Cell Penetrating Peptide-Conjugated PEGylated Quantum Dots for *in Vitro* Intracellular Delivery

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With the development of nanotechnology, the integration of nanomaterials (quantum dots (QDs), carbon nanotubes (CNTs)) into cancer therapeutics is one of the rapidly advancing fields. They have shown great potential in cancer therapy by enhancing the performance of medicines and reducing systemic side effect in order to gain therapeutic efficiency (1).

Targeted ligands have been attached to QDs in order to achieve specific targeting for tumor cell labeling (2). Thus, they are assured to be chosen as long-term, high-sensitivity and multi-contrast imaging agents applied for the detection and diagnosis of cancer *in vivo* (3). In the last decade, reports have built up on the subject of a new vehicle for intracellular delivery, namely cell penetrating peptides (CPPs). CPPs are short peptides with the ability to transport relatively large macromolecules across the plasma membrane of a wide range of cell types (4). There are reports of successful cell barrier transport and in vivo applications, using these remarkable peptides (5-6).

In this study, conjugation of PEGylated QDs with CPPs has constructed as a multifunctional platform to facilitate its and cargos penetration from the membrane and imaging of the intracellular localization. Cellular internalization degree and the localization of bioconjugates were observed via fluorescence properties of QDs using fluorescence microscopy and flow cytometry.

Fig 1. Schematic representation of the bioconjugate

Fig 2. Fluorescence microscopy imaging of HeLa cells incubated with QDs and CPP/QDs bioconjugate. In blue are indicated the nuclei stained with DAPI.

KEYWORDS: QDs, cell penetrating peptides (CPPs), cancer cell imaging

REFERENCES: