

## Supporting Information

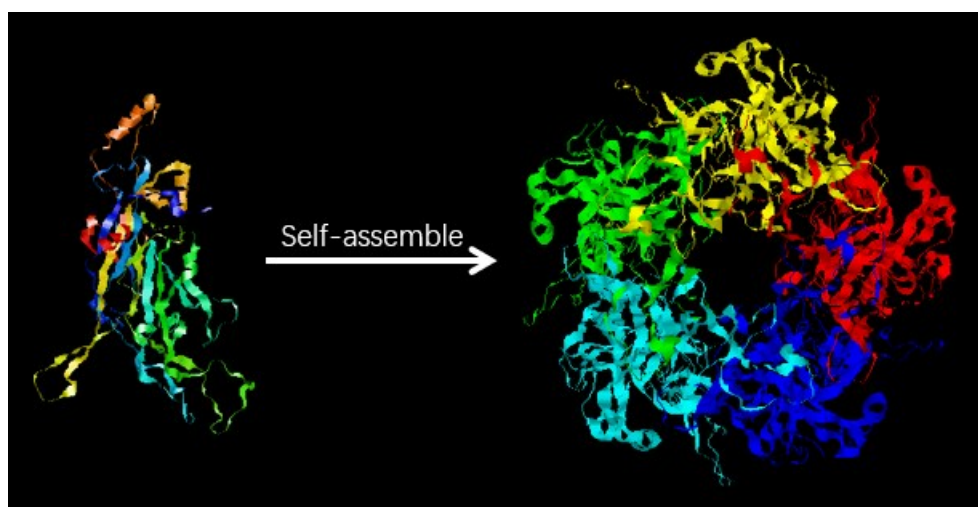


Fig. S1 Simulation of HPV L1 pentamer formed by HPV L1 monomer

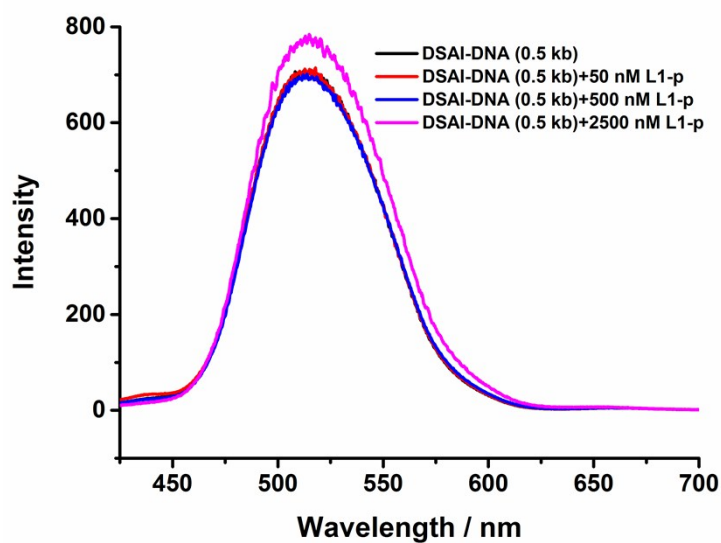
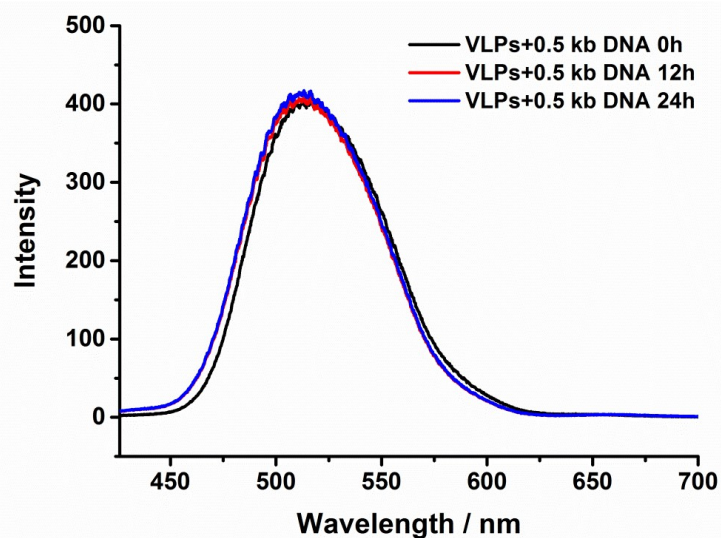


Fig. S2 The fluorescence spectra of DSAI (10  $\mu$ M) in assembly buffer solution upon adding different amount of as-prepared VLPs, equals to 50, 500, 2500 nM L1-p, respectively.

Fig. S3 The fluorescence spectra of DSAI-DNA (10  $\mu$ M) assemble with L1 in assembly



buffer solution for different time.

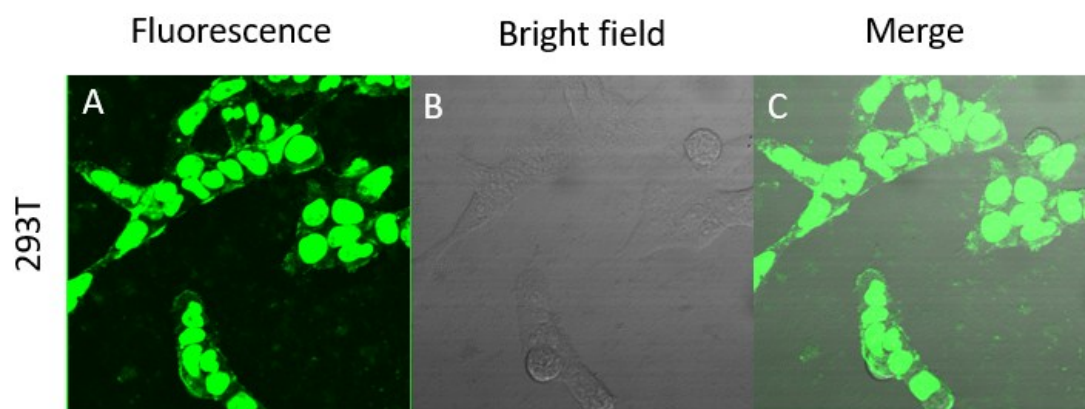


Fig. S4 Fluorescence images of HeLa cells after incubation with DSAI-DNA+VLPs.

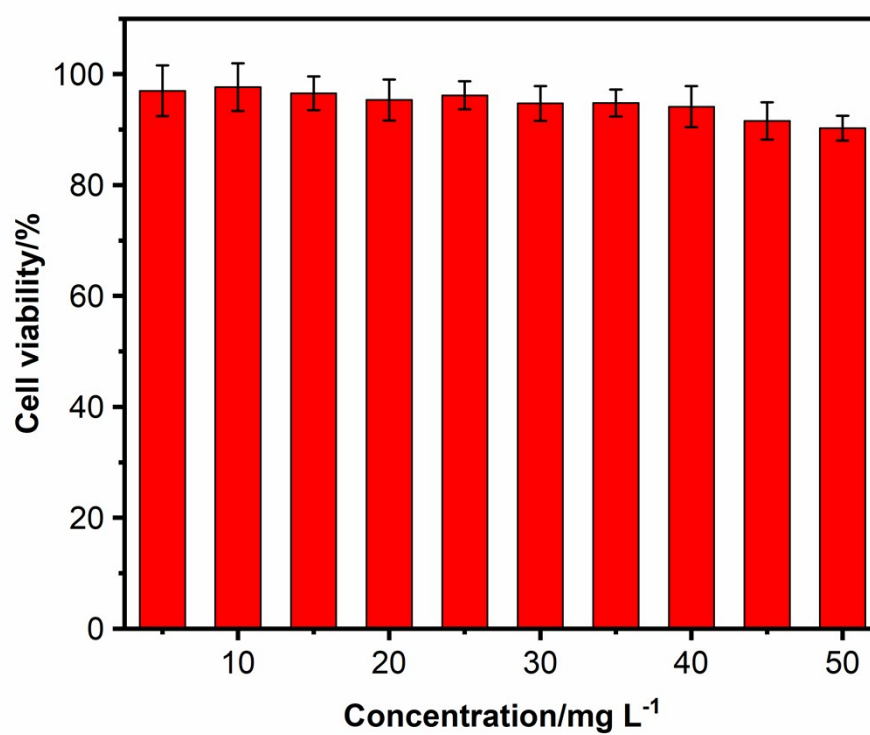


Fig. S5 The viabilities of HeLa cells at changing DSAI-DNA VLPs concentrations