Corneal Diabetes: Where to Next?

Impairments are almost inevitable, mainly due to the fact that the eye has been exposed to hyperglycemia long-term and the basement membrane has accumulated enough toxic end products to lead to cell death, opacity, and eventually vision impairment.

In terms of research, in vivo, scientists have concentrated for years on animal studies and developed a variety of animal models both for T1DM [15-19] and T2DM [20-28], as recently reviewed by King [29]. However, there is a significant lack of reproducible paradigms of human DM complications and rather disappointing results when rodents’ treatments are tested on humans. In vitro, there are quite a large number of studies looking into nerve pathologies and corneal sensitivities [9,11-14,30,31]. Perhaps the most advanced model is the organotypic cultures, developed by Ijibimov and co-authors [32,33], for the identification of epithelial defects in DM. Even still, we are far away from our ultimate goal which is to treat and prevent corneal damage and vision impairment.

In summary DM is a multifactorial disease and when it affects the human cornea there is a variety of factors that we have to consider if we are going to treat any defects. Clearly, both in vivo and in vitro studies are necessary and huge advancements have been made over the last ten years, but we need further and greater understanding of the molecular events at the initial stages of the disease.

References