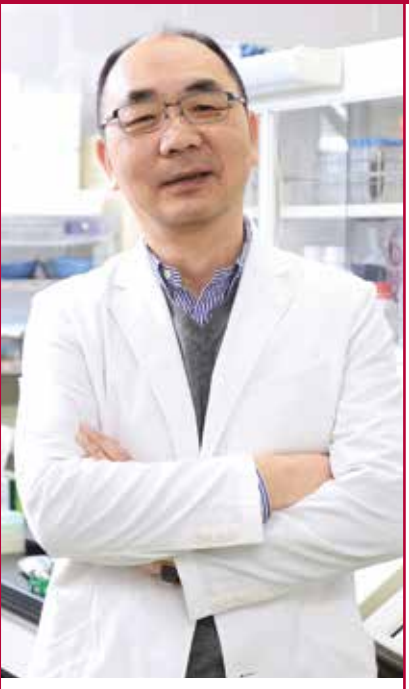
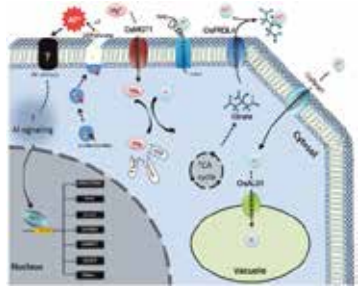


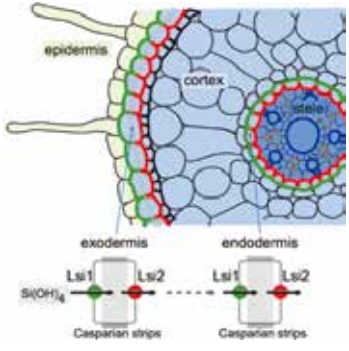
Prof.
MA Jian Feng

Molecular mechanisms of aluminum tolerance in plants

Aluminum (Al) toxicity is a major factor limiting crop production on acid soils. However, some plant species or accessions have evolved strategies to cope with Al. Rice is the most Al-tolerant species among small grain cereal crops. We identified a transcription factor for Al tolerance (ART1) and found that it regulates at least 32 genes implicated in Al tolerance. On the other hand, barley is the most sensitive cereal to Al toxicity, but there is a large genotypic difference in Al tolerance. We identified a major Al-tolerance gene in barley, HvAACT1. Furthermore, we found that high expression of this gene is acquired by a transposon insertion in its promoter.



Transport system of mineral elements in plants



Mineral elements including essential, beneficial and toxic elements in soil affect both plant growth and human health. We are working on identification of transporters involved in uptake, root-to-shoot translocation and distribution/redistribution of these elements in plants. We have identified a number of transporters for Si, P, Mg, Mn, Zn, Cu, Fe, B, Cd and As. Especially, we found that rice has developed an efficient uptake system for mineral elements, which is mediated by both influx and efflux transporters polarily localized at the exodermis and endodermis of the roots. We also identified several transporter genes for accumulation of Cd and As in rice.