

sensitive response (HR), hairpins and *hrp* genes. The concluding section of this review is very interesting in which the authors compare pathogenicity of *Erwinia chrysanthemi* with that of *Pseudomonas aeruginosa* and *P. syringae* with *Yersinia pestis* (reviewed in this volume by Cornelis), thus bringing out similarities/dissimilarities in the deployment and functions of their extracellular virulence proteins. The review by Cornelis is a detailed account of the molecular genetics of yops, the extracellular virulence proteins produced by *Yersinia pestis*.

An extensive review by Bonas discusses structural organization and functions of *hrp* (hypersensitive reaction and pathogenicity) genes and *hrp*-dependent secretion of hypersensitive response-inducing proteins (hairpins) in *Erwinia amylovora* and *Pseudomonas syringae* pv. *syringae*. Among the animal pathogens this system can be compared, in the larger perspective, to a number of virulence genes of *salmonella* (reviewed by Finlay). The various genes of *Salmonella* which are under intensive investigation are: *Spv* (*Salmonella* plasmid virulence) *Spa* (*Salmonella* presentation of antigen) and *pag* (*Pho-P* activating genes).

The commonality of the molecular and cellular mechanisms among bacterial pathogens producing quite different clinical disease entities is illustrated by the study of *Shigella flexneri* and *Listeria monocytogenes* as reviewed by

Parrot and Sheehan *et al.* respectively. Although quite different as to the clinical disease produced, these pathogens show several similarities in their cytoplasmic multiplication, actin-based movements and cell-to-cell spread.

In a detailed review entitled 'enigmatic avirulence genes of phytopathogenic bacteria' Dangi discusses whatever little is known about the organization, regulation and virulence functions of avirulence (*avr*) genes, bringing into focus some of the paradoxical issues of the topic and posing several questions which must be explored further to understand their exact role in pathogenesis.

A very important question which emerges from the foregoing discussion is: taking cues from animal pathogens, where molecular genetics of pathogenicity are decidedly better understood, can we address ourselves to some of the hitherto unsolved issues of plant pathogens or even vice-versa? This question has been posed more convincingly by McKhann and Hirsch in their review on *Rhizobium*. Arguing from several points of view the authors show that there are important conceptual differences between symbiotic and plant pathogen interactions and suggest that *Rhizobium*-legume symbiosis cannot be regarded as a modified or refined type of plant pathogen interaction as proposed by some investigators sometimes back. They further suggest that to understand root hair invasion by rhizobia

we should, perhaps, look into models representing invasion of mammalian cells by bacterial pathogens.

The objective of this intellectually stimulating volume is to make the readers view bacterial pathogenicity from newer perspectives. Seen in this context, the volume in its totality is a laudable attempt and a novel addition to works already available on the subject. However some of the reviews, when seen individually, tend to look aloof and wanting in overall objectives of the compilation. This apart each review, whether dealing with plant or animal pathogens, gives detailed information on the molecular and cellular mechanisms underlying the bacterial pathogen discussed. Each review has been provided with an extensive and up-to-date bibliography.

This volume is strongly recommended as part of any collection of books dealing with microbiology. The volume will be of much use to researchers studying various aspects of the molecular genetics of bacterial pathogens and to teachers engaged in teaching advanced level courses on bacteriology plant or animal bacterial pathogenesis and infectious diseases.

J. S. VIRDI

Department of Microbiology,
University of Delhi South Campus,
Benito Juarez Road,
New Delhi 110 021, India

Erratum

Pioneers of ozone study bag chemistry Nobel

S. Parthiban

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The photographs of Rowland and Molina were inadvertently interchanged. The error is regretted.

– Editors