

Sexual Differentiation of the Brain. Robert W. Goy and Bruce S. McEwen. MIT Press, Cambridge, MA, 1980. 223 pp., illus., index, \$17.50.

Sexual Differentiation of the Brain is based upon a work session of the Neurosciences Research Program which was held in May 1977. This book is in the same format as the proceedings of other sessions published in the Neurosciences Research Program Bulletin. It is a summary by Drs. Goy and McEwen of the conversations and presentations of some 20 persons who have worked in the general field of sexual differentiation of the brain.

After a definition of sexual dimorphism (two distinct forms of behavior exhibited in a single species) there is a review of the differences in behavior between males and females in various animals from birds to primates. Many differences are obviously related to reproduction, but many others are not so for example, levels of activity and extent of aggressive behavior. These differences are enumerated and discussed in terms of the effects of castration and hormone treatments in various types of animals.

As implied by the title, a principal concern is the role that the central nervous system plays in sexual differences. In at least some species there is a clear function of specific brain areas in determining sexual differentiation, but it is difficult to separate the portion under direct nervous system control from the portion under hormonal control, especially when hormonal levels are only partially regulated by nervous activity. In primates and most particularly in humans, there is the very important additional question of how much sexual behavior is learned.

While the results of many experimental studies are presented and discussed, the final conclusions are somewhat unsatisfactory. Much of our knowledge of the brain areas mediating sex-specific behavior comes from work on songbirds and fish. These studies, some of which are elegant, document that some specific sex-determined behaviors are controlled by specific sites in the central nervous system. However, it is somewhat difficult to extrapolate from a male canary's song to human sexual differentiation. The study of neural control of sexual differentiation in primates is in its infancy, although Goldman and associates have made some important contributions.

After a brief discussion of some aspects of genetic control, the authors discuss in detail the cellular and molecular aspects of sexual differentiation. Receptors for estrogens and androgens are asymmetrically distributed in the brain with greatest concentration in hypothalamus and limbic structures. In most respects these receptors appear similar to those for the sex steroids in peripheral organs. The receptor is located in the cell cytosol. After the steroid diffuses into the cell and combines with the receptor, the complex binds to nuclear sites and results in stimulation of RNA and protein synthesis. Most of our knowledge of the distribution of receptors comes from radioautographic localization of labeled steroid binding to the nucleus. Nothing is known, however, of the results of activation of such receptors in the brain. The situation is further complicated by the possibility that there are several different receptors for androgens, since testosterone and dihydrotestosterone have different effects.

This book has a considerable amount of information and many references on a variety of aspects of sexual differentiation, particularly as related to behavior. It is also interesting reading, with, for example, reports of fertile chicken hens documented as changing into fertile cocks after pathologic regression of the ovarian cortex. The book has all the advantages and disadvantages of the other proceedings of Neurosciences Research Program work sessions. It contains an enormous amount of information in semi digested form, well organized into appropriate sec-

tions. However, in spite of all the references it is often difficult to identify the source of evidence for a particular statement. Furthermore the original reports do not always say or even imply what is credited to them here.

Sexual differentiation of the central nervous system is a research field that has a long way to go. Unfortunately the results to date are essentially descriptive and not very satisfactory. These considerations limit this book value through no fault of the authors. The results are also somewhat dated, as there has been considerable progress since 1977, when the conference was held. There is not even a mention of plasma membrane receptors for steroids, reflecting the fact that their demonstration is relatively recent. Nevertheless, this book is an excellent review of a large literature in a new and complex area.

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Phosphate and Minerals in Health and Disease. Shaul G. Massry, Eberhard Ritz and Henri Jahn, Eds. Plenum Press, New York, 1980. 675 pp., illus., index, \$59.50.

This book is volume 128 of the continuing series -*Advances in Experimental Medicine and Biology*- and contains the proceedings from the Fourth International Workshop on Phosphate and Other Minerals held in Strasbourg, France, in June 1979.

Recent advances in the area of phosphate and mineral homeostasis are presented by an international panel of scientists in the field. The sixty-six contributions encompass both state-of-the-art analyses and presentations of original experimental information and are arranged in several categories. The major sections are renal handling of phosphate, calcium and magnesium; phosphate homeostasis in health and disease; phosphate depletion, and intestinal absorption of phosphate and calcium. Also included are topics on parathyroid hormone, bone and Vitamin D metabolism, and different aspects relating to nephrolithiasis.

This book serves as a useful reference for those actively engaged in research in this field as well as for those wishing to familiarize themselves with the current investigative effort in the physiological and pathophysiological aspects of phosphate and mineral homeostasis.

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