

## BOOK REVIEWS

**Annual Review of Nutrition 1991.** Vol. 11. R. E. Olson, ed. Annual Reviews Inc., Palo Alto, California 94303, USA, 1991. 521 pp. Price: USA \$45, elsewhere \$50.

Volume 11 of the 'Annual Review of Nutrition' contains a prefatory chapter by F. J. Stare and 21 review articles on nutrition-related subjects in diverse fields like lipids, carbohydrates, amino acids, vitamins, inorganic nutrients, clinical nutrition, public health nutrition and comparative nutrition. Exploitation of the advances in molecular biology and biochemical genetics in the exploration of nutritional problems is exemplified in many articles.

While recounting his contributions to the biochemistry of respiration, vitamins, cholesterol, atherosclerosis and cardiovascular diseases and his encounters with eminent scientists during his formative years, Fredrick Stare, in his prefatory chapter, gives a historic account of the birth and growth of the Department of Nutrition at Harvard University.

In the area of energy metabolism, the use of doubly labelled water to measure energy expenditure in obesity, under-nutrition, pregnancy, lactation and growth and the key findings in the last five years are highlighted. Demonstration of higher energy expenditure by obese subjects than lean controls and formula-fed infants than breast-fed ones, the importance of body size and composition for energy expenditure as against adaptive thermogenesis and the energy costs of pregnancy, lactation and growth are adequately dealt with. Using  $^{31}\text{P}$  magnetic resonance spectroscopy, studies on high energy phosphate metabolism in various organs and metabolic disease states are reviewed by Zohar Argov and Britton Chance. Reduced energy state of cells was found in exercising muscle of fasting and low caloric diet fed humans and animals. Fasting and alcoholism reduce phosphorylation potential in liver. On carbohydrate metabolism, a chapter on the health effects of fructose is included in which hypertriglyceridemic, hyperinsulinemic and in case of gout, hyperuricemic effects of fructose are discussed. Fructose ingestion has no specific advantage over glucose in regard to exercise endurance or weight control and no detrimental effects on carbohydrate and lipid meta-

bolism in non-diabetic and non-insulin dependent diabetes mellitus subjects or on copper deficiency in normals. The other review by S. J. Pillis and T. H. Claus on hepatic gluconeogenesis and glycolysis addresses to structure-function relationships of substrate cycle enzymes, their gene structure, regulation and evolution. The application of molecular biology and molecular genetic techniques helped reap rich harvest in this area.

Lipid metabolism is covered in several chapters. Kinetics of eicosanoid formation and inactivation, interactions of  $n_3$ ,  $n_6$ ,  $n_7$  and  $n_9$  fatty acids and the moderation of  $n_6$  eicosanoid actions by dietary  $n-3$  fatty acids discussed in the chapter on prostaglandins are of potential interest to nutritionists. A review on the purification, characterization, molecular biology, biosynthesis, secretion and regulation of activity of lipoprotein lipase is also included. Stereochemistry of dietary triglycerides and the influence of structure on absorption and metabolism are reviewed in another chapter. A point of interest is the possibility of increased plasma concentration and arterial bed uptake of chylomicron remnants resulting from the intake of triacylglycerols with saturated fatty acids in 2-position as in the case of lard. Two articles are devoted to amino acid metabolism. One of them on glutamine describes its role as a substrate for the splanchnic bed, its interorgan metabolism in normal and catabolic states, its potential use in total parenteral nutrition and its role as a conditionally essential amino acid. The other article is on lysine pipercolic acid metabolism describing the biosynthesis of pipercolic acid from lysine, its oxidation in microbes and mammals, its relation to some peroxisomal disorders and its possible role in neurotransmission.

On the vitamin front the use of niacin as a drug is of general interest. Although the antilipolytic, antipsychotic, anticarcinogenic, anti-diabetic, hypocholesterolemic and vasodilating actions of megadoses of niacin are of limited value, it still holds first line position in coronary drug trials as antihyperlipidemic agent. Several interesting effects of niacin on lipoproteins,  $G_1$ -protein systems and pancreatic B-cells have been highlighted which deserve further attention. Another article on vitamin  $D_3$  receptors concentrates on the molecular

biology of vitamin  $D_3$  receptor which appears to belong to a super family of receptors of steroid hormones, thyroid hormones, vitamin  $D_3$ , retinoic acid and a host of related proteins for which ligands and functions need to be identified.

The topics dealing with inorganic nutrients discuss the role of thiomolybdates and Cu, Mo, sulphur interactions in ruminant nutrition, increased hepatic cholesterol synthesis and efflux into plasma as lipoproteins in copper deficiency and the effect of fluoride on skeletal histology, metabolism and osteoporosis.

The effect of nutritional status on the metabolism of drugs and other chemicals by hepatic mixed function oxidase system is dealt with in the article on dietary regulation of cytochrome P-450. Several points of interest to nutritionists have been highlighted which would help plan further studies.

There is an excellent review on the genetic aspects of animal models of obesity illustrating the use of cellular and molecular genetic methodology to isolate and identify genes syntenic with gene loci like *db*, *ob* and *fa* that lead to genetically determined obesity in laboratory rodents.

Nutritional regulation of insulin-like growth factors (IGF-I and IGF-V, earlier known as somatomedins or sulphation factors) and their binding proteins is an emerging area of immense interest to nutritionists. The review on these factors describes recent developments on autocrine, paracrine and endocrine actions of IGFs and how they mediate nutrient-dependent signalling for anabolic responses. The review on the effect of parenteral nutrition on bone and mineral homeostasis is of clinical interest and concludes that prolonged parenteral nutrition is not innocuous with regard to bone and mineral homeostasis.

An article related to public health nutrition reviews dietary patterns, serum lipids and the need for dietary intervention in children to reduce the risk of atherosclerosis and coronary heart diseases. Another topic in this category is on vegetarianism. Though highly publicised by some sections of nutritionists and lay men with inadequate knowledge of nutrition, it appears that there is no magical health giving property that automatically adheres to

vegetarian diets and regardless of their composition, protects health.

Finally a topic on comparative nutrition of cats and dogs is included. The topic assumes importance in view of increasing pet food sales and manufacturing regulations by USDA, FAD, AAFCO and feed control officials.

As usual, too many areas concerned with nutrition are covered in these volumes and grouping the topics into subject categories appears necessary.

N. LAKSHMAIAH

*National Institute of Nutrition,  
Hyderabad 500 007, India.*

---

**Reproductive Biology of Invertebrates, Vol. V, Sexual Reproduction and Behaviour.** Adiyodi, K. G. and Adiyodi, R. G. eds. Oxford & IBH Publishing Co. Pvt. Ltd., 66, Janpath, New Delhi 110 001. 1992. 511 pp. Rs. 450.

---

Invertebrates are becoming increasingly important in respect of human disease control, pest management, food production and pharmaceuticals. This book, fifth in the multivolume series, *Reproductive Biology of Invertebrates*, is devoted to sexual differentiation and behaviour of the various invertebrate phyla. Considering the fact that many invertebrate phyla are little known both biologically and systematically, only a few major invertebrate groups such as arthropods and molluscs contain justifiably adequate information on this topic. Sex determination is, in general genetic, but the sexual differentiation is influenced by epigenetic factors like cytoplasmic, developmental and environmental, to mention a few. Under-

standably, a variety of sexual patterns is expected to occur in different phyla in view of their diversified habitats both in the aquatic and terrestrial environments. Similarly, sexual behaviour also involves several factors such as mate location, sex recognition, courtship, receptivity, mating and post-copulative behaviour. Endocrine regulation of sex differentiation and behaviour has also received attention only in the highly evolved invertebrate groups. The lowly organized invertebrate forms with tissular body organization (*Porifera*) is not expected to reveal such type of controlling mechanisms inasmuch as they do not possess any organized nervous or endocrine centres. Nevertheless, they show tremendous capacity in sexualization, at cellular level. In *Porifera*, the cell lineages leading to the formation of the gonocyte as influenced by developmental factors is an interesting example.

By far, malacostracan crustaceans have received maximum attention in respect of hormonal control of sexual differentiation. It is in this group, a male hormone producing androgenic gland has been discovered for the first time among invertebrates. Remarkable strides have also been made in providing experimental proofs for not only the male and female sex differentiation but also various types of hermaphroditic functioning. Further, the sexuality as well as the behavioural patterns related to sexual activities have great relevance to the controlled culture of certain invertebrate forms of economic importance. For instance, many marine invertebrate forms are known to produce natural product with far-reaching pharmaceutical importance as well as physiological functions, which are not known to exist in the animals that

produce them. Furthermore, in recent years, aquatic invertebrates such as rotifers are assuming greater importance as live feed organisms in the aquaculture of both finfish and shellfish. The selection and isolation of a suitable strain or phenotype require adequate information on the sexual biology and behaviour. In this context, some of the chapters especially dealing with not-very-well-known invertebrate forms is commendable and the information contained is useful not only to the researcher, but also to those who want to exploit them commercially.

The book, however, suffers setbacks in some respects. For example, the chapter on Chaetognatha deals mainly with maturation and the factors influencing the gamete formation. Information on either sex differentiation or sexual behaviour, instead, should have more justification concerning topicality of the book. Several authors used different terminologies to indicate a variety of sexual patterns, viz, gonochorism, mono- and bisexuality, as well as several parthenogenetic forms. This creates confusion to the general reader. Of course, the editors have tried to adopt uniformity by discarding the synonyms used in the earlier literature. It would have been highly rewarding if a glossary is given for the important terminologies used in the text. Despite these minor observations, in general, the book is quite good in scope and content and should provide interesting reading to all invertebrate biologists.

T. SUBRAMONIAM

*Department of Zoology,  
University of Madras  
Madras 600 025, India*