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In vitro selection of RNA aptamer that is specific for Leptin protein

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Leptin is a protein hormone with important effects in regulating body weight, metabolism and reproductive function. The protein is a 16 kDa protein that plays a critical role in the regulation of body weight by inhibiting food intake and stimulating energy expenditure. In addition to its effects on body weight, leptin has a variety of other functions, including the regulation of hematopoiesis, angiogenesis, wound healing, and the immune and inflammatory response. We have selected an RNA aptamer that binds to part of leptin protein with high specificity by an *in vitro* selection process called Systematic Evolution of Ligands by EXponential enrichment (SELEX). High affinity target-binding aptamers are identified from random oligonucleotide libraries. We have used biotin conjugated-magnetic beads for target immobilization and oligopeptides for efficient elution of the bound RNAs to the leptin oligopeptide. It is hoped that the selected RNA aptamers that specifically bind to the leptin will be used *in vitro* for diagnosing hereditary obesity.

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A novel cationic liposome reagent for gene transfer with low toxicity

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Delivering genes into cells or tissues is an extremely promising therapeutic tool to alleviate morbidity. Cationic liposome has been studiedas one of the most promising non-viral gene delivery systems. In this report, we describe a synthesized cholesterolic cationic lipid (2-aminoethylcarbamate-cholesterol) and dioleylphosphatidylethanolamine (DOPE) improve the cellular uptake properties of antisense ODNs, as well as plasmid DNA with low toxicity. This formulation of cholesteroliccationic lipid termed Chol-E, efficiently transfects ODNs and plasmids into many cell types in the presense or absence of 10% serum in the medium. A liposome formulation with a high transfection efficiency that is not inhibited by high serum concentrations, would provide a considerable advance toward the goal of systemic delivery. We have developed methods that increase the effectiveness and efficiency of lipid-mediated transfection in the presence of serum. The present research relates to compositions and methods for the therapeutic delivery of a nucleic acid by delivering a serum-stable lipid delivery vehicle encapsulating the nucleic acid to provide efficient gene expression.