

Effect of Bovine Serum Albumin on an Europium(III):Oxytetracycline Bioprobe

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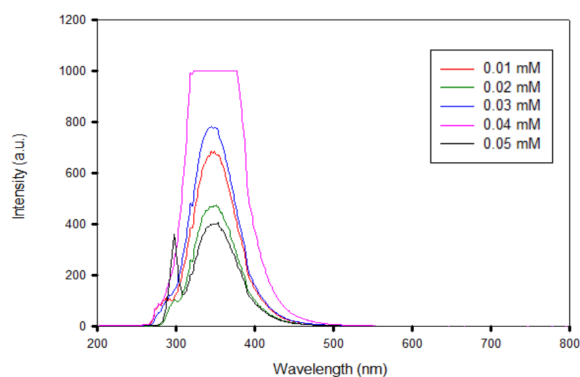
Abstract

Bioprobes are non-invasive tools and when utilizing lanthanides, they can be quite responsive.¹ The main purpose of this project is to determine the effects of bovine serum albumin (BSA) on a Ln(III):ligand bioprobe,² Eu(III) to oxytetracycline (OTC). This combination is ideal due to the strong luminescence properties of Eu(III), whereas OTC is used to enhance the luminescence of the bioprobe. The addition of BSA is to simulate how this bioprobe would react while in a biological environment. After taking fluorescence and phosphorescence scans of the Eu(III):OTC:BSA complex, circularly polarized luminescence (CPL) measurements are performed to study the circular polarization of the emitted light.

Project Activities or Findings

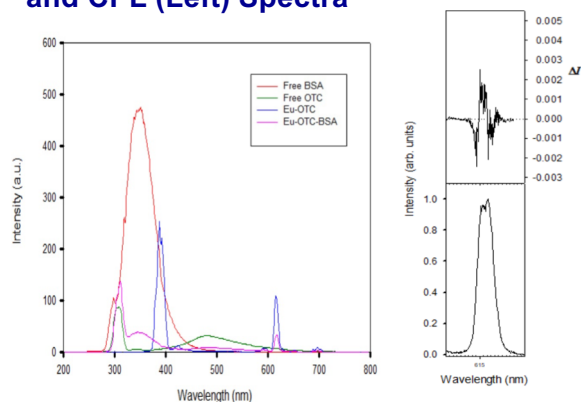
- Best Eu(III):OTC Ratio is 1:2
- Best Eu(III):OTC:BSA Ratio is 1:2:1
- Addition of BSA decreases the luminescence intensity of Eu(III):OTC bioprobe
- CPL scan of Eu:OTC:BSA at a ratio of 1:2:1 demonstrates that addition of biomolecule affects the polarization of the emitted light
- Future studies involve further CPL scans of Eu:OTC:BSA at ratios 1:2:2 and 1:2:3 in order to confirm findings and absolutely determine the effects of this biomolecule to the Eu:OTC bioprobe

Steady-State Luminescence Spectra of Free BSA



0.04 mM Free BSA is most intensive. However, 0.02 mM BSA is more soluble when combined with 1:2 ratio of Eu(III):OTC bioprobe

Steady-State Luminescence (Right) and CPL (Left) Spectra



Right: Combined Graph demonstrates decrease of intensity of addition of BSA on Eu(III):OTC bioprobe

Left: CPL scan of 1:2:1 ratio of Eu(III):OTC:BSA

Research Questions

- At what ratio will Bovine Serum Albumin in conjunction with Eu(III) and Oxytetracycline, will it produce the best luminescence intensity?
- What are the effects of Bovine Serum Albumin on the bioprobe?

Citations

1. M. Andrews, J. E. Jones, L.P.Harding, S. J. A. Pope, *Chem. Commun.*, **2010**, 27, 2011-2013.
2. I. S. Ibarra, J. A. Rodriguez, J. M. Miranda, M. Vega, E. Barrado, *J. Chromatogr. A*, **2011**, 1218, 2196-2202.