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

Jong Bum Lee and Daehoon Han
University of Seoul, Korea

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) formedsponge-like nanostructureby 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 polyethyleninmine (PEI), without losing the amount of ODN. This LbL-coated nanospongecontained extremely high amount of ODN, $1X10^6$. In addition, LBL assembled nanosponge showed significant improvement of stability in *in vivo* environment and ability of endosomal escape.

jblee@uos.ac.kr