Correspondence

Central nervous system regeneration

Sir,
I read with interest Dr A. Williams’ article, ‘Central Nervous System Regeneration—Where Are We’, in which he describes how remyelination can take place in the brain and spinal cord of patients with multiple sclerosis, a process which, until recently, had been thought not to be possible. It is still a dogma that there is no regeneration of neurones. However, it may be that this doctrine can now be challenged. In 1981, John Williams1 and I described the first study of brain changes in Wilson disease, as revealed by computerised tomography scanning, showing multiple anomalies. Fourteen of the 60 patients studied showed hypodense lesions in the basal ganglia, strongly suggesting loss of neurons, changes that corresponded with the cavities shown by Wilson in patients dying of Wilson disease.2 But in our series, patients studied after treatment with penicillamine or trientine showed resolution of these lesions that corresponded with a remarkable recovery of function. A later study3 using magnetic resonance imaging scanning confirmed these findings. It is difficult to understand how such a structural and functional recovery could occur without regeneration of neurones. What other explanation is available?

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References

Response to letter to editor from Dr Walshe

I am delighted that Dr. Walshe has written to me with a comment on my article about research advances in central nervous system regeneration,1 where I concentrate on remyelination—it is a pleasure to correspond with such an important figure in the history of Wilson’s disease.

I think that Dr. Walshe is correct that the dogma ‘central nervous system neuronal regeneration in the adult human is impossible’ no longer stands. It is now well accepted that adult human hippocampal neurogenesis leading to functional integrated neurons occurs,2 even up to the fifth decade.3 Adult olfactory bulb neurogenesis is extensive in rodents but not found in humans. Instead, neuroblasts in the human lateral ventricle wall (but not rodent) have recently been found to integrate into the striatum, forming interneurons.4 It is hypothesized that the newborn neurons in the hippocampus significantly contribute to learning and memory in humans and may even contribute to what ‘makes us human’, as this seems more extensive than in rodents. Conversely, rodents rely much more on olfactory cues, perhaps making them ‘more rodent’. The function of newborn neurons in the striatum is as yet not known but may contribute to motor, cognitive and psychiatric outputs, and there is a lack of postnatally generated neurons in striata of patients with Huntington’s disease.4 Human neurogenesis may even occur as a regenerative response to disease, as putative neuroblasts have been identified in the human striatum after stroke.5 Therefore, the findings suggestive of neuronal regeneration that Dr Walshe found in Wilson’s disease patients 30 years ago are being now confirmed at least in specific areas of the brain at the cellular level, and this does provide hope that these neurogenic responses may be therapeutically harnessed in the future.

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