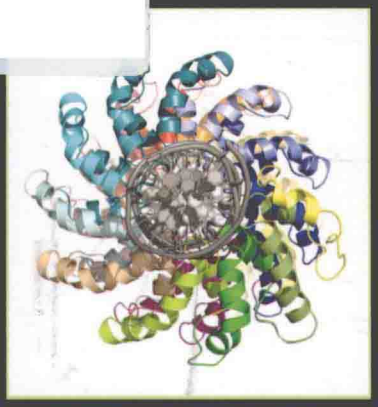
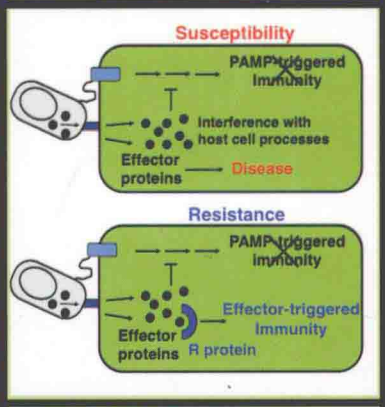
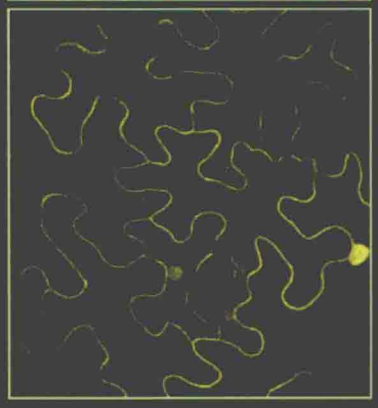
Molecular Plant Immunity







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Preface

Plants and pathogens are constantly engaged in an "arms race," each party competing to develop molecular weapons for the defeat of its enemy. As a result, plants are equipped with a sophisticated immune system for the recognition of invading pathogens, transmission of alarm signals, and rapid activation of efficient defense responses that limit infection. Concurrently, pathogens have developed strategies to cause disease through sabotaging the plant immune system. In an era of growing food demand for the sustainment of the world's population, understanding the molecular mechanisms of plant immunity and microbial pathogenicity is of cardinal importance for devising strategies that limit the large yield losses owing to plant diseases.

This book provides comprehensive coverage of the molecular basis of plant disease resistance by reviewing fundamental features of the plant immune system as well as the most recent insights into this important field of plant biology. Chapter 1 describes recognition of a novel bacterial quorum sensing factor by the rice Xa21 receptor, representing a paradigm for how a first line of immune responses is activated on recognition of conserved molecular signatures of microbial pathogens by plant transmembrane receptors. Chapters 2 and 3 review molecular mechanisms involving resistance (R) proteins, an additional class of immune receptors responsible for the activation of a second line of immune responses. Topics covered in these chapters include structure, control, and activation of R proteins; molecular mechanisms mediating effector recognition by R proteins; and signaling pathways acting downstream of R proteins and leading to the activation of effective immune responses. Chapter 4 describes the role of the plant hormones salicylic acid and jasmonic acid in signaling pathways downstream of immune receptors. Chapters 5, 6, and 7 discuss molecular features of pathogen effector proteins of bacteria, fungi, and oomycetes that interfere with plant immunity and contribute to bacterial and fungal pathogenicity. Chapter 8 presents molecular mechanisms that modulate the interaction between plants and viruses. Chapters 9, 10, and 11 focus on plant-pathogen interactions representing model systems for the interplay between host plants and bacterial, fungal, or viral pathogens. Chapter 12 describes future prospects for genetically engineering disease-resistant plants.

I would like to thank all the authors for their excellent contributions that integrate well-established and emerging concepts to provide an up-to-date review of the state of the art in the challenging field of molecular plant immunity.

Guido Sessa

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