Excitation and Inhibition. Synaptic Morphology. By K. UCHIZONO. (Pp. v+218; 176 figures; 9 tables; US $47.95.) Tokyo, Igaku Shoin; Amsterdam, Oxford, New York: Elsevier. 1975.

This luxuriously produced monograph is concerned with putting the argument in favour of the structural similarity of excitatory and inhibitory synapses. This is the S–F hypothesis by which the presynaptic terminals containing spherical vesicles are considered excitatory and those containing flattened vesicles are looked on as inhibitory. The argument is put by means of a series of short review chapters on the development of the concept of excitation and inhibition; the S–F hypothesis; the mechanism of synaptic excitation and inhibition; the physiological classification of neurons; the release mechanism of transmitters and their relation to vesicles and membrane recycling; transmission in a sympathetic ganglion; transmitter substances; and a criticism of the S–F hypothesis.

The greater part of the monograph is taken up with 114 full page (22 × 16 cm) electron micrographs of synapses and other structures in the central nervous system of some mammals (mainly cat cerebellum) and of the frog and toad. The majority are of excellent quality, though some of the amphibian material seems poorly fixed. Some of these plates have been overprinted in colour to demonstrate clearly the distribution of the two types of synapses (S and F). There are also electron micrographs of parts of the peripheral nervous system, mainly of the crayfish, and several excellent line drawings, many culled from other authors, are placed at appropriate points in the text. It is unfortunate that the numerous plates are not referred to in the text so that it is very difficult for the reader to find appropriate illustrations. Inevitably this leads to frustration and gives the impression that many of these plates have little or nothing to do with the argument – a feeling strengthened by the introduction of parts of a few of the crucial illustrations into the text. Also, the captions for several of the plates either do not indicate the part of the nervous system or state the animal from which the illustration was obtained.

The reader will be grateful to Professor Uchizono for having written the text in English, but is bound to regret the poor quality of the proof reading, which has passed so many obvious typographical errors, and the fact that the quality of the English is not always adequate to make the meaning entirely clear at crucial points in the argument. For example, figure 38, which presumably illustrates two synapses in crayfish muscle, is labelled 'Two types of synapses in vertebrate muscle'; or the statement of the new hypothesis ' – structure specificity of transmitters – which implicates that the same transmitters show the same structure irrespective of the functional difference of the transmitters'.

Nevertheless there is much of interest in this book, which has an excellent bibliography. It is certain to stimulate discussion and disagreement. Anatomists can only be pleased that a physiologist has applied so much energy and expertise to correlating structure and function, even if the newer developments in the structure, physiology, and pharmacology of synapses have led the author to a cautious interpretation of the S–F hypothesis. He ends by saying of the hypothesis that it is 'still too simple and immature... If applied carefully and correctly with some reservations, it will work nicely as a guide-line for physiology and morphology of the nervous system in general.'

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