SOLUTION INDUCED CORNEAL STAINING: EVOLVING OUR UNDERSTANDING OF SICS

Key milestones on the way to reaching current thinking

2002
First reports of solution-related staining associated with silicone hydrogel lenses.\(^1,2\) Maximal staining typically observed after 2 hours lens wear.\(^3\)

Staining matrices developed\(^4,5\)
Wide variation in staining response driven by combination of lens material and care solution used.

Debate: contact lens comfort
Range of results found for impact of SICS on contact lens comfort, from asymptomatic,\(^1,2,6\) through to mild,\(^3,5,7\) and moderate symptoms.\(^8,9\)

Debate: mechanism of staining
Previous work implicated the preservative in MPS, especially PHMB.\(^4,5,10\) Initial reports suggested PHMB associated with the cell surface led to hyperfluorescence.\(^11\) Further work established fluorescein is taken up into cells rather than simply pooling between damaged cells as previously thought.\(^12-15\)

Cause – preservative or surfactant?
Demonstrated that uptake of fluorescein into the cell is through a dynamin-dependent pathway mediated by a specific surfactant, Tetronic 1107.\(^16\) Thus, Tetronic 1107 found in some MPS, may play a role in SICS.

Significance?
Though not all in vitro work demonstrated cell damage,\(^16\) SICS is still considered an undesirable response.\(^17,18\)

Applying this knowledge in practice
- Some material-MPS combinations may produce SICS.
- Pay attention to the surfactant rather than the preservative present in the MPS.
- If SICS occurs, consider changing the material-MPS pairing to reduce potential clinically significant changes to epithelial cells.