

## 「A multiomics approach to bioprospecting and biosynthetic pathway discovery in plants」

Tomáš Pluskal博士

Massachusetts Institute of Technology

Whitehead Institute for Biomedical Research

(世話人: 上野 勝准教授  
大学院先端物質科学研究科  
分子生命機能科学専攻)

### 《Abstract》

As sessile organisms, plants have extensively explored the chemistry of bioactive specialized metabolites for their defense and for adaptation to ecological niches. Consequently, bioactive natural products from plants have provided a great source of medicines, with about 25% of the prescription drugs used today being derived from plants. However, the lack of knowledge on the biosynthetic pathways of plant natural products hinders potential clinical applications, as in many cases the compounds must be laboriously isolated from their native hosts. Unlike bacteria and many fungal species that contain biosynthetic operons, the genes of plant specialized metabolic pathways typically scatter across the genome, making pathway discovery via genome mining nearly impossible. Leveraging a diverse set of molecular tools developed for studying specialized metabolism in non-model organisms, we recently identified and characterized seven enzymes that constitute the biosynthetic pathway of kavalactones, the psychoactive principles of kava (*Piper methysticum*). Kava is an ethnomedicinal shrub native to Polynesia with anxiolytic and analgesic properties supported by over 3,000 years of traditional use as well as recent clinical trials. Kavalactones interact with human central nervous system through mechanisms distinct from those of common prescription psychiatric drugs such as benzodiazepines or opioids. We further demonstrated the feasibility of bioengineering heterologous production of kavalactones and their derivatives in bacterial, yeast, and plant hosts, thus opening an avenue towards the development of novel non-addictive psychiatric therapeutics through the means of synthetic biology. We aim to generalize the developed workflow into an experimental and computational platform to explore and exploit the remarkable chemodiversity of over 400,000 plant species found on Earth for the benefit of human health.

※本セミナーは5研究科共同セミナーです。

開催日時: 平成 30 年 12月 14日(金) 17:00-18:00

会場: 広島大学 先端科学総合研究棟 3F 302S会議室

お問い合わせ先

○広島大学大学院先端物質科学研究科分子生命機能科学専攻 上野 勝  
連絡先: E-mail [scmueno@hiroshima-u.ac.jp](mailto:scmueno@hiroshima-u.ac.jp) TEL 082-424-7768