生命科学セミナー

Understanding plant stress resistance in Yoshioka lab – Investigation of CNGC-mediated Ca2+ signals and identification of beneficial bacteria for agricultural usage

吉岡　啓子　博士

トロント大学　細胞システム生物学部

教授

12 月 18 日（月）15：00 - 16：00

農学生命科学研究棟（北部構内）１階セミナー室(2)

In our lab, we are mainly interested in plant immune responses and currently working on two topics,
1. Investigation of CNGC-mediated Ca2+ signals in stress tolerance.
2. Identification of beneficial bacteria to enhance plant immunity for agricultural usage.

Calcium ions (Ca^{2+}) are universal second messengers in eukaryotic signaling that control many phenomena, such as neuronal transmission in animals. Similarly, Ca^{2+} plays a central role in plants. However, Ca2+ channels, their signal transduction, and biological roles are still enigmatic. Plant Cyclic Nucleotide-Gated Channels (CNGCs) are Ca2+-conducting ion channels that regulate a variety of physiological responses. CNGC2 has been implicated in plant immunity due to the autoimmune phenotypes and impaired response to the bacterial elicitor, flg22, in CNGC2 knockout mutants (*cncg2*). However, *cngc2* mutants display pleiotropic phenotypes such as flowering and developmental defects, indicating multi-functionality of CNGC2. Recently, we showed that CNGC2 is involved in auxin signaling by affecting auxin biosynthesis. Our data indicate the role of CNGC2 as a nexus of immunity and development/auxin signal transduction, likely controlling overall plant Ca^{2+} homeostasis.

In parallel, we are also working on a project for sustainable agriculture. Given current and predicted climate conditions, there is an urgent need to shift to sustainable agricultural practices that use less energy and agrochemical inputs. In our lab, we aim to develop and deliver scientific solutions using beneficial bacterial consortia of Canadian origin and performance-enhancing bio-active metabolites for sustainable food production. To achieve this goal, we are conducting a screening to find bacteria that can enhance plant immunity and plant growth using tomato plants. Through this screening, so far we found 13 promising bacterial strains and currently we are characterizing these strains to make a more effective bacterial consortia for agricultural application.

京都大学　大学院　生命科学研究科

連絡先　　全能性統御機構学分野

氏名 中野　雄司　(Takeshi Nakano)　内線:6380