Supplementary figure' description

To confirm the successful construction of the recombinant plasmids pET28b-MS2-W6P-HEV and pET28b-MS2dimer-W6P-HEV, restriction enzyme digestion analysis was performed. The purified plasmids were digested with SnaBIand BmgBIrestriction endonucleases. The digestion products were then analyzed by electrophoresis on a 1% agarose gel. As shown in Figure S1, the undigested original plasmids (Lane 1) both showed a single band corresponding to the supercoiled form. After double digestion (Lane 2), both plasmids yielded two clear fragments: one matching the expected size of the linearized vector and the other matching the expected size of the insert, as compared to the DNA Marker (Lane M). These results successfully confirmed the accurate construction and correct orientation of the insert in both recombinant plasmids.

Figure S1. Gene structure of target plasmid and restriction digestion and DNA sequencing verification

Footnote: (A) and (B) illustrate Gene structure of pET28b-MS2-W6P-HEV and pET28b-MS2dimer-W6P-HEV; (C)right, M: DNA marker, lane 1: plasmid control, lane 2: restriction digestion product of plasmid by *SnaBI* and *BamHI* ;(C)left: DNA sequencing verification of W6P insertion into A-B loop site of MS2 bacteriophage coat protein engineered via pET28b-MS2-W6P-HEV; (D) right, M: DNA marker; lane 1: plasmid control; lane 2: *BamH*I-digested plasmid product. (D)left, DNA sequencing verification confirming W6P insertion into the first A-B loop site of the MS2 bacteriophage coat protein dimer engineered via pET28b-MS2dimer-W6P-HEV.