detail the morphological, biochemical, and functional consequences of immunosympathectomy. This process has been of considerable value as a research tool for studies of many aspects of adrenergic mechanisms, since it allows a very substantial destruction of the sympathetic nervous system to be achieved by a few simple injections. The use of this technique has, for example, helped to clarify the cellular localization of many of the enzymes associated with catecholamine metabolism.

On the other hand, immunosympathectomy has not proved to be the perfect tool for studies of the functional significance of the sympathetic nervous system. The technique unfortunately does not cause a complete destruction of the sympathetic nervous system and has no effect on catecholamines in the adrenal medulla or the central nervous system. The residual catecholamine stores, together with a supersensitivity to catecholamines which develops in most tissues, may well explain the rather disappointing absence of physiological effects of immunosympathectomy. Thus, the treated animals retain relatively normal cardiovascular control, temperature regulation, endocrine function, and behavior. They are, however, resistant to some forms of experimentally induced hypertension and more sensitive than normals to cold and other forms of stress.

It seems likely that the use of immunosympathectomy as a method for the experimental destruction of the sympathetic nervous system will be replaced by the newer techniques of "chemical sympathectomy" using the drug 6-hydroxydopamine. The latter compound causes a very extensive destruction of the sympathetic nervous system when administered to neonatal animals. Apart from its ready availability, 6-hydroxydopamine has the added advantage of being able to destroy adrenergic neurons in the central nervous system as well as in the periphery (see T. Malmfors and H. Thoenen, Eds., *6-Hydroxydopamine and Catecholamine Neurons*, North-Holland, 1971).

Nevertheless, the mode of action and the possible developmental significance of NGF and its antiserums remain neurobiological mysteries of the first order. The present volume does not answer these questions, but provides a useful source and review of background information. The contributions are written by world authorities, and the book is well produced with many good photomicrographic illustrations.

Anyone who reads this and the other two volumes referred to here will be well versed in the arts of chemical manipulation of the life and death of adrenergic neurons.

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Vascular Mechanisms

The Physiology of the Cerebral Circulation. M. J. PURVES. Cambridge University Press, New York, 1972. xiii, 420 pp., illus. $26. Monographs of the Physiological Society, No. 28.

The physiology and metabolic functions of the cerebral circulation resemble those of other vascular beds in some ways but differ substantially and importantly in others. These differences are particularly important in regard to metabolic permeability, the presence of specialized metabolic carrier functions, and the remarkable capacity of the cerebral vasculature to alter its arteriolar resistance in response to changes in the carbon dioxide and oxygen tension of the blood and the tissue. Being closely related to problems of human cerebral vascular disease, and for technical reasons having been most extensively and accurately studied in man rather than in animals, the cerebral circulation has received attention in numerous and recent reviews, symposia, and conference proceedings. However, this is the first English-language textbook on the subject. The volume departs somewhat from the more clinically oriented treatment that has marked many other reviews on the subject and usefully discusses the cerebral circulation more from the standpoint of the general physiologist. In doing so, it gives rather more attention to animal experiments and less to the lessons learned from observations on man than is usually the case. The text, which is clearly written and traditional in its approach, goes from general to specific considerations—first anatomy, then to hemodynamics, then to factors regulating vascular resistance, and finally to the relation of cerebral blood flow to metabolism and to pharmacological agents. The illustrations are well chosen and clear and the writing is for the most part sensibly didactic and well balanced. The enormous bibliography in the field has been reduced to a generally well chosen list of references, although few are more recent than 1969, which is a handicap for those actively working in this rapidly changing field.

One of the main features that differentiate the volume from other treatises on the subject is its meticulous description of older anatomical and physiological experiments, many of which modern workers may have overlooked or forgotten. The volume also gives considerable and accurate attention to the anatomy and possible function of the extensive innervation of the cerebral vascular bed, citing much often neglected material. Methods of measuring the cerebral blood flow are presented in detail and with critical evaluation. The influence of nervous control of the cerebral circulation is Purves's special interest, and he interprets as favorably as the facts will at present allow the often conflicting evidence for neurogenic influences on the cerebral circulation. This area of investigation undoubtedly will attract more attention during forthcoming years; hence this is an especially valuable part of the book.

The close couple between cerebral blood flow and metabolism is well described, as are many of the main unsolved physiological problems related to it. However, the fastest moving research has been on this aspect of the cerebral circulation, and several important recent studies are omitted from the volume. Thus it is disappointing to find no mention of the work of Kogure *et al.* linking cerebral tissue lactate production to vasodilatation in hypoxia, or of Ter Pogossian's remarkable new techniques for simultaneously measuring cerebral blood flow and metabolism in man with the use of intracarotid injections of oxygen-15. Such probably unavoidable omissions, plus the fact that the author largely avoids consideration of how disease alters the cerebral circulation, mean that the volume will be useful mainly to students of general physiology and introductory students of medicine. For them, as well as for those who need a solid grounding in the classical literature and concepts on the subject, the book is to be highly recommended.

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