

Development of Coacervates using mPEGylated Poly(ethylene arginylaspartate diglyceride)  
Cationic Polymer for Protein delivery

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Poly(ethylene arginylaspartate diglyceride) (PEAD) polycation was widely used to prepare coacervate-microparticles with the anionic heparin and these coacervates have been utilized as growth factor (GF) delivery platform. In this study, mPEGylated-PEAD was developed for increasing stability of coacervate droplets in aqueous environments. In vitro cytotoxicity test revealed mPEGylated-PEAD was not toxic to hDFs up to 200 µg/mL. Surface charge of mPEGylated-PEAD/heparin complex was measured and isoelectric point was identified. As compared to nonPEGylated-PEAD/heparin complexes, mPEGylated-PEAD/heparin complexes were less aggregated over time and its stability was increased in a higher surrounding ionic strength (i.e., 0.15 M NaCl). Also, bone morphogenetic protein-2 (BMP-2) was effectively encapsulated in complexes with a high loading efficiency (96.4 %). Along with a sustained release of encapsulated BMP-2 over 21 days, our mPEGylated-PEAD/heparin complexes could be used as effective GF delivery vehicles with an improved stability in aqueous conditions.