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**LOW MOLECULAR WEIGHT CHITOSAN DERIVATIVES AS CONVENIENT NANOPLATFORM FOR DELIVERY OF ANTIBIOTICS AND PLASMID DNA**

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Chitosan is a polycationic, bio-compatible and biodegradable polysaccharide, however, its application for biomedical purposes is hindered by its high viscosity due to high molecular weight and poor solubility in water solutions at physiological pH. Here, we described preparation of chitosan derivatives which allowed circumventing the above mentioned physico-chemical short-comings of chitosan that block its use in biology and medicine.

We developed a procedure for preparation of low molecular weight (l.m.w.) fractions of chitosan. Their conjugation with branched 25 kDa polyethylenimine (PEI) enhanced significantly chitosan’s ability to serve as a platform for delivery of plasmid DNA at transfection of mammalian cells of MCF-7, HeLa, HCT116, and HEK293 lines. The transfection efficiency of such conjugate complexed with plasmid DNA in MCF-7 cells achieved 44.9%. Conjugate of chitosan (l.m.w.) with PEI at concentration range from 1 to 100 μg/mL possessed significantly lower toxicity for these cells, compared to such effect of free PEI. Ampicillin conjugation with l.m.w. chitosan enhanced considerably antibacterial action of this antibiotic towards *Pseudomonas aeruginosa* bacteria that was resistant to ampicillin. Both chitosan and chitosan-ampicillin complex inhibited growth of *Staphylococcus aureus* bacteria..

The conjugate of chitosan (l.m.w.) with PEI was prepared and shown to be efficient platform for transfection of mammalian cells with plasmid DNA. Cytotoxicity of PEI in its conjugate with chitosan was significantly reduced. The conjugate of ampicillin with chitosan (l.m.w.) possessed higher antibacterial activity towards *Pseudomonas aeruginosa* bacteria, compared to free ampicillin. Complexation of ethacridine with chitosan secured gradual dynamics of release of this antibiotic in laboratory rats after injection.

L.m.w. chitosan derivatives were shown to be a perspective nanoplatform for delivery and prolongation of action of antibiotics, and to be a convenient cargo at delivery of plasmid DNA for transfection of mammalian cells.