Pathogen effector recognition by paired NLR immune receptors and decoy domains

By Thomas Kroj  
INRA, UMR BGP, Campus International de Baillarguet, France

Nucleotide-binding domain and leucine-rich repeat proteins (NLRs) are important receptors in plant immunity and allow specific recognition of pathogen effectors. Based on our work on the detection of the Magnaporthe oryzae effectors AVR-Pia and AVR1-CO39 by the rice NLR RGA5, we recently developed the hypothesis that some NLRs recognize effectors by integrated decoy domains. By detailed structure-function analysis we deciphered the molecular details of the binding of AVR-Pia and AVR1-CO39 to the integrated heavy metal-associated (HMA) decoy domain of RGA5. This demonstrated that the direct RGA5-HMA/effector binding is strictly required for effector recognition but only of moderate affinity and acts in concert with the association of the effectors to additional sites in RGA5. This combination of integrated decoy domains with additional independent effector-NLR interactions seems to confer robust effector recognition that is resilient to effector mutations. I will also present first results on how knowledge on the molecular details of effector recognition by integrated decoy domains can be exploited for the modification of the recognition spectrum of NLRs.