

Starvation and semistarvation diets in the management of obesity by J. S. Fidler and E. J. Drenick; Nutritional application of the health and nutrition examination surveys (HANES) by Elizabeth Yetley and Clifford Johnson; Evolution of recommended dietary allowances — New directions by A. E. Harper.

The volume ends with a comparative nutrition assay on the pig as a model for human nutrition. A list of related articles from other Annual Reviews is also provided.

Most topics have received scholarly treatment. While the book is of special interest to research scientists practising clinicians and nutritionists will also profit from it.

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SCIENCE NEWS

INDO-UK SYMPOSIUM ON BIOMATERIALS TO MARK THE RAMAN CENTENARY— 5 AND 6 JANUARY, 1988, AT SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM

The coming years will undoubtedly see major advances in the development and applications of biomaterials. In this context, the two-day Indo-UK Symposium on Biomaterials organized at the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, as part of the Raman Centenary Celebrations was trend-setting. The purpose of the symposium was primarily to bring together a multidisciplinary group of scientists from the Indian universities for intensive interaction with experts from India and UK, on the state of the art and frontiers of biomaterials research.

The inaugural session, held at the Kanakakkunnu Palace was marked by a sparkling keynote by Dr Ramanna who stressed the vital need for self-reliance in biomaterials and devices-technology as in other areas of technology development. The scientific sessions started with an interesting presentation by Dr R. A. Mashelkar of the National Chemical Laboratory, Pune who spoke on transport phenomena and reaction engineering in living systems. Providing a chemical engineer's viewpoint, he drew analogy between the reaction processes in the living cell and those in a chemical plant. The human body, he pointed out, can be viewed as a chemical plant under the control of the brain. The conservation equations, such as the mass transfer, momentum transfer and energy transfer equations which applied to a chemical engineering plant apply to the human body as well. Future research should be based upon this basic premise, Dr Mashelkar emphasized.

Dr Gopinath of the Bhabha Atomic Research Centre, Bombay spoke on 'Radiation processed polymers as biomaterials. He dwelt upon the advantages of using gamma radiation for the production of polymeric materials for biomedical applications. He discussed the work carried out at BARC on the development of haemodialyser using activated charcoal coated with poly (vinyl alcohol). Cross-linked poly (vinyl alcohol) films prepared by gamma irradiation have been used by his group to detect urinary bilirubin.

Dr K. I. Petrark of UK highlighted the problems posed by the body's defence mechanism to the designing of materials for directed drug delivery. He discussed transdermal drug delivery systems which have assumed considerable importance in recent years. The thrust of the presentation of Prof. David Annis (UK) related to the development of small diameter vascular grafts. The University of Liverpool had been working on the development of a small diameter (< 6 mm) graft based on polyurethane fabricated by electrostatic spinning, a process developed by ICI, Inc. Prof. Annis said that such small diameter grafts should be microporous so that blood percolates into the pores and clots and promotes scar tissue formation. But for the biodegradability problems encountered lately and being overcome, polyurethane made by electrostatic spinning techniques holds promise for the production of small diameter vascular grafts.

Prof. C. H. Bamford (UK) who spoke on the modification of polymers for medical applications, discussed various chemical methods to alter the surface properties of polymers, without affecting bulk properties, to make them more blood and tissue compatible. He said that the incorporation of antiplatelet drugs into polymers could help in overcoming the problem of thrombus formation.

Dr David Williams of UK discussed the development of dental materials and dental implants. In restorative dentistry, the development of non-mercurial amalgam was described. Modified composites such as polyurethane dimethacrylates cross-linked with triethylene glycol dimethacrylate had been successfully used wherein the curing reaction could easily be done with visible light in less than a minute. Dr Williams also discussed the work done using single crystal sapphire as dental implants.

Prof. K. J. Rao of the Indian Institute of Science, Bangalore gave a lucid introduction to the dynamic nature of the complex chemistry of bones. Prof. S. Ramaseshan discussed the work done by his group at the National Aeronautical Laboratory, Bangalore on the preparation of titanium prostheses for bone replacement by the ion-milling technique developed by his team. He also discussed the use of very high molecular weight polyethylene for acetabular cup replacement.

Prof. Bonfield (UK) spoke on the problems associated with total hip replacement in young patients. The success rate of this implant surgery had been very high (> 90%) in the age group over 65, but in younger patients, the results were rather disappointing. Polyethylene prostheses impregnated

with hydroxyapatite are better materials for bone replacement. The problems in sintering polyethylene with hydroxyapatite were highlighted and the techniques to achieve satisfactory composites of the same were discussed. The session on bones came to a close after Prof. J. E. Davies (UK) gave an interesting account of the *in vitro* and *in vivo* models being used in the investigations on bone-cell/biomaterial interactions.

Dr A. Jayakrishnan (SCTIMST, Trivandrum) presented his work on the preparation and evaluation of hydrogel microspheres as artificial emboli for endovascular occlusion. Preparation of radio-opaque microspheres by impregnating them with barium sulphate or coupling with iodine compounds was discussed.

In the concluding scientific presentation, Dr K. Shivakumar (SCTIMST, Trivandrum) touched upon the salient features of the phenomenon of cell adhesion and discussed the important application of microcarrier culture. He described the work that led to the successful culture of human skin fibroblasts and human lung and heart cells on the hydrogel microspheres developed by Dr Jayakrishnan. Dr Shivakumar spoke on the potential applications of the hydrogel microspheres in the large-scale culture of anchorage-dependent animal cells.

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