

## BOOK REVIEW

BREY P.T. & HULTMARK D. (eds): MOLECULAR MECHANISMS OF IMMUNE RESPONSES IN INSECTS. Chapman & Hall, London, 1998, 325 pp. ISBN 0-412-71280-6.

The book covers various aspects and mechanisms of insect defense against microbial attack. The editors brought together an impressive series of 11 chapters from 16 authors to present some of the most important advances in insect immunity.

The book begins with a historic chapter on the discovery of insect immunity at the Institute Pasteur from the end of the 19th century through the first three decades of the 20th century. Following is a group of chapters providing an update on the most recently characterized insect antimicrobial peptides. The first one characterizes both insect hemolymph antibacterial peptides/polypeptides divided into four families (cecropins, insect defensins, the proline rich and the glycine rich inducible antibacterial peptides) and antifungal peptides found in Diptera. Another special chapter addresses ceratotoxins, a new family of antibacterial peptides from female reproductive accessory glands of the Mediterranean fruit fly, *Ceratitis capitata*. The authors examine the ceratotoxins as a novel means by which the female medfly protects her reproductive tract. This group is completed by a very special chapter devoted to the immune response of social insects belonging to Hymenoptera. Social insects living in densely-populated colonies and in constant temperature are very vulnerable to epidemics. Their immune response is based on the action of peptides like apidaecin, abaecin, hymenoptaecin and bee defensin.

The following in-depth chapter is on the mode of action of various antimicrobial peptides. The author deals with those antibacterial peptides that exert their activity by altering the permeability properties of the bacterial plasma membranes and describes a "carpet-like" mechanism.

Next are two chapters dealing with self/non-self recognition molecules and cascades: the phenoloxidase cascade and hemolin, containing the most recent mechanistic, regulatory and sequence information. Insect phenoloxidases are synthesized as inactive zymogens and their activation is finally

tuned developmentally and in response to traumatic stress and microbial invasion. On the other hand, hemolin, an insect hemolymph protein, is present at a low level in normal hemolymph. It is composed of four Ig-like domains and, as a member of Ig superfamily, affects phagocytic activity and has a role in the regulation of adhesion of hemocytes to foreign or self surface.

This section is followed by an important cluster of chapters on immune peptide/polypeptide gene regulation and the cellular tools that made the study possible, as well as a mind-opening chapter on the interface between immune mechanisms and developmental processes. In the first chapter of this cluster, the author characterizes the *mbn-2* cell line as a useful tool in studying the expression of genes involved in the immune response, as well as genes fortuitously found in immunoscreens for surface receptor proteins on induced *mbn-2* blood cells. Another area of study is the ecdysteroid response of these cells characterized by increased phagocytosis. Other chapters cover the recent data on the expression and regulation of immune gene transcripts in insects, including recent progress on the *Sarcophaga peregrina* defense system. One defense protein may play at least two different roles in both defense and development. The author also describes the function of a novel inducible substance named 5-S-GAD, which seems to be a key molecule in the defense systems of insects.

The book closes with a novel chapter which brings together the molecular mechanisms of the immune response of disease vectors and how organisms which cause human diseases contour the immune response and allow for successful parasitism.

*Molecular Mechanisms of Immune Responses in Insect* is an excellent review of the recent trends in insect immunity and reflects the rapidly increasing progress of this field made within the last decade. It is written for a broad audience ranging from specialists in the field of innate immunity to informed biologists and graduate students. It is an excellent source of information and summarizes the recent methods and references for everyone, who is interested in insect immunity.

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