Quantum dots conjugated to pCramoll lectin for carbohydrates investigation in biological systems

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Introduction: The glycoconjugates profile identification in biological systems can elucidate some processes, such as, the microorganisms' pathogenicity and the malignancy and metastasis levels of tumors. Fluorescence based techniques allow these identifications at the cellular level using fluorescent probes, as the quantum dots (QDs). QDs are fluorescent nanoparticles that have been widely used in life science, due their advantages, such as: high resistance to photobleaching and active surface allowing conjugation with molecules for specific labels, for example, lectins. Cramoll 1.4 (pCramoll) is a lectin extracted from *Cratylia mollis* Mart. ex. Benth, which specifically recognizes glucose and mannose residues, and also presents several biological activities. **Objectives:** The aim of this work was to bioconjugate pCramoll with QDs for glycoconjugates identification in biological systems. **Material and Methods:** After lectin extraction, purification and protein dosage, this molecule was conjugated by adsorption with carboxyl-coated CdTe QDs. For this purpose, QDs (2.6 µM) pH was adjusted to 7.0 and then pCramoll (280 µg/mL) was added to the system. Bare QDs and QDs-pCramoll were characterized by absorption and emission spectroscopies. Hemagglutination activity (HA), of bioconjugated and non-bioconjugated lectin, was also performed. Fluorescence microscopy and flow cytometry analyses were used to evaluate the bioconjugation process by labeling *Candida albicans* cells with QDs-pCramoll. The specificity of labeling was confirmed by QDs-pCramoll inhibition assay using methyl-α-D-mannopyranoside (0.4 M). **Results and Discussion:** The bioconjugation process did not affect the lectin HA (512^{-1}), and did not change QDs optical properties. Fluorescence microscopy analysis showed yeast wall labeled by QDs-pCramoll and flow cytometry identified ca. 90% of cells labeled. The specificity of labeling was confirmed by the reduction of cells labeled to about 4% by QDs-pCramoll after the inhibition assay. **Conclusions:** These results indicate the potential of QDs-pCramoll as a tool to investigate changes in glycoconjugates profile in biological systems.

Keywords: Lectin; Quantum dots; *C. albicans*.

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