betically unless there is a drug of choice, which then is listed first. Preparations are listed immediately following the drug that is their main ingredient.

Appendixes 1–3 contain pertinent information on drug interactions, intravenous additives, and borderline substances. A small formulary section also is included for dispensing those preparations commonly prepared extemporaneously, as are a dental formulary, an index of manufacturers, and an extensive subject index.

The BNF is a pocket book for easy referral, and thus cannot contain all the information necessary for prescribing and dispensing, but should be supplemented by manufacturer's data sheets and specialized texts as needed.

Future editions will be published twice a year to maintain current information on the drugs and preparations.

Staff Review

The Use of Alternatives in Drug Research. Edited by ANDREW N. ROWAN and CARL J. STRATMANN. University Park Press, 233 E. Redwood St., Baltimore, MD 21202. 1980. 190 pp. 15 × 23 cm. Price $24.50.

The advent of the National Toxicology Program has caused a rethinking of the procedures available for economical toxicological assessment of the thousands of chemicals to which people are exposed and the means whereby such exposure can be limited or prevented. This volume follows the pathway of chemical evaluation by *in vitro* systems designed to reduce, but not eliminate, the use of animals in pharmacological and toxicological research. As the various contributors state, there comes a time when only the whole animal will provide the final answer.

Hansch's contribution points out a logical manner in which modern drug modifications can be carried out *in vitro* utilizing computer techniques that allow rational changes in basic molecules to increase potency and decrease possible side effects, utilizing partition coefficients and binding to receptor sites. Many contributors point out that *in vitro* use of bacteria and cultured cells and tissues can indicate binding sites that cannot be determined by *in vivo* studies. Thus, the techniques that have been used to develop treatments for polio, mumps, and measles now can be used to screen antiviral chemicals to determine their antiviral potency and the maximum concentrations at which no toxic effects are caused to tissue culture cells.

Macrophages can be grown in culture, and *in vitro* studies of cellular immunity can be undertaken prior to whole animal testing. Micropharmacokinetics of various agents can be undertaken with this system. Protozoan diseases now can be studied with culture systems, and the various diseases afflicting humans and animals, such as trypanosomiasis, leishmaniasis, trichomoniasis, and amoebiasis, in either vector or vertebrate forms, can be evaluated for chemical susceptibility.

Pharmacologists have utilized both tissue slices and cell-free systems to study chemical biotransformations, enabling the evaluation of metabolic processes prior to introduction into whole animals, but the conjugation processes are not usually included in such studies and overall excretion may result in damage to such organs as the kidneys. However, tissue perfusion can eliminate this drawback partially. The mechanisms whereby both inorganic and organic chemicals exert their toxic effects on cell membranes and constituents can be studied with such models as amoeba proteus and isolated rat hepatocytes. Immunological preparations have been prepared by *in vitro* methods, but numerous biologicals have caused disease in humans because they contained live viruses; either the viruses were not killed during processing or they were not susceptible to the antiviral agent used. Thus, whole animal testing must be conducted.

By far, the greatest application of *in vitro* tests is the microbiological assessment of mutagenic and possible carcinogenic potentials of chemicals. Such methods are discussed by Rosenkrantz *et al.*, who point out the various modifications of microbial assays, the activation by S-9 fractions from various tissues, and the pitfalls encountered. However, such tests coupled with various cultured animal and human cell lines greatly assist in showing cell transformations and their possible link to the mutagenic and carcinogenic processes.

Of all *in vivo* tests used for the determination of skin and eye irritation, the Draize test has had the greatest application and has caused the most emotional impact. This eye test does not differentiate intermediate irritants and has a great degree of subjectivity. Recently, a cytotoxicity test was proposed based on the *in vitro* effects of irritants on I-929 mouse embryo cells. The results obtained compare favorably with eye irritation obtained in the Draize test. However, more work must be done to establish it as the method of choice.

In general, this symposium volume should indicate to pharmacologists and toxicologists that *in vitro* procedures should be applied to drug development and chemical evaluation during preliminary research. The succinct nature of the material presented and the extensive bibliography recommend this volume, and it should be in the library of all researchers and students in these fields.

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NOTICES

Scientific Considerations in Monitoring and Evaluating Toxicological Research. Edited by EDWARD J. GRALLA. Hemisphere Publishing Corp., 1025 Vermont Ave., N.W., Washington, DC 20005. 1981. 221 pp. 15 × 23 cm. Price $24.50.

Advances In Chromatography, Vol. 19. Edited by J. CALVIN GIDDINGS, ELI GRUSHKA, JACK CAZES, and PHYLLIS R. BROWN. Dekker, 270 Madison Ave., New York, NY 10016. 1981. 312 pp. 15 × 23 cm. Price $39.75 (20% higher outside the United States and Canada).

Recent Developments in Chromatography and Electrophoresis, 10. Edited by ALBERTO FRIGERIO and MALCOLM McCAMISH. (Analytical Chemistry Symposia Series, Vol. 3.) Elsevier/North-Holland, 52 Vanderbilt Ave., New York, NY 10017. 1980. 342 pp. 16 × 24 cm. Price $68.25.

High-Performance Liquid Chromatography: Advances and Perspectives, Vol. 1. Edited by CSABA HORVATH. Academic, 111 Fifth Ave., New York, NY 10003. 1980. 330 pp. 15 × 23 cm. Price $35.00.

High-Performance Liquid Chromatography: Advances and Perspectives, Vol. 2. Edited by CSABA HORVATH. Academic, 111 Fifth Ave., New York, NY 10003. 1980. 341 pp. 15 × 23 cm. Price $39.50.

Further Studies in the Assessment of Toxic Actions. Archives of Toxicology, Supplement 4. (Proceedings of the European Society of Toxicology meeting in Dresden, 1979.) Edited by P. L. CHAMBERS and W. KLINGER. Springer–Verlag New York, 44 Hartz Way, Secaucus, NJ 07094. 1980. 507 pp. 16 × 24 cm.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Supplement 2. Long-Term and Short-Term Screening Assays for Carcinogens: A Critical Appraisal. International Agency for Research on Cancer. World Health Organization, 1211 Geneva 27, Switzerland. 1980. 426 pp. 17 × 24 cm. Price U.S. $25.00 (Sw.fr. 40.00).

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Vol. 23: Some Metals and Metallic Compounds. International Agency for Research on Cancer. World Health Organization, 1211 Geneva 27, Switzerland. 1980. 438 pp. 16 × 24 cm. Price U.S. $30.00 (Sw.fr. 50.00).