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Technical Books Section

THE ITEM

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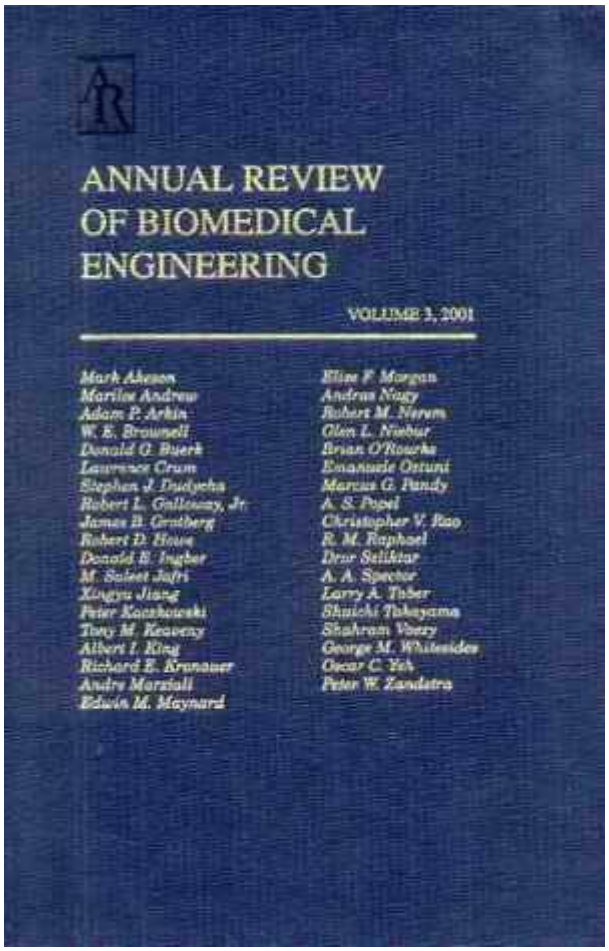
A REAL MASTERPIECE FOR ALL BIOMEDICAL ENGINEERS

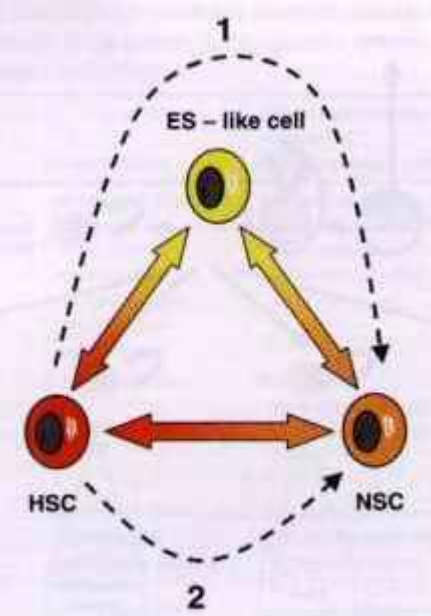
Annual Review Of Biomedical Engineering, VOLUME 3, 2001 *by* Martin L. Yarmush (Editor), Kenneth R. Diller (Associate Editor) and Mehmet Toner (Associate Editor), hard cover, 6"x9"
Annual Reviews, 4139 El Camino Way, P.O. BOX 10139, Palo Alto, California, USA : xxxix + 486 Pages: Publication Date: 2001: ISSN 1523-9829: ISBN 0-8243-3503-1: Price $67.00 (individuals), $155.00 (Institutions)



Biomedical engineering is a field of high entropy. Every day is a new dawn with new discoveries and theories coming up. The unique challenge is "*How to keep yourself updated*?" That is where the book under review comes to the rescue. It has a niche of its own, catering to the demands of varied people employed in this field, helps them cater to their forte.

It was a pleasure reading through the "*Annual Review of Biomedical Engineering Vol. 3, 2001*, published by *Annual Reviews*. It offers an excellent compendium of articles in the diverse field of biomedical engineering, which are richly illustrated and thoroughly cross-indexed. This field offers a unique challenge of integrating the sundry groups, which make up this unique and upcoming branch. Although the articles have not been organized into sub-topics, the articles cover a wide range of categories: biochemical engineering, bioelectrical engineering, biomechanical engineering, biomedical imaging etc.

The book is full of explanatory color diagrams such as this. This one appears facing page 281 in the chapter "Stem Cell Bioengineering". Through this diagram, the authors try to explain stem cell plasticity. Two mechanisms appear to be involved (1) Tissue-specific stem cells, such as hematopoietic stem cells (HSCs) may dedifferentiate through a pluripotent cell state [embryonic stem (ES)-like cells] to another tissue-specific cell. (2) Alternatively, the developmental capacity of tissue-specific stem cells may be broader than originally envisioned, allowing transdifferentiation of one cell to another as a result of specific microenvironmental influences. NSC, Neural stem cell.



The most impressive feature of all is the *Introduction* and the *Background* in the beginning of each article. It offers a baseline overview of the topic under discussion; this is immensely relevant since the readers of this book are from a very wide educational background. It helps a physicist understand the basic biology behind the article and a biologist gets his share of physics.

The book starts with a dedication to late Dr. Thomas McMahon, a pioneer in the field of biomechanics. The memoriam illustrates the brilliance of this fine educator. It is complete with excerpts from his books, illustrations of his experiments and personal experiences. Further, this volume has seven chapters dedicated to biomechanics in memory of Dr. McMahon.

The article "*Biomechanics of Cardiovascular Development*" by Larry A. Taber is an excellent review of the work done in this field. It presents the reader with relevant biology and goes on to discuss the intricate mechanical forces that come into play in the development of human cardiovascular system.

" *Visual Prosthesis by Edwin M. Maynard*" gives us insights into this exciting branch. It discusses the fundamentals of visual pathways and the various approaches (subretinal prosthesis, epiretinal prosthesis, optic nerve stimulation etc.) that are being used to restore vision in the blind. It also discusses the current problems and methodology of this complex science.

"*New DNA Sequencing methods*" by Andre Marziali and Mark Akeson is a lucidly written article on the current and upcoming methods being used for DNA sequencing. It explains the techniques and the principle behind each. It also gives details of the currently available DNA sequencing instruments. I really enjoyed reading it, my understanding and knowledge took a quantum leap. It is a must read.

> *...All the articles are adequately supplemented with tables, illustrations. The book comes with a extensive index and online links. It is a very good book for reference and meets the standards of Annual Review Series with its hard paperback cover and printing. A real masterpiece for all biomedical engineers...*

I have always been intrigued by stem cell research, however, my understanding on the subject was limited. I read "*Stem Cell Bioengineering"* by Peter W. Zandstra and Andras Nagy and the erudition

of the author was evident. It is a masterly article on the subject, explaining the complexity of the topic in a limpid manner. The article is supplemented with colorful illustrations that further enhance understanding. It discusses at length the various cell-lines, their culture methods, how their differentiation is controlled and how they are being used.

Another very interesting article was "*Image Guided Acoustic Therapy"* by Shahram Vaezy, Marilee Andrew, Peter Kaczkowski, and Lawrence Crum. It discusses the role of focused ultrasound in the treatment of tumors and to achieve haemostasis under Image guidance. The graphic illustrations are excellent and text offers insights into this unique technique which could revolutionize treatment in the near future. It is a must read for doctors and bioimaging enthusiasts.

Lastly, the article *"Respiratory Fluid Mechanics and Transport Processes"* by JamesB.Grotberg is like the cherry on the cake. The article explains the mysteries of airway transport with physical parameters and theories of fluid mechanics. After reading this article I got a new perspective on our respiratory tract and understood how this enigmatic array of tubes and sacs performs the tedious task breathing. It also explains the mechanics of ventilation and the physics behind the ever elusive lung sounds.

All the articles are adequately supplemented with tables, illustrations. The book comes with a extensive index and online links. It is a very good book for reference and meets the standards of Annual Review Series with its hard paperback cover and printing. A real masterpiece for all biomedical engineers.



-Pranav Jain
Dr. Pranav Jain is currently an intern practicing at one of the most reputed hospitals in New Delhi - the Lok Nayak Hospital. He has completed his graduation in medicine and surgery from the prestigious Maulana Azad Medical College, New Delhi. Dr. Jain likes spending most of his time with his PC. Reading and writing are his main hobbies. Biomedical Engineering is his special area of interest. He can be contacted at conky_doc@hotmail.com.

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-Editor-in-Chief

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