



Genome-based Chemically Synthesized Cyclic Peptide Library for Phenotypic screening

Background:

Phenotypic screening with chemical library is a powerful tool to find novel bioactive compounds. Many small molecules have been discovered by this approach, and some of them eventually were developed into first-in-class drugs with new molecular mechanism of actions. Although the success of this strategy in small molecule based drug discovery, access to peptide based chemical library for phenotypic screening is very limited and effective design of library have not developed enough. The researchers have developed cyclic peptide library that is applicable to phenotypic screening. The structure of each cyclic peptides is designed from genome information.

Technology Overview:

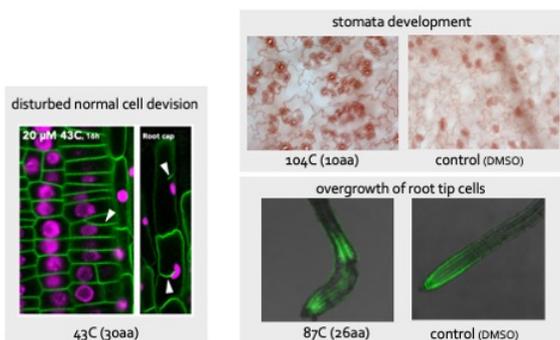
The researchers focused on secreted cysteine rich peptides/protein (CRPs). CRPs are known to play many important roles in biological systems, such as growth factors and hormones. The most representative example of CRPs is insulin, peptide hormone regulating metabolism of carbohydrates. They abstracted partial structures of CRPs of which functions and active forms are yet unknown, and embedded them into each cyclic peptides. These “natural-product like” cyclic peptides are expected to give high hit rate in phenotypic screening and to mimic the functions of parent CRPs.



The researcher has synthesized over 200 cyclic peptides based on the genome information of *Arabidopsis thaliana* and conducted phenotypic screening. Several hit compounds with unique phenotypes are discovered to date.

The researchers also established an efficient immobilization method of the synthetic cyclic peptides onto agarose gels for affinity purification of target proteins.

Human genome based cyclic peptide library is now under constructions toward drug discovery study.



Benefits:

Phenotypic screening of cyclic peptides, drug discovery, screening of agrochemicals

Potential Applications:

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