



# Europium enabled luminescent nanoparticles for biomedical applications



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## ABSTRACT

Lanthanide based nanoparticles are receiving great attention owing to their excellent luminescent and magnetic properties and find challenging biomedical applications. Among the luminescent lanthanide NPs, europium based NPs (Eu-NPs) are better candidates for immunoassay and imaging applications. The Eu-NPs have an edge over quantum dots (QDs) by means of their stable luminescence, long fluorescence lifetime, sharp emission peaks with narrow band width, lack of blinking and biocompatibility. This review surveys the synthesis and properties of a variety of Eu-NPs consolidated from different research articles, for their applications in medicine and biology. The exquisite luminescent properties of Eu-NPs are explored for developing biomedical applications such as immunoassay and bioimaging including multimodal imaging. The biomedical applications of Eu-NPs are mostly diagnostic in nature and mainly focus on various key analytes present in biological systems. The luminescent properties of europium enabled NPs are influenced by a number of factors such as the site symmetry, the metal nanoparticles, metal ions, quantum dots, surfactants, morphology of Eu-NPs, crystal defect, phenomena like antenna effect and physical parameters like temperature. Through this review we explore and assimilate all the factors which affect the luminescence in Eu-NPs and coil a new thread of parameters that control the luminescence in Eu-NPs, which would provide further insight in developing Eu-based nanoprobe for future biomedical prospects.

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