Basic neurosciences

Editorial

Neurology has always been considered to be based on a sound knowledge of basic neuroscience with a 'Sherlock Holmes' approach to localization in the brain. At a recent meeting of the editorial board of this journal, we were told by our distributors that some of the Clinics in Developmental Medicine had too much emphasis on basic neuroscience. I have been described as belligerent because of my constant nagging at these meetings about the lack of good basic research papers in the field of paediatric neurology. However, looking at other paediatric journals and performing a mental geographical tour of known paediatric research units, there does seem to be a genuine paucity of fundamental research in this area.

In terms of the neurosciences, we live in exciting times, allowing clinical doctors more scope for diagnosis and treatment of children than ever before. However, some university anatomy departments have been disbanded and others, which are usually dominated by cell biology, have so few members who know any human anatomy that it is difficult to find lecturers to teach undergraduate medical students. Also, if one hears the inaugural lectures of professors of say anatomy, zoology, pharmacology, or genetics, one often cannot tell the speciality of the Chair: so many lectures focus on cell and molecular biology. As a result, we may see a generation of doctors who have little idea of the anatomy and physiology of the brain or of how to examine the nervous system. It is already obvious that our clinical colleagues have a better knowledge of neuroanatomy and neurophysiology than many doctors: the physiotherapists' knowledge of myology and osteology; the speech therapists' knowledge of speech, language, and the brain's mechanisms controlling them; the psychologists' knowledge of brain physiology and anatomy as well as behaviour and learning; and the technicians' knowledge of EEG, and so on, may outweigh that of the doctor.

The advent of MRI demands a good knowledge of neuroanatomy. Functional MRI studies have allowed brain function to be divided into smaller and smaller anatomical units. Clinical neurophysiology should not only encompass EEG, nerve conduction, EMG, and evoked responses but also gait analysis, measurement of cerebral blood flow, assessment of the autonomic nervous system, and so on, as well as sophisticated studies of perceptual problems with hearing and vision. The clinician may have to perform and report on some of these, but interpret all of them. If we also consider the newer sciences of cell biology, neurochemistry, neurogenetics, neuropsychology, neuropharmacology – all of which have led to the explosion of knowledge such as the control of human brain development, the role of neurotransmitters, ion-channel abnormalities, together with increasing knowledge of memory and learning, we realize that one person cannot cover this in 5 years, let alone 3.

A medical degree must continue to include the *lingua franca* of basic neuroscience if it is to be of value in the training of a future clinical neuroscientist (neurologist, rehabilitation specialist, neurosurgeon, neurophysiologist, or neuroradiologist). A glance at some of the proposed changes to the medical undergraduate curriculum for the millennium may suggest an even less 'scientific' but more 'touchy feely' doctor with greater management and accountancy skills.

For universities to increase their government funding, a huge research grant from an external body and original papers in a journal with a high score on the citation index are most important. Research rating now drives the central institutions of learning. Teaching is not considered meritorious nor the writing of chapters in books; such 'scholarship' is actively discouraged. Clinical research is also regarded as inferior to laboratory research, so universities are reducing the number of lecturers in the clinical field.

The knowledge of brain anatomy and physiology, and the understanding of how we learn due to the enormous progress in molecular biology (supported by recent functional MRI studies) have begun to give us more in-depth knowledge of the brain as the organ of learning – some of these thoughts have been recently reviewed in 'A Neurodevelopmental Approach to Specific Learning Disorders'[1]. A certain fundamental language based on facts, that is, basic science, is necessary to form concepts in order to develop understanding. Only then can we compare and contrast these concepts and thus reason. The alternative is a parrot-fashion style of learning of guidelines and protocols. Perhaps now is the time for universities to look at how we learn, and arrange the curriculum and type of teaching accordingly; the curriculum must include basic neurophysiology and neuroanatomy.

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Reference

1. Whitmore K, Hart H, Willems G, editors. (1999) *A Neurodevelopmental Approach to Specific Learning Disorders. Clinics in Developmental Medicine No. 145.* London: Mac Keith Press.

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