【Grant-in-Aid for Specially Promoted Research】
Science and Engineering (Chemistry)

Title of Project : Studies on the Synthesis of Highly Oxidized Complex Natural Products of Biological Significance

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Research Area: Organic Chemistry

Keyword: Synthetic Organic Chemistry, Development of New Synthetic Method, Total Synthesis of Natural Products

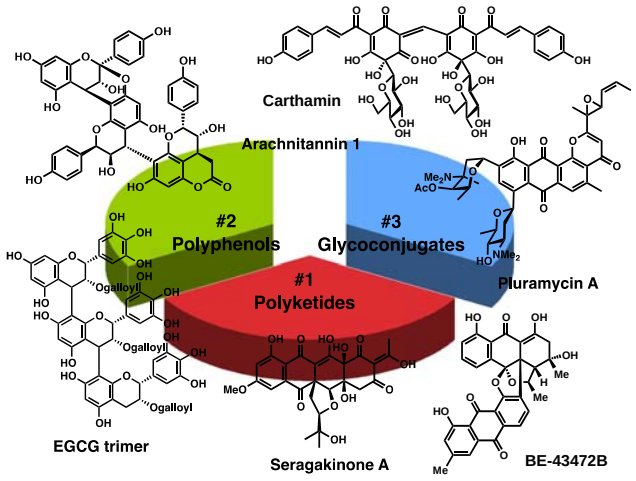
【Purpose and Background of the Research】

Spectacular advance of organic synthesis in the past decades have enabled facile access to organic compounds that play significant roles in various scientific and industrial fields. However, certain classes of compounds remain hardly accessible from the current status of organic synthesis. A typical example is the densely functionalized polycyclic compounds derived from the type-II polyketide biosynthesis, which constitutes an attractive class of compounds in view of the bioactivities. The potential bioactivities become even more attractive the hybridization with other biosynthetic products, e.g. sugars or terpenoids, while the synthesis becomes even more challenging.

As the synthetic targets for this five-year project, we selected *highly oxidized complex natural products*. To address synthetic challenges posed by such formidable synthetic targets, we will focus on the development of new synthetic strategies and tactics, hoping eventually to achieve the total syntheses, and contribute to the material and biological sciences.

【Research Methods】

Our target molecules are categorized into three classes as listed below: 1) polyketide-derived polycyclic compounds, 2) catechin-class polyphenolic compounds, 3) glycoconjugates. Sizable molecular diversity is generated by the conjugated oxidation/reduction and also by skeletal modifications including ring fission. The main obstacle is the general *complexity* of the molecules, making the synthesis / purification / analysis challenging. Some effective approaches have been developed *en route to* these intriguing, potentially useful classes of natural products.



【Expected Research Achievements and Scientific Significance】

Efficient strategies for constructing complex organic architectures are very important for enhancing the material-based science and technology, including biosciences because complex structures are exploited for modulating biological functions within the cell. This project deals with the exploration of new synthetic strategies and tactics that will allow the de novo construction of complex natural products and their derivatives that are otherwise inaccessible from the natural source or through conventional organic synthetic methods.

【Publications Relevant to the Project】

・"Integrated Synthetic Strategy for Higher Catechin Oligomers", K. Ohmori, T. Shono, Y. Hatakoshi, T. Yano, K. Suzuki, *Angew. Chem. Int. Ed.* **50**, 4862–4867 (2011).
・"Total Synthesis and Absolute Stereo chemistry of Seragakinone A", A. Takada, Y. Hashimoto, H. Takikawa, K. Hikita, K. Suzuki, *Angew. Chem. Int. Ed.* **50**, 2297–2301 (2011).
・"Lessons from Total Synthesis of Hybrid Natural Products", K. Suzuki, *The Chemical Record*, **10**, 291–301 (2010).

【Term of Project】 FY 2011-2015

【Budget Allocation】 333,800 Thousand Yen

【 Homepage Address and Other Contact Information】

http://www.chemistry.titech.ac.jp/~org_synth