

## **Characterization of intracellular water investigated with terahertz spectroscopy**

Keiichiro SHIRAGA, M.S., Ph.D

*Graduate School of Agriculture, Kyoto University, Japan*

*email: [shiraga.keiichiro.22v@st.kyoto-u.ac.jp](mailto:shiraga.keiichiro.22v@st.kyoto-u.ac.jp)*

Broadband terahertz (THz) spectroscopy of a HeLa cell monolayer was performed to quantitatively characterize the hydration state and the hydrogen-bond (HB) structure of these intact human cells. Our analysis of broadband complex dielectric constant of the HeLa cell monolayer in the THz region showed that about 24 % of intracellular water was hydrated to biomolecules, exhibiting retarded reorientational motion than bulk water. Also we found that water in the cell interior had a larger population of non-hydrogen-bonded water compared to that of bulk water, indicating intracellular water forms a "distorted" high-density HB network.