Nanoparticles With Enhanced Fluorescence for Medical Imaging and Research Purposes

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BACKGROUND

Currently, fluorescent dyes are used for image-guided surgery and other clinical applications. It would be ideal for fluorescent organic dyes, like the US FDA–approved indocyanine green (ICG), to have stronger fluorescence emission. Alternative dyes with improved emission characteristics would be useful in various imaging applications in the clinic and in research.

BRIEF DESCRIPTION

Professor Bahman Anvari and colleagues from the University of California, Riverside and the University of Maryland have developed nanoparticle systems with greater fluorescence emission when compared to known dyes. These nanoparticles incorporate dual near infrared fluorescence (NIR) and magnetic resonance (MR) dyes for improved fluorescence. The nanoparticles encapsulate brominated carbocyanine dyes with MR qualities and ICG with NIR properties. This technology is advantageous because these nanoparticles containing these dyes exhibit greater fluorescence emission when compared to the individual dyes. This presents a promising dual-mode platform with high optical sensitivity and clinical diagnostic and research applications.

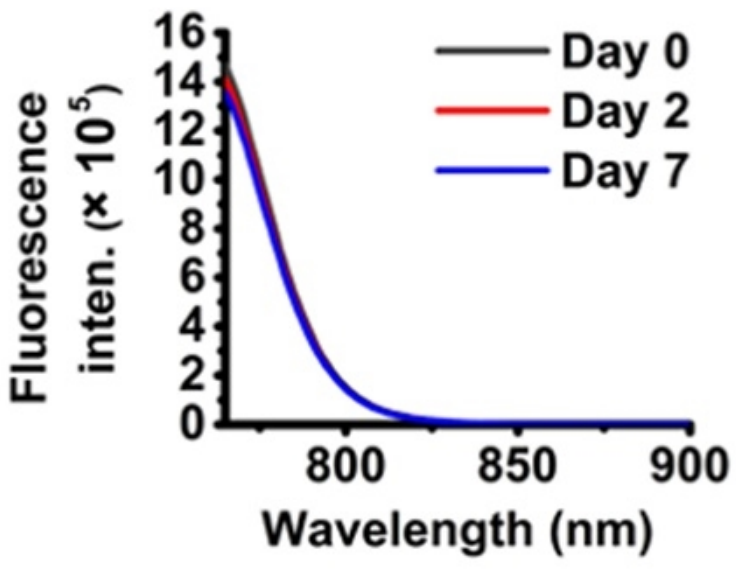

Fig 1: Fluorescence emission spectra of the nanoparticles combining the NIR and MR dyes. These nanoparticles have a 2.6- and 2-fold higher fluorescence emissions, respectively, when compared with the values for the single-mode NIR and MR particles.

SUGGESTED USES

- For use in various imaging applications such as deep tissue imaging, tumor staging and mapping, and small tumor nodules visualization for resection.
- For integration into various theranostic treatments like chemotherapy, phototherapy, and dual therapy, as nanovaccines and as theranostic agent.

CONTACT

Grace Yee
grace.yee@ucr.edu
tel: 951-827-2212.

OTHER INFORMATION

KEYWORDS

biomimetics, fluorescence, halogenated dyes, nanoparticles, near infrared, red blood cells, spectroscopy, ICG

CATEGORIZED AS

- **Imaging**
  - Medical
  - Molecular
- **Medical**
  - Diagnostics

RELATED CASES

2024-710-0

PATENT STATUS

Patent Pending

RELATED MATERIALS

- Lee, C. H., Zaman, S., Kundra, V., & Anvari, B. (2024). Erythrocyte nano-ghosts with dual optical and magnetic resonance characteristics. Journal of biomedical optics, 29(8), 085001 - 08/20/2024

University of California, Riverside
Office of Technology Commercialization
200 University Office Building,
Riverside,CA 92521
otc@ucr.edu
https://research.ucr.edu/