

its analogs, chapter 16 is primarily an account of the differential interaction of chemically diverse O-specific antigens with complement and its importance in bacterial killing/survival. These chapters will serve to provide enough information to anyone evincing more than a casual interest in lipopolysaccharide.

In chapter 17 molecular genetics of *ctx* operon (containing two cholera toxin genes, *ctxA* and *ctxB*) and its regulation by *toxR* and *toxS* genes has been dealt with in fair detail. An important feature of the chapter is the inclusion of a detailed discussion on coordinate regulation of virulence determinants. This has been done in relation to the expression of toxin coregulated pilus (Tcp) and accessory colonization factor (Acf). The model of coordinate regulation proposed for the virulence determinants of *Vibrio cholerae*, however, raises many new questions which have been posed by the authors very explicitly at the end of the chapter.

Chapter 18 is a comparative account of the molecular structure, genetic basis and regulation and, role in human disease of Shiga toxin and *E. coli* Shiga-like toxins (SLT-I, SLT-II, SLT-IIv). A detailed discussion implicating Shiga-like toxins in haemorrhagic colitis and haemolytic uremic syndrome makes it an interesting chapter.

In chapter 19, detailed genetics of staphylococcal epidermolytic, entero- and membrane-damaging toxins along with the role these toxins play in causation of the disease, has been discussed in the chronological order in which discoveries relating to each of these toxins were made. This enables one to view the subject of staphylococcal toxins in its entirety. The authors deserve complement for their lucid presentation of a topic of bewildering proportions.

Chapter 20 is of special importance as exotoxin A domain structure has been discussed in relation to the specific functional aspects of the molecule. This chapter will be of most use to those who wish to comprehend the complexity of molecular events underlying the genetics of exotoxin A synthesis and its regulation. A section which compares exotoxin A to diphtheria toxin does not take into account a host of other ADP-ribosylating toxins.

This volume is an extremely valuable

collection of up-to-date articles dealing with almost all facets of pathogenic process and presents a very coherent insight of the molecular basis of bacterial pathogenesis. Most of the systems discussed represent fascinating models of host-pathogen interaction. Many complex aspects of the subject have been discussed in a fairly lucid style.

A very positive feature of the volume is that each chapter has a fairly detailed introductory section which gives an overview of the topic under discussion. Thus, this volume will be of use not only to those interested specifically in molecular mechanisms of bacterial pathogenesis but also to those interested in general aspects of virulence determinants in pathogenic bacteria.

A sufficiently good number of scrupulously selected references have been included at the end of each chapter making it a truly reference work. On the whole this volume is an important landmark in our endeavours to delve deep into the realms of bacterial pathogenicity, in man's perpetual quest for complete control of microbial pathogens.

J. S. VIRDI

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

New Trends in Biotechnology. N. S. Subba Rao, C. Balagopalan, S. V. Ramakrishna, eds. Oxford and IBH Publishing Co. Pvt. Ltd., 66 Janpath, New Delhi 110 001. Rs 495, 434 pp.

Biotechnology has made rapid advancement during the past one decade. Now many technologies developed using biological systems find excellent applications. This has led to both commercialization of many of the technologies so developed and an interest in the basic research which leads to further development of newer technologies with wider applicability. The progress in biotechnology is due to the development of technologies like recombinant DNA technology, hybridoma technology, artificial synthesis of proteins and DNA, immunology, culture of both animal

and plant cells and tissues, protoplast technology and somatic cell hybridization, *in vitro* fertilization in both animal and plants, methods to overcome incompatibility barriers and techniques for embryo rescue after wide crosses in plants so as to produce hybrid between distantly related plant species, nitrogen fixation and micorrhizal associations, sericulture, aquaculture, etc. The amount of knowledge acquired in basic sciences during the past half a century is tremendous. Application of the newly developed technologies in the background of this knowledge on basic sciences, specifically those relating to the structure and function of living systems, has led to many novel areas of their application. There are many books available on different areas under biotechnology. Some of them are of a general nature and there are quite a few of them on specific areas giving in-depth information. This book, "New Trends in Biotechnology" is an addition to the literature available on biotechnology.

This book is the proceedings of a national symposium on the same theme held at Trivandrum on the 3rd and the 4th of June, 1988. In this book the works presented in the symposium are arranged under five headings, viz. General, Crop productivity, Crop protection, Nitrogen fixation and micorrhiza and Bioconversion.

Under the heading 'General' there are two excellent articles, one on 'Biotechnology and molecular biology of silk synthesis' by K. P. Gopinathan and the other on 'Strategies for field application of bioinoculants for augmenting food and fuel production' by N. S. Subba Rao.

In the section of 'Crop productivity', there are articles encompassing works on various tissue culture techniques for increasing crop production, viz. clonal multiplication, shoot tip and meristem culture, direct and via callus regeneration of plantlets, androgenesis, protoplast technology, etc. on plantation crops, herbaceous plants and woody perennials.

Under the section 'Crop protection', an article on 'Biotechnology for crop protection' by Panicker and Panicker gives an interesting account on biotechnological approaches for crop protection from pests, diseases, weeds, cropping without fertilizer, resistance to freezing

BOOK REVIEWS

and scorching, drought and water logging, alkalinity and acidity, thriving without soil, sun and gravity. This section also contains articles on bio-pesticides, control of plant viral diseases by biological products, control of nematode in brinjal by VA micorrhizae, biological control of dryrot in groundnut, microbial biotechnology, culture of *Fusarium pallidoroseum* using locally available and cheaper substrates.

The section on 'Nitrogen fixation and micorrhiza' contains articles on *Azolla* as an organic manure for rice, homology testing between the Nif-A region of *Klebsiella pneumoniae* and *Azospirillum* DNA, symbiotic nitrogen-fixing ability of a spontaneous mutant of *Rhizobium*, nitrogenase-depressed mutants in *Azospirillum*, synergistic effects of *Glomus mossea* and *Azospirillum brasilense* on growth of *Sorghum bicolor*, interaction between *Glomus constrictum* and *Sclesotium bataticola* in sorghum, nitrogen fixation and competitive survival ability

of certain antibiotic-resistant mutants of *Azospirillum brasilense*, development of high temperature-resistant strains of *Azospirillum* and two ectomicorrhizal associations present in species of *Eucalyptus* and pine.

Under the section 'Bioconversion, an article on 'Lignocellulose biotechnology, recent advances and technology prospects' by M. C. Srinivasan gives an update on the topic. Other articles under this section are H14 mutants in *Bacillus thuringiensis* with potential for producing entomotoxin and dehydroxy-phenyl alanine, detoxification of industrial effluents by microorganisms, screening of lignocellulytic white rot fungi for their suitability of use for bioconversion of wheat straw, environmental factors on cellulose and protein production by *Aspergillus niger*, growth and fermentation pattern of *Saccharomyces* sp 1L in different substrates, protein enrichment of cassava pulp by yeasts, biodegradation and utilization

of agricultural waste by fungi and growth of thermophilic fungi and growth of *Saccharomyces cerevisiae* in alginate gel matrix.

This book contains information on a wide variety of topics, some interesting articles by experts in the respective areas and several research papers representing routine experimental results on specific topics. Since the book mostly is of information on work done prior to 1988, it will not be appropriate to consider them as 'new trends' in 1992, particularly in an area like biotechnology. This emphasizes the need to bring out such edited proceedings of symposia in much more limited span of time. However, this will make a reference book for the research workers in the field of biotechnology.

RAJANI S. NADGAUDA

Division of Plant Tissue Culture
National Chemical Laboratory
Pune 411 008, India