Polyacrylamide-based phantoms of human skin for fluorescence optical measurements

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Introduction

Previous research has relied on the use of a solid matrix base using polyacrylamide (PAA) and gelatin for modeling the background fluorescence of skin collagen and FAD fluorescence at various concentrations (0, 5, 10, 15, and 20 µM). An analysis of the fluorescence spectra of optical phantoms with different FAD concentrations shows that all spectra had their maxima corresponding to the FAD fluorescence peak (about 530 nm) upon excitation with 450 nm laser. And now...

Methodology

The fluorescent properties were reproduced by adding PPIX extracted from crushed dark egg shells. The resulting concentration of protoporphyrin was 150 µm.

Experimental setup

Figure 1. Hyperspectral fluorescence imaging system

Results

The fluorescence properties of the developed phantom were determined using the developed experimental hyperspectral fluorescence imaging system. The spectral characteristics of the developed phantom were determined by use of spectrophotometer with an integrating sphere (Shimadzu, Japan).

Conclusion

The results obtained confirm the optical characteristics of the developed optical phantom reproducing the fluorescence of protoporphyrin IX. The measured spectra are in accordance with the literature data. Further development of the technology of the hyperspectral imaging of protoporphyrins in living tissues considered as further work.

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