Technical Note
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Use of Fluorescent Polymer Microspheres for Marking the Risk Zone in Myocardial Infarct Studies

1. PRODUCT APPLICATION

Various dyes and particulate markers have been used to mark the "risk zone" in evaluating regional ischemia. Markers that have been used include Evans Blue, India ink and fluorescein; however these dyes tend to rapidly migrate throughout the tissue, making the risk zone difficult to identify. Fluorescent particulate markers are particularly effective because they lodge in the capillaries and can be easily visualized under illumination with a hand-held black light (sometimes referred to as a Woods Lamp). Particulate markers that have successfully been used in the past are zinc cadmium sulfide particles and certain colloidal pigments. Problems with the ZnCdS particles include potential toxicity and their high density, which makes them difficult to suspend and inject. New fluorescent polymer particles from Duke Scientific are designed to replace the discontinued ZnCdS material previously available from Duke Scientific.

2. PRODUCT DESCRIPTION

Duke Scientific fluorescent marker beads (Catalog No. 34-1) are made of polymer containing a special fluorescent dye that excites efficiently with a hand-held UV lamp (Woods lamp). The fluorescence is a brilliant yellow-green color. The particles are spherical, 1-10 micrometers in diameter, and have a density of 1.06 g/cm^3, which makes them easy to suspend in an aqueous medium. The particles are heavily loaded with dye, resulting in a very strong fluorescence that can easily be seen visually. They are invisible under white light, allowing the non-risk tissue to be examined for infarction. Since the dye is embedded in the interior of the particles, it cannot leach out and cause indiscriminate staining.

3. PHYSICAL DATA

Chemical composition:	Polystyrene/divinylbenzene with fluorescent dye
Appearance:	White powder
Diameter:	1-10 micrometers
Density:	1.06 g/cm^3
Fluorescence properties:	
Maximum excitation	360 nm (long UV)
Maximum emission	530 nm (yellow-green)

4. REFERENCES

1) International Society for Heart Research website, www.ishrworld.org. H.E.L.P. section; see "Measuring infarct size by the tetrazolium method" by James M. Downey.
2) Burckhart, B. et al, *Cardiovascular Research* **1995,** 29*(5)* 653-657
3) Lasley, R. D. et al, *American Journal of Physiology* **1995,** 269*(4)pt.2* H1460-H1466
4) Thornton, J. D. et al, *Circulation Research* **1993,** 73*(4),* 649-655

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