43rd RAP Seminar

The 43rd Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **May 12 (Fri) 16:00 - 17:00, 2017**

Location: **W319, 3F, Cooperation Center, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟 3階会議室 W319)

Title: **Photophysical properties and photofunctions based on the magnetic properties of porphyrinic compounds**

ポルフィリン化合物の磁気的性質に基づく光物性と光機能

Speaker: **Prof. Kazuyuki ISHII**

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Discovery and elucidation of new electronic structures are important not only for pioneering frontier scientific fields but also for developing new functions. We are conducting research by designing various, characteristic electronic properties on the basis of coordination chemistry, supramolecular chemistry, photochemistry, and spin chemistry. In this lecture, I'll present the following photophysical properties and photofunctions based on the magnetic properties of porphyrinic compounds.

(1) Magneto-chiral dichroism (MChD)

Homochirality of life-the biased distributions of L-amino acids and D-sugars-is still unsolved. We have succeeded in observing MChD, one of plausible candidates for explaining the homochirality of life, in organic compounds for the first time, by using porphyrin J-aggregates. This MChD due to the π-electronic properties of aggregates of conventional organic aromatic compounds is important for studying the contributions of MChD towards the homochirality of life.

(2) Fluorescence bioimaging of ascorbic acid

After a groundbreaking study demonstrated that a high dose of ascorbic acid selectively kills cancer cells, the compound has been tested in the clinic against various forms of cancers, with some success. We have succeeded in fluorescence imaging of ascorbic acid intravenously injected into mice by the use of a novel fluorescence probe consisting of silicon phthalocyanine and nitroxide radicals. The present results provide opportunities to advance the use of ascorbic acid as cancer therapy.

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