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Cell Viability Study in HEK293 Cells Exposed to Gold Nanoparticles with Chitosan, N-Acylated Chitosan and Chitosan Oligosaccharide

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Currently, chitosan has been studied for different fields, like food and medical applications. Chitosan is a polysaccharide that can be obtained after the transformation of chitin (obtaining 2-amino-2-deoxy-h-D-glucopyranose repeating units but still retaining a small number of 2-acetamido-2-deoxy-h-D-glucopyranose residues), a polymer widely present in nature, found as the main constituent of crustaceans shells and as part of the cell walls of many fungi. Despite the potential applications of native chitosan, some modifications are needed in many cases, because of its insolubility in physiological pH and high viscosity in dilute acid solution. At this sense, chitosan represents a good alternative for conjugation with gold nanoparticles due to the compatibility of the amino groups with gold. Gold nanoparticles conjugated with chitosan, acylated chitosan and oligosaccharide chitosan, were synthetized and evaluated in viability assay of HEK-293 cell culture. Physical and chemical properties of gold nano composites were characterized using UV-Vis Spectroscopy, Z Potential and Transmission Electron Microscopy. Gold-chitosan, acylated chitosan and chitosan oligosaccharide composite nanoparticles were obtained, presenting stability in colloidal distribution, confirming the viable use of chitosan as stabilizer. The assay viability was evaluated by blue dye, cells were compared (dead or damaged) against total cells per field. Best viability was obtained with chitosan oligosaccharide compared to tests with Lipofect AMINETM2000 and chitosan without modification AuNPs that presented the lowest viability. High concentrations were used for all tests, so viabilities were low in comparison with literature.