Assessment of the eye using fluorescein under a blue light source is a routine part of the examination. From contact lens assessment, contact tonometry, through to tear assessment and investigation of anterior pathology, the ability of fluorescein to fluoresce under a blue light source when in high dilution makes this a very useful way of enhancing a view of tears. The dye is also dependent on pH for its activity and will tend to fluoresce maximally at around pH8. This means that as it is taken up by damaged cells in the cornea and passes deeper into the more alkaline cornea, it will increase its fluorescent activity, making it an excellent way to assess damage and depth of damage to the cornea. An intact cornea is impermeable to the dye.

Most people assess fluorescence using the cobalt blue filter on their slit lamp, the Burton lamp being less common today. The maximum transmission through the cobalt blue filter is in the region of 390nm to 410nm. Fluorescein maximally absorbs light of wavelengths between 485nm and 500nm. This then causes it to fluoresce and emit a green light of maximum intensity at between 525nm and 530nm.

It is obvious, therefore, that the light that is usually used in slit lamps with a blue filter is not at the best wavelength to give maximum absorption and therefore fluorescence of the dye.

Furthermore, typical modern CCD capture cameras will not distinguish between the fluorescent green and the excitation blue light. This is one reason why capture of fluorescein shots of, for example, RGP fits, is difficult without a separate blue flash. Most practitioners also use a barrier filter in conjunction with an excitation (blue) filter to absorb the excitation light, leaving just the fluorescent green light to be viewed. These orange filters are usually placed before the microscope system.

An option is available on the Topcon SL-7E, 7F or 8Z slit lamps to have a blue activation filter (Figure 1) incorporated, which has been developed from work in fluorescein angiography and which transmits light at a wavelength maximal around 480nm, so much closer to the absorption peak for fluorescein and thereby encouraging greater fluorescence. The system also includes a more selective barrier filter which absorbs the excess light at this new wavelength and is positioned on a flipper just before the microscope (Figure 2).

By enhancing fluorescence and absorbing more efficiently the excess excitation light, then much better contrast may be attained and, if used in conjunction with a sensitive camera (Topcon recommend the Sony DXC-C33 or the Sony DXC-390), then excellent views of any dye uptake may obtained, as shown in Figures 3a to 5b.

Details from Topcon on 01635 551120.