Diabetic Neuropathy: A focus on small fibres

The accurate detection and quantification of human diabetic neuropathy (DPN) are important to define at risk patients, anticipate deterioration, and assess new therapies. Current methods lack sensitivity (QST), require expert assessment and focus only on large fibres (neurophysiology) or are invasive (skin/nerve biopsy). Our studies in patients with diabetic neuropathy have shown that loss of IENF and dermal nerve fibres may be related to reduced expression of VEGF (Quattrini et al, 2008, Krishnan et al 2007). Additionally, diabetic neuropathy lacks a non-invasive surrogate for nerve damage and hence we do not have a microalbuminuria equivalent of diabetic nephropathy. However, our recent NIH, JDRF and DUK funded research using corneal confocal microscopy (CCM) suggests that this non-invasive and hence reiterative test might be an ideal surrogate endpoint for human diabetic neuropathy. Thus CCM accurately quantifies corneal C-fibre morphology and reflects the severity of peripheral neuropathy in diabetic patients (Malik et al, 2003; Kallinikos et al. 2004). This led us to suggest that CCM may be an ideal non-invasive and hence reiterative surrogate marker for detecting small fibre damage in diabetic and other peripheral neuropathies (Hossain et al, 2005).

More recently, we have shown that corneal nerve damage assessed using CCM relates to the severity of intra epidermal nerve fibre loss (Quattrini et al, 2007), results in loss of corneal sensitivity (Tavakoli et al, 2007) and can detect early small nerve fibre regeneration following pancreas transplantation in diabetic patients (Mehra et al, 2007).