Cultivating corneal epithelial cells from the limbus

Chinese researchers have reported first-time success in deriving a human corneal epithelial cell line from a normal human limbus. The cells retain differentiation potential and proliferative properties under continuous cell culture. The cell line emerged spontaneously after 50 passages of serial cultured epithelial cells. The researchers were able to create stratified multilayer epithelia by growing the cells on an air-liquid interface. The researchers believe the cell line could be very useful both as a research tool and clinically for reconstructive corneal tissue engineering.


Understanding photoreceptor degeneration

Investigators in the US reported results from in vivo studies that provide key information on photoreceptor degeneration – the conducted genetic studies of X-linked hereditary retinal degeneration (choroideremia) in a zebrafish model. They wanted to determine whether photoreceptor degeneration results from autonomous defects in opsins transport within the photoreceptor or as a non-autonomous and secondary consequence of RPE degeneration. A series of studies showed that photoreceptor degeneration was non-autonomous and required contact with the mutant RPE as mutant photoreceptors were rescued in wild-type hosts and wild-type photoreceptors degenerated in mutant hosts. They conclude that mutations in Rab escort protein-1 (REP1) disrupt cellular processes in the RPE, which causes photoreceptor death as a secondary consequence. This suggests that therapies that correct the RPE may successfully rescue photoreceptor loss in choroideremia.


Avastin used in to treat radiation optic neuropathy

Bevacizumab (Avastin, Genentech), which has recently shown promise in the treatment of macular degeneration and diabetic retinopathy, could also be a useful treatment for ocular and non-ocular radiation neuropathy. Researchers in New York City evaluated intravitreal bevacizumab treatment for radiation optic neuropathy. A single patient with symptoms of decreased vision associated with radiation optic neuropathy received treatment with 1.25mg of intravitreal bevacizumab. The patient’s vision improved from 20/32 to 20/20 within one week of therapy. The optic disc haemorrhage was also reduced. The researchers noted decreased haemorrhage and optic disc oedema at six weeks, using photography, angiography and OCT/SLO. The haemorrhages resolved and the patient’s disc margins were sharp in the following months. The treatment was well tolerated with no adverse effects. The researchers believe that anti-VEGF therapy deserves further investigation for this indication.


CMV retinitis declining

Investigators at Johns Hopkins University reported some good news on the AIDS front. Results from a large cohort study indicate that CMV retinitis, formerly considered an end-stage phase of AIDS, is on the decline. They attribute this “substantial” decline to successful use of highly active antiretroviral therapy (HAART). Nonetheless, they caution that new cases of CMV retinitis continue to emerge, and that patients with longstanding disease still require careful management.


JCRS Highlights

Pupil size and multifocal IOL outcomes

Pupil size is correlated with visual acuity and contrast sensitivity in eyes implanted with an apodised diffractive intraocular lens (AcrySof ReSTOR, Alcon). A six-month follow-up study of 670 eyes of 335 consecutive patients showed that a larger pupil correlated significantly with better distance visual acuity, but also with worse near visual acuity with the diffractive intraocular lens. Intermediate visual acuity worsened significantly for all pupil diameters as the distance of the test increased. Distance photopic contrast sensitivity and mesopic contrast sensitivity were better in patients with large pupils than in patients with small pupils. The researchers called for further studies to correlate visual performance with optical performance of the ReSTOR N atural IOL. They also said additional studies should be conducted to help determine the best candidates for multifocal IOLs.


Constant Q values questioned

Modern corneal topographers provide a wealth of clinically useful information, including data on anterior corneal asphericity, ie, the Q value. New research suggests that because there are wide variations in corneal Q, using constant Q values to plan surgery may not be such a good idea. Portuguese investigators evaluated 36 eyes of 36 patients with a videokeratoscope. They also analysed topographic data using Vol-CT 6.89 software (Sarver & Associates, Inc) to obtain the Q-values with different corneal diameters (3.0mm, 4.0mm, 5.0mm, 6.0mm, and 7.0mm). They compared variable Q models of corneal sagittal height against models assuming constant Q-values obtained with the Medmont E300 videokeratoscope and a standard Q model of 0.26. They found that the peripheral rate of change in corneal Q with different corneal diameters increased as corneal astigmatism increased. Difference in the sagittal height between the constant model and variable model were evident beyond the central 3.0mm area. They noted significant differences between low and high astigmatic corneas in Q-values measured by the Medmont along the flattest meridian and Q-values obtained with Vol-CT software with a 7.0mm corneal diameter. They suggest that surgeons should be aware which procedure is behind Q computing by different corneal topographers and that a constant Q-value cannot reflect the actual shape of the cornea as significant departures from the actual sagittal height can arise depending on which Q-value is assumed.


Accommodative IOL metadata

As increasing numbers of patients begin to receive accommodating IOLs from various manufacturers, researchers continue to ask how well do these lenses actually work. Oliver Findl and colleagues conducted a meta-analysis that included all peer-reviewed studies of three commercially available IOLs (1CU, BioComFold, and AT-45 Crystalens). The analysis of the six studies indicated that none of the lenses produced promising near-visual acuity results. They note that using only psychophysical evaluation for proof of true pseudophakic accommodation does not seem appropriate since the results of near-visual acuity are strongly influenced by pseudoaccommodation. Pharmacological stimulation studies indicate forward shift of less than 1.0 D for each of the lenses. The researchers also question whether the studies reporting visual acuity data had appropriate statistical power given the number of patients tested. They conclude that more clinical trials with randomised, controlled, masked study designs that follow the guidelines of evidence-based medicine are needed to prove the benefit of accommodating focus-shift IOLs.