Sir, We congratulate Calabresi et al. (2010) for the scientific commentary regarding retinal pathology in multiple sclerosis. The authors have excellently summarized the pathological mechanism in multiple sclerosis in the brain and retina. We would like to make a contribution to the retinal aspects of their comments.

Full-field flash electroretinogram is the mass electrical activity of the retina to a flash of light. Pattern electroretinogram reflects the retinal response to a structured, contrast-reversal stimulus, mostly a checkerboard pattern. There have been many studies investigating the functional and structural retinal changes in the retinas of patients with multiple sclerosis. Mostly, optical coherence tomography has been used to explore the structural changes that show retinal nerve fibre layer thinning. This change was linked to the retrograde axonal degeneration in ganglion cells, as the retinal nerve fibres lack a myelin sheath.

In a recent study, we investigated the full-field flash electroretinogram changes in multiple sclerosis (Gundogan et al., 2007). The N95 component of pattern electroretinogram originates from the ganglion cell function and many studies have shown N95 amplitude reduction in patients with multiple sclerosis with or without optic neuritis history. However, we found that rod response b-wave amplitude was significantly reduced and standard-combined response a- and b-wave implicit times were significantly delayed in patients with multiple sclerosis. In addition, patients with multiple sclerosis with a delayed P100 latency (as assessed by 95% confidence interval in control subjects) had significantly reduced cone response b-wave amplitude and, significantly delayed cone response a- and b-wave implicit times (Gundogan et al., 2007). These findings were surprising, as these data showed photoreceptor cell dysfunction in the retina. The photoreceptor cell layer is the outermost layer of the retina and retrograde transynaptic retinal degeneration as distal as that layer does not seem reasonable. Moreover, a study that was conducted by Hollander et al. (1984) in cat eyes, showed that pathological changes in the retina after transection of the optic nerve were restricted to the innermost layers by light and electron microscopic examinations (Hollander et al., 1984). As mentioned by Calebresi et al. (2010) in their commentary, Green et al. (2010) reported a post-mortem analysis of eyes from 82 cases of multiple sclerosis and 10 control patients. The authors reported extensive retinal atrophy with shrunken neurons and dropout of both retinal ganglion cells in 79% of eyes and inner nuclear layer atrophy in 40% of eyes from patients with multiple sclerosis. As Calebresi et al. (2010) stated, the study by Green et al. (2010) is the first description of inner nuclear cell layer loss in multiple sclerosis. Calebresi et al. (2010) named this new finding as a ‘paradigm shift’ in the understanding of multiple sclerosis. However, as we mentioned above, this finding was showed in an experimental model in 1984. The importance of the study by Green et al. (2010) lies in the fact that this is the first study in the post-mortem human eye.

We believe that the findings reported by Gorczyca et al. (2004) were a cornerstone in the understanding of retinal damage in patients with multiple sclerosis. The patients whose sera showed the highest reactivity with 41 and 46 kD antigens had deficiencies in visual acuity, visual fields, ophthalmoscopy and
electroretinograms. Multiple sclerosis has been associated with pars planitis, suggesting an immunological link between the uvea and central nervous system. Pars planitis and multiple sclerosis are both associated with the HLA-DR15 allele. All of these findings, in addition to our study, suggest an immune-mediated mechanism that is responsible for the damage in the outer layers of the retina in patients with multiple sclerosis.

References