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Quantum dots: Applications and safety consequences

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Abstract

Nanotechnology is one of the frontier areas of research involving nanoscale manipulation of atoms and molecules. Its development is one of the most innovative advancement of biomedical field in the past decade. Nowadays this emerging field focuses on developing new generation nanomaterials like Quantum dots for multitasking purposes such as medical diagnostics, drug delivery, gene therapy etc. 'Quantum dots' also known as semiconductor nanocrystals are rapidly becoming a critical tool for a variety of biomedical applications owing to their exceptional photo physical properties. Most probably, liver and kidney are the organs prone to Quantum dots (QDs) as part of their metabolism and excretion during their applications. Toxicity is a major obstacle when considering QDs for various biomedical applications. Significant challenges still exist and need to be validated before their clinical applications. This review focus on to the science behind quantum dots, various biomedical applications and their interaction with liver and kidney. Safety concerns being the major downside of its application are also briefly discussed followed by factors affecting their toxicity. Also, strategies towards modification of quantum dots for reducing cytotoxicity are illustrated and concluded with a glance at the future direction of quantum dots.

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