

## CdSe Quantum Dots in human models derived from ALS patients: characterization, nuclear penetration studies and multiplexing.

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### Abstract

CdSe Quantum Dots (QDs) have become useful probes with unique fluorescent properties for in vitro and in vivo imaging research, helping to understand the molecular mechanism underlying pathological cellular processes. QDs conjugated with antibodies are exceptional tools for multiplexing staining that provide narrow emission spectra and a gain of photostability compared with traditional fluorophores, using a single excitation source. This technology applied to pathological cell models derived from patients offers a great potential to describe quantitative molecular profiling and contribute to personalized medicine. However, although there is relevant data of QDs experiments in cell lines, exists a lack of previous evidence about the behavior of these nanotechnology tools applied to primary human cells. Furthermore, there are limitations of these materials that must be considered, such as the commercial availability and the need to characterize QDs and their conjugates before use to guarantee a proper function and reproducibility. Improvements in the characterization data of commercially available QDs and their conjugates are required to establish their potential for target labeling and expand their use among research labs. Here we have made a comparison between the characterization and labeling performance of different QD conjugates in SH-SY5Y cell line, fibroblasts, and immortalized lymphocytes derived from amyotrophic lateral sclerosis patients.

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