



Title of Project : Frontier research of chemical communications

Hideaki Kakeya
(Kyoto University, Graduate School of Pharmaceutical Sciences,
Professor)

Research Project Number : 17H06400 Researcher Number : 00270596

【Purpose of the Research Project】

Many natural products have served as pharmaceuticals, agrochemicals, and their leads because of the structural and biological diversity. However, essential roles of natural products as chemical communication molecules among microbes, animals, plants, et cetera have not been fully elucidated. Integrated understanding of various kinds of chemical communications could therefore accelerate functional regulation by utilizing chemical communication molecules.

This research project aims at not only developing innovative high-order analysis platforms, but also at clarifying essential roles of natural products as chemical communication molecules in the natural environment, leading to development of useful chemical tools as well as pharmaceuticals/agrochemicals leads. In addition, this research project would contribute to the advancement in medical, agricultural, and food sciences, as well as open up a new discipline, “Molecular Sociology”, which would focus on the frontiers in chemical communications in a variety of biological species.



【Contents of the Research Project】

In this research area, the following three research groups interact closely with each other.

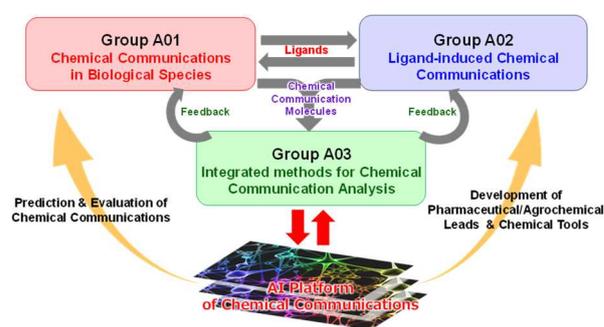
Group A01 (Chemical Communications in Biological Species): Screening and development of bioactive natural products as chemical communication molecules by a target-based phenotypic screening approach.

Group A02 (Ligand-induced Chemical Communications): Development of bioactive synthetic ligands as chemical communication molecules by theoretical design & synthesis and physicochemical approach.

Group A03 (Integrated Methods for Chemical Communication Analysis): Development and application of integrated platforms for identifying

chemical communication molecules and analyzing their modes of action.

Proposal with synergistic, transversal, and applied perspectives will be openly recruited for these research items.



【Expected Research Achievements and Scientific Significance】

This research project will establish a new scientific principle of “Molecular Sociology” in regard to chemical communications in the natural environment, which will result in the paradigm shift not only in natural product chemistry but also in chemical biology. Moreover, a new class of useful chemical tools as well as pharmaceutical and agrochemical leads will be developed, contributing greatly to human welfare in the future.

We also focus on international collaboration among interdisciplinary research fields, leading to international network development and bringing up young scientists broader views and higher expertise.

【Key Words】

Chemical Communications, Chemical Signal, Molecular Sociology, Natural Product Chemistry, Bioactive Ligand, Chemical Biology, Chemical Genomics, Chemical Ecology, Cheminformatics, Artificial Intelligence (AI), Bioinformatics

【Term of Project】 FY2017-2021

【Budget Allocation】 1,108,700 Thousand Yen

【Homepage Address and Other Contact Information】

http://www.pharm.kyoto-u.ac.jp/fr_chemcomm
fr_chemcomm@pharm.kyoto-u.ac.jp