

Layer-by-layer assembled oligodeoxynucleotide drug nanosponge for highly efficient drug delivery

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To achieve efficient drug delivery, a novel method for preparation of nucleic acid based carrier was developed. As carrier and drug, highly concentrated oligodeoxynucleotide (ODN) formed sponge-like nanostructure by enzymatic elongation without any crosslinker. The size of nanosponge dramatically decreased to favorable size for cellular uptake by a layer-by-layer assembly of poly-L-lysine (PLL), DNA, and polyethylenimine (PEI), without losing the amount of ODN. This LbL-coated nanosponge contained extremely high amount of ODN, 1×10^6 . In addition, LbL assembled nanosponge showed significant improvement of stability in in vivo environment and ability of endosomal escape.