Aluminium – Alzheimer's link?

SIR — Landsberg *et al.*¹ claim that “the most direct evidence for the link between aluminium and Alzheimer's disease stems from reports of granular aluminosilicates found in neuritic plaque cores”. This hypothesis is not supported by evidence. Terry *et al.*, for example, have found no correlation between numbers of plaques and severity of dementia in Alzheimer's patients; a weak correlation with neurofibrillary tangle density; and a high correlation with synaptophysin-containing neurites². This raises the question of whether aluminium associated with plaques would be relevant to the clinically important dementia of Alzheimer's. If aluminium does play a role, it is important to know its localization to examine its pathological significance.

Landsberg *et al.* state that their novel instrumentation (PIXE) is highly sensitive. Having failed to demonstrate the presence of aluminium in neuritic plaque cores in unstained sections, they conclude that demonstration of aluminium by previous research using other methodology was probably due to contamination. Yet Landsberg *et al.* did not present positive controls in the form of cellular matrix-bound aluminium. Their specimen, stated to be from the brain of a patient with Alzheimer's, would have contained neuritic plaques interspersed with tangle-bearing neurons. If Landsberg *et al.* had looked at these tangles or neuronal nuclei and showed the presence of matrix-bound aluminium in neurofibrillary tangles or in nuclei, significant knowledge would have been gained regarding the use of their novel technique to answer questions of histological aluminium compartmentalization. This would have been of particular importance because the presence of aluminium in neurofibrillary tangles in unstained sections using different instrumentation and procedures has clearly been demonstrated (see the recent Scientific Correspondence by Good and Perl³). Further, a study by Lovell *et al.*⁴ clearly shows aluminium accumulation in nuclei and neurofibrillary tangles of Alzheimer's brains using laser microprobe analysis. We have shown, using electrothermal atomic absorption spectrophotometry, that nucleosomal fractions from Alzheimer's brains contain up to nine times as much aluminium as controls⁵.

Having failed to demonstrate aluminium in neuritic plaques while being able to detect contaminating aluminosilicate particles, Landsberg *et al.* state “previous evidence that aluminium is involved in the aetiology of Alzheimer's disease should be reviewed”. With this

conclusion the authors disregard or challenge all previous work relating aluminium and aluminium-induced toxic effects on the central nervous system in people with Alzheimer's⁶. Contrary to the opinion of Landsberg *et al.*, which was widely quoted by the popular press, we believe that evidence suggesting a link between aluminium and the pathogenic process in Alzheimer's disease cannot be dismissed.

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Illusion and view stability

SIR — Carman and Welch¹ argue that illusory contours and surfaces retain their shape over changes in position and orientation relative to the observer (view stability). We would like to provide an example of illusory surfaces that do not exhibit three-dimensional view stability. The inducing pattern was devised by W. Ehrenstein² and is shown in Fig. 1a. When this pattern is viewed at arm's length straight on, the illusory bright patches observed are round and delineated by circular illusory contours. When the pattern is viewed at a slanted angle as described in the figure legend, the illusory patches become deformed and assume oval or squashed shapes.

The illusory surfaces used by Carman and Welch are induced by solid luminance edges while those shown in Fig. 1 are induced by the ends of lines. It has been proposed that these two types of illusory surfaces are induced by different mechanisms³, and they may have different neurophysiological correlates^{4,5}. Moreover, Watanabe and Cavanagh⁶ showed that, generally, illusory surfaces induced by solid luminance edges resist depth capture while illusory surfaces induced by line ends do not.

Note that, under the slanted viewing conditions, the black lattice inducing the illusory patches and the page on which it is printed are perceived as shape-invariant. Nevertheless, there is no view stability for the illusory patches. This finding may indicate that the process of morphopsis¹ is based on local informa-

FIG. 1a, Ehrenstein's original pattern². Bright illusory patches are seen in each gap. When this pattern is viewed at arm's length straight on (visual axis perpendicular to the page), these patches usually appear round and are delineated by a circular illusory contour. When the page is now tilted so that the Ehrenstein pattern is seen at a slanted angle, the illusory patches are no longer round but assume oval or squashed shapes, depending on the degree of tilt. This deformation is more pronounced if the slanted pattern is viewed from the side (along one of the diagonals) (b). The deformed illusory patches in a pattern presented this way have a shape similar to patches induced by a correspondingly pre-deformed pattern that is viewed straight on (b). This indicates that the position of the observer, relative to the inducing pattern, has little or no influence on the form of the illusory patches under these conditions, and there is no three-dimensional view stability.

tion restricted to the immediate surroundings of the illusory surface, that is, to the line ends, rather than on more global features of the Ehrenstein lattice. The binocular disparity signals provided by the line ends are probably too weak⁶ to generate view stability.

Although our observations do not necessarily contradict the general concept of view stability proposed by Carman and Welch, they do provide an exception which awaits an explanation.

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