Book Reviews

The Growth Requirements of Vertebrate Cells in Vitro. Edited by Charity Weymouth, Richard G. Ham, and Paul J. Chapple. New York, Cambridge University Press, 1981. 550 pp. $69.50.

The study of cells in culture has revealed many basic cellular properties, but the use of this system is severely limited by the fact that established cell lines do not retain the characteristics of their progenitor cells. They differ morphologically, biochemically, and in genetic complement, almost always containing an increased number of chromosomes. That these abnormal cells have a selective growth advantage in culture indicates that we do not yet understand the environmental conditions required for normal cell function.

This realization, along with the increased use of cultured cells in genetic studies during the early 1970s, created a flurry of activity in the field with a corresponding glut of reviews. But since then no completely satisfactory review has been released.

This monograph is based on two symposia of the same title, which were supported in part by the Bureau of Biologics and The Food and Drug Administration. It provides an excellent, current review of the requirements for vertebrate cell proliferation in culture.

It is clearly the intent of the editors to present a comprehensive review. This is particularly apparent in Richard G. Ham’s insightful and masterfully organized introduction discussing the justification for and aims of the current studies. This introduction creates a certain unity among the thirty-five otherwise autonomous chapters.

The subjects covered range in scope from Jack Aronowitz's entertaining anecdotal discussion of purity to Norman Dulak’s presentation of somatomedin-like multiplication-stimulating factors in chicken embryo fibroblasts.

Some of the topics which are poorly handled include the effect of platelets on the establishment of primary cultures, the description of exogenous peptides that promote cell growth, and trace element requirements in defined media.

Two well-written, extensively referenced, and potentially very useful chapters are devoted to comparisons between the various defined media that have been developed during the past twenty-five years. Two other chapters with practical significance discuss the role of electrolytes, dissolved gases, buffers, and pH changes on cell growth properties.

There are also some very good data-presenting chapters; two of these deal with the growth-promoting agent acto-peptone dialysate, and three others cover the relationship between lipid metabolism and cell growth control.

It is important to point out that the theme of this monograph is not unique. Since L.E. Baker’s early work on the in vitro growth requirements of human fibroblasts in the mid 1930s, many reviews have been published. Some of these approach or exceed this volume in depth, breadth, and applicability. But this review has a distinct advantage in that it is almost eight years more recent than any other review of quality,
making it a fine reference book for the library of anyone interested in current cell culture studies.

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Biological/Biomedical Applications of Liquid Chromatography IV. Edited by Gerald L. Hawk. New York, Marcel Dekker, Inc., 1982. 367 pp. $55.00.

This volume contains selected papers presented at the International Chromatography Symposium IV. The selections were well chosen to form a volume that broadly covers the areas promised in the title. In fact, it could serve admirably as an introductory handbook for those who wish to examine areas where liquid chromatography can be used to advantage.

Preparation and analytical liquid chromatography of peptides on silica and reversed-phase supports, in addition to surface modified size-exclusion supports, are described in the volume. The advantages of recycle chromatography in peptide purification and the use of liquid chromatography for the preparation of radiochemicals are clearly shown. Examples of peptide and protein analysis and preparative chromatography constitute about one-third of this book.

Most of the remainder of the volume is evenly divided between analysis of drugs and naturally occurring metabolites. The coverage of drug analysis ranges from reviews to highly focused reports on the assay of a variety of drug classes (e.g., aphaalosporins and psychoactive drugs). Examples of analyses of naturally occurring metabolites include assays for various catecholamines, metabolic profiling of tryptophan metabolites, and the screening for inborn errors in purine and pyrimidine metabolism. Other areas covered include analysis of vitamins A and D, the use of ion-pair chromatography for determination of additives, and the use of size-exclusion chromatography for the assay of micromolecule-macromolecule interaction. Certain methods are more rapid with modern microporous supports rather than with swollen gels, and so offer much promise for the determination of physicochemical parameters of importance in biology.

In summary, this volume contains a good mix of selections of breadth and depth. It will be a valuable addition to the library of those who wish to see, by way of example, how chromatography can be used to solve biological and biomedical problems.

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Osteoarthro-Mechanics. By Dhanjoo N. Ghista. Washington, D.C., Hemisphere Publishing Corporation, 1982. 485 pp. $49.50.

Biomechanics is a broad field whose proponents range from the applied mathematician to the practicing orthopedic surgeon. The historical development of many of its clinical triumphs include the intertrochenteric fixation devices, the total hip, and now the total knee. Arthroplasty illustrates a learning phenomenon that may be peculiar to the field. Biomechanical principles are too often applied retrospectively to empirically derived clinical innovations, with subsequent discovery of major shortcomings that were probably avoidable.