Setsunan University

Applied Biosciences

Research on the molecular mechanism of plant-virus interactions

Masanori Kaido, Assoc. professor
(Department of Applied Biosciences)

E-mail masanori.kaido@setsunan.ac.jp

Keywords Plant viruses, RNA replication, cell-to-cell movement, Systemic acquired resistance, RNA silencing

Research topics

Backgrounds

- In general, host range of a plant virus is very limited.
- Plant viruses and plants fight each other in plant cells using various tactics to conquer and defend.
- Even if the plant virus infects systemically, the plant does not necessarily show symptoms. There are many cases where the plants coexist with viruses in a compromised manner.

Purpose

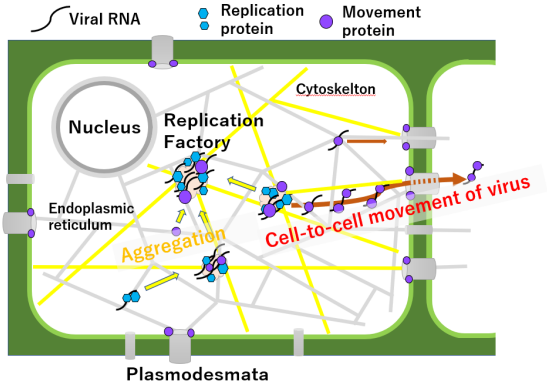
- Revealing the molecular mechanism of plant virus replication and cell-to-cell movement mechanisms, and also plant defense mechanism
- Applying those knowledge to the development of new technology to prevent virus diseases.

Achievements

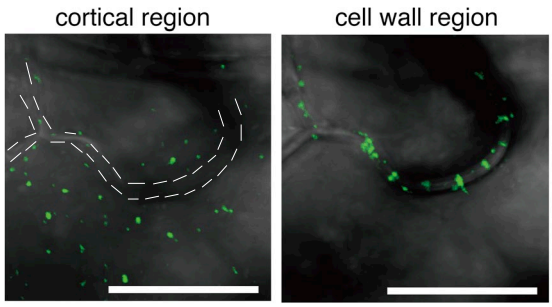
- We have identified several host factor proteins required for replication, or cell-to-cell movement of plant RNA viruses.
- We are analyzing the relationship between the formation of virus replication factory and virus cell-to-cell movement.
- We have technology to produce transgenic plants and suppress or destroy gene expression.

Prospects for collaboration

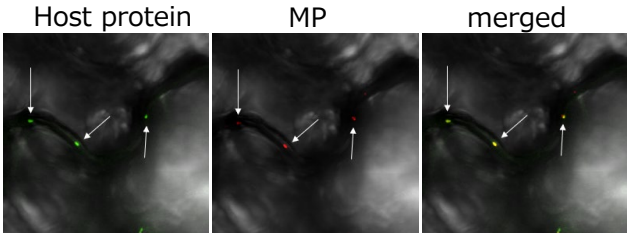
【Agriculture and Food Industry】
Searching for new genes that are essential for the multiplication (replication or cell-to-cell movement) of plant viruses.
Disruption or silencing of the genes that are essential for multiplication of viruses and evaluation of the effects.
Introduction of resistant genes to plans.



Schematic diagram of replication and cell-to-cell movement process of plant RNA virus



Visualization of viral movement protein (MP)
MP localizes at viral replication factories (left) and at plasmodesmata (right). White dot lines : cell wall, bars = 10μm



MPs cooperate with host plant proteins to open intercellular conduits (plasmodesmata)

Research features

Investigation of new technologies to prevent crops from viral diseases based on a new perspective on the molecular interactions between plants and viruses.