

Enhanced Glutathione Content Allows the In Vivo Synthesis of Fluorescent CdTe Nanoparticles by Escherichia coli

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The vast application of fluorescent semiconductor nanoparticles (NPs) or quantum dots (QDs) has prompted the development of new, cheap and safer methods that allow generating QDs with improved biocompatibility. In this context, green or biological QDs production represents a still unexplored area. This work reports the intracellular CdTe QDs biosynthesis in bacteria. *Escherichia coli* overexpressing the *gshA* gene, involved in glutathione (GSH) biosynthesis, was used to produce CdTe QDs. Cells exhibited higher reduced thiols, GSH and Cd/Te contents that allow generating fluorescent intracellular NP-like structures when exposed to CdCl₂ and K₂TeO₃. Fluorescence microscopy revealed that QDs-producing cells accumulate defined structures of various colors, suggesting the production of differently-sized NPs. Purified fluorescent NPs exhibited structural and spectroscopic properties characteristic of CdTe QDs, as size and absorption/emission spectra. Elemental analysis confirmed that biosynthe