

## **THE INTERACTION BETWEEN DNA AND POLYCATIONS: CHITOSAN AND ITS DERIVATIVES.**

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Chitosan is a nontoxic and biodegradable polysaccharide that has recently emerged as a promising candidate for gene delivery. In this work the ability of various chitosans to compact DNA was studied. Chitosan derivatives containing increasing amounts of poly(ethylene glycol) were synthesized and characterized by potentiometry and infrared spectroscopy (IR) measurements. The interaction of chitosan and chitosan-poly(ethyleneglycol) (PEG) derivatives (CH-PEG) with calf thymus DNA was monitored by the fluorescence quenching technique using the cationic dye ethidium bromide (EB). The titration of DNA-EB aqueous solutions with chitosans solutions was conducted at different pH values (4.0, 5.0, 6.3). The decrease in fluorescence is observed in all mixtures which indicate formation of DNA-chitosans complexes at all studied pH values. For lower pH values (pHs 4.0 and 5.0) the interaction resulted in more pronounced quenching with the maximal effect at pH 4. At pH=4.0 the fluorescence quenching occurred at level of 25% of the initial fluorescence when the charge ratio was close to 1. This finding suggests that at pH 4 and 5 almost all amino groups (substituted and unsubstituted) are involved in the formation of ionic pairs with phosphate groups of DNA.