the multiple sclerosis lesion increased only by a factor of 4 from normal. This contrasts with our MR findings using Gd-DTPA, in which signal enhancement is high (approximately 100%) in enhancing lesions, and negligible (< 3%) in normal white matter.[3] These MR findings suggest that the BBB permeability is enhanced by at least a factor of 30 in active multiple sclerosis. At 45 minutes after contrast injection MRI shows uniform enhancement, like HVD-CT.[4] However, at shorter times (5–10 minutes) ring enhancement is usually seen in lesions > 5 mm in diameter,[4] which is consistent with pathological descriptions of active inflammation and demyelination at the perimeter of multiple sclerosis plaques.[5] Later enhancement in the older, inner core of the lesion is probably caused by diffusion inwards from the ring enhancing edge. Using the CT scan to delineate the region of interest on the PET scan will produce a mean K_i over the *whole* lesion, thus significantly underestimating the K_i of the active ring-like part with defective BBB. The true K_i will be greater by approximately the ratio of total lesion area to ring area, that is, as much as twenty times higher. Even if the correct region of interest was used, PET is intrinsically incapable of resolving the ring enhancement in multiple sclerosis because its spatial resolution is too poor (9 mm in the plane of a 16 mm thick slice). Our preliminary measurements of K_i in the active part of the lesion using dynamic MRI scanning suggest values of K_i in the range 0·012–0·06 ml $g^{-1}min^{-1}$ (3 lesions) that is 10–50 times higher than in the authors' table 3.

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Pozzilli et al reply:

We are grateful to Drs Tofts and Kermode for giving us the opportunity to rectify a typographical omission in our article. In tables 2 and 3 the Vp should have been multiplied by 10^{-2}, as correctly shown in our previous paper,[1] and in the summary the values of Ki are $\times 10^{-4}$. Clearly this omission solves a contradiction which is only too apparent. The values of Vp in the range of $3·3–4·5 \times 10^{-2}$ ml g^{-1} are in agreement with the values of CBV reported in the literature.[2,3]

Drs Tofts and Kermode, on the basis of signal enhancement, reach the conclusion that BBB permeability should be increased by a factor of 30 in active multiple sclerosis. This, according to them is in contrast with the increase by a factor of four reported by us. We frankly have some difficulty in comparing the two sets of data since one originates from a signal enhancement ratio and the other from a numerical value of Ki calculated on the basis of a kinetic model for the passage of substances across the BBB.[1]

Unfortunately we are unable to comment on the value of Ki measured with MRI since the underlying assumptions and the mathematical formulation of the method are neither reported in the letter, nor in the quoted reference. It should be pointed out, however, that Ki approaches in magnitude the permeability-surface area product (PS) only when $PS \ll F$ (where F = blood flow).[4] Values of Ki as high as 0·06 ml $g^{-1}min^{-1}$ would suggest that PS approaches F in magnitude. In these circumstances Ki is not only expression of PS, but would also depend upon blood flow. Thus for a correct evaluation of PS a measurement of local blood flow would be required.

Finally, our recent experience on Gd-DTPA suggest that ring enhancement in patients with multiple sclerosis is an uncommon finding. Moreover, none of the patients reported in our study showed a ring enhancement in the high volume delayed (HVD) CT scan.

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Encephalopathy, deafness and blindness in young women: a distinct retinocochleocerebral arteriolopathy?

Sir: The recent paper by Bogousslavsky *et al*[1] documenting three patients who developed progressive neuropsychiatric and neurological disturbances with hearing loss and multifocal retinal artery branch occlusions, requires some comment.

Their first patient demonstrated an abnormality of the T-helper/suppressor cells in blood suggesting an immunological disturbance. This patient also showed elevations of the CSF protein and erythrocyte sedimentation rate. Their third patient, in addition to an elevated ESR of 27 mm/hour, also demonstrated positive antinuclear antibodies (1:320) as well as positive rheumatoid factor (1:160), and low complement levels were later also discovered.

We would draw attention to the recently defined "primary" antiphospholipid syndrome.[2] These patients may develop multi-infarct dementia,[3] and vascular occlusions occur, involving both venous and arterial circulations. Indeed there appears to be a strong association between the retinal vasculopathy described and the presence of CNS disease.[4,5] As many as 40% of these patients may be ANA negative, and there is only a 60%–70% concordance between "lupus anticoagulant" activity and the presence of anticardiolipin antibodies (aCL). The VDRL may only be positive in 20%–30% of patients. Other immunological dis-