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Answer: Fluorescein corneal staining test and reveals a central corneal abrasion

Fluorescein sodium (C₂₀ H₁₀ Na₂ O₅) is a water soluble chemical dye which exhibits the photodynamic phenomenon of fluorescence.¹ Fluorescence is a type of temporary photoluminance that occurs when incident cobalt blue light (465-490 nm) is shone (excitation). This light gets absorbed and green light (520-530 nm) is emitted (emission). Emission of green light stops when the excitation blue light is cut off.

Fluorescein dye was first synthesised by Adolf Von Baeyer in 1871. The fluorescent properties of this dye have made it useful in a variety of industrial, scientific, military, and medical applications. Ophthalmic uses can be topical or intravenous. When topical Fluorescein is instilled in the eye, in the presence of an intact corneal epithelium, the stain is washed out by the tears and does not diffuse into and stain the cornea.¹ Hence there is no green area of stained cornea, when blue light is shone and the test is termed as negative. Fluorescence is enhanced in areas where there is stromal diffusion of the dye in areas of epithelial defects and where there is a disruption of cell-cell junction.¹ Thus, in cases of corneal epithelial damage (e.g. abrasions, corneal tears, foreign bodies) the area of epi-

thelial loss is detected as green areas of stained cornea when examined under cobalt blue light and the test is termed as positive.

Fluorescein dyes are also used in performing Fluorescein Angiography to detect vascular lesions of the anterior segment (iris neovascularisation), posterior segment lesions of retina and choroid (like diabetic retinopathy, retinal vascular occlusions, age related macular degenerations etc)² and evaluating the lacrimal duct.³

Other stains that could be used for corneal staining are Lissamine Green and Rose Bengal. Rose Bengal differs from Lissamine green as it stains areas where there is deficiency of tear production.¹

Fluorescein staining can help in the ready differentiation of and in ruling out any subtle corneal damage which might not be readily apparent on torch light evaluation. This dye is readily available in the Outpatient and in the emergency room setting. The Blue light filter of a direct ophthalmoscope can be easily used as a source of blue light in such situations. This test is simple, easy to interpret and could be easily performed to rule out any corneal surface disruptions in the primary care setting.

REFERENCES

- 1: Feenstra RP, Tseng SC. Comparison of fluorescein and rose bengal staining. *Ophthalmology*. 1992; 99:605-17.
 - 2: Morris PF. Fluorescein sodium and indocyanine green: uses and side effects. In: Saine PJ, Tyler ME, editors. *Ophthalmic Photography: Retinal Photography, Angiography and Electronic Imaging*. 2nd ed. Boston, Butterworth-Heinemann; 2002:137-65.
 - 3: Hurwitz JJ. The lacrimal drainage system. In: Yanoff M, Duker JS, Augsburger JJ, Azar DT, editors. *Ophthalmology*. 2nd ed. Philadelphia, Pa: Mosby Elsevier; 2004: chap 98.
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