treatment and biomedical energy generation. In addition, we used the stream of water microdroplets interfacing with mass spectrometry for label-free chemical imaging of cells or tissue. This allows the construction of micron-scale spatial omics in tissue. The application of the mass spectrometric imaging technique to cancer diagnosis and pharmaceutical research will be discussed.

Brief Biosketch

Jae Kyoo Lee completed his B.S. degree in Physics and M.S. degree in Biomedical Engineering at Seoul National University. He received a Ph.D. in Biomedical Engineering from the University of Southern California on the studies of retinal ganglion cell stimulations and response in artificial retinal prosthesis devices. During his postdoc studies in the Richard N. Zare group at Stanford University, he pioneered the research field named “microdroplet chemistry,” the studies of water molecule behaviors and physical/chemical reactions in water microdroplets and their applications. After continuing microdroplet chemistry research at Stanford University as a research scientist, he joined the Department of Applied Bioengineering at Seoul National University as an associate professor.