

Scientists at NIPGR found that calcium channels (CNGC 19) help plants to accommodate fungus *Piriformospora indica*

Research team headed by Dr. Jyothilakshmi Vadassery at DBT's National Institute of Plant Genome Research (NIPGR), New Delhi, studied the mechanism responsible for colonization of plant roots with good fungus *Piriformospora indica*. To know how plant root interacts with fungus *P. indica* and recognize it as good interacting partner, team studied all the genes induced upon fungal stimuli. According to Dr. Abhimanyu Jogawat, SERB postdoctoral fellow at NIPGR, New Delhi, they found that cyclic nucleotide gated calcium channel 19 (CNGC 19) gets highly induced upon fungal colonization.

Furthermore, team generated a transgenic plant that does not have CNGC19 gene. In these lines (*cngc* mutant lines) they saw increased colonization of *P. indica* and a growth inhibition due to uncontrolled colonization. Study showed that Arabidopsis CNGC19 calcium channel is very important for maintenance of balance between plant immunity and controlled colonization of plant roots, which results in growth promotion of host plant. This study will help plant scientists to understand how plant recognizes and accommodates its useful microbial partners without causing harmful effects and by not compromising on its ability to detect harmful microbes.

Ever wondered how does a plant welcome friendly fungi? How do the plant roots turn on and off its defence mechanisms to an array of good and bad fungi in its vicinity? These intriguing questions have been addressed by Dr. Jyothilakshmi Vadassery's research team at DBT-National Institute of Plant genome Research, New Delhi using model plant Arabidopsis thaliana and the growth promoting fungi, *Piriformospora indica* isolated from Indian Thar desert. *Piriformospora indica* is a good fungus that colonizes the roots of many plant species and promotes their growth, increases nutrient uptake. *P. indica* also imparts abiotic and biotic stress tolerance to a wide array of host plants.

Plant uses many different chemicals and permeable ionic channels to send and receive signals. Among these, calcium signaling operates through calcium permeable channels present in the plasma membrane and many organelles like endoplasmic reticulum, chloroplast and nuclear membranes of plant cells. Through these calcium channels, plant uses calcium ions to communicate and drive cellular processes. Activation of calcium signaling in plant roots is a crucial event for perceiving *P. indica*. Increase in cellular calcium levels in plant roots is associated with increased plant defense. Calcium elevations are produced in cells

upon opening of ion channels that are activated when cells perceive stimuli. The work was published in *Journal of Experimental Botany*.

Source: <https://academic.oup.com/jxb/article/71/9/2752/5709769>

Blog link: <http://www.scisoup.org/article/2020/how-plant-recognizes-and-accommodates-its-useful-microbial-partners.html>

Contact Person:

Shri Ratnesh Thakur

E-mail: ratneshthakur@nipgr.ac.in