Electronic Supplementary Material (ESI) for Nanoscale.


# Supporting Information

## Gold nanoclusters-based vaccines for dual-delivery of antigens and immunostimulatory oligonucleotides

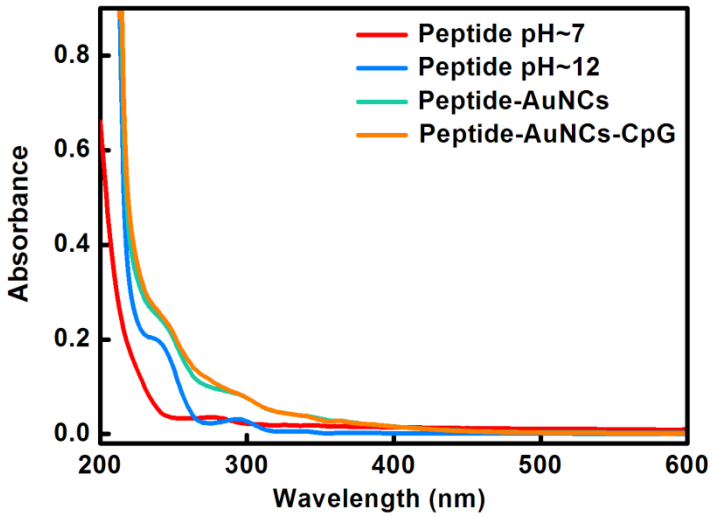


**Fig. S1** Optical absorption spectra of peptide solutions at pH ~7 and ~12, the peptide-AuNCs conjugates, as well as the peptide-AuNCs-CpG conjugates.

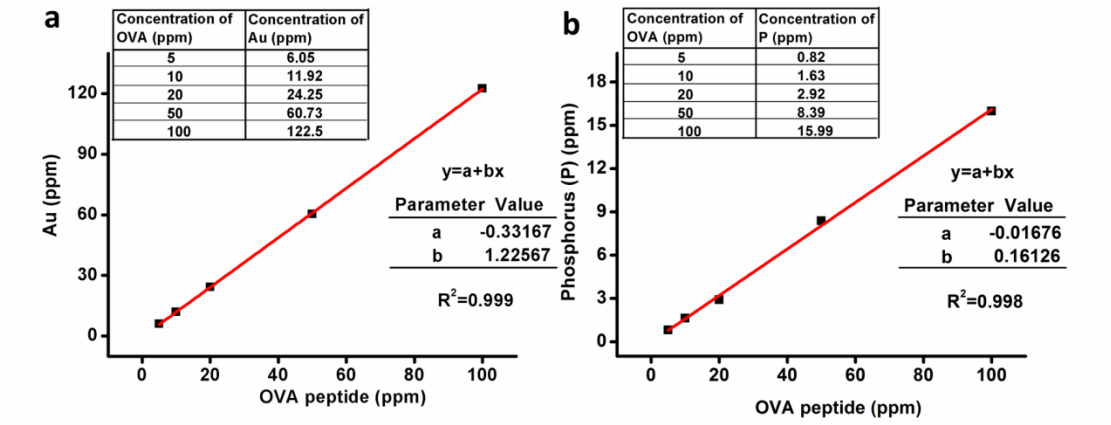


**Fig. S2** ICP-MS qualitative analysis results. (a) Plot obtained by plotting the concentration of Au obtained from ICP-MS versus peptide in peptide-AuNCs-CpG conjugates at different concentrations. (b) Plot obtained by plotting the concentration of phosphorus (P) obtained from ICP-MS versus peptide in peptide-AuNCs-CpG conjugates at different concentrations.

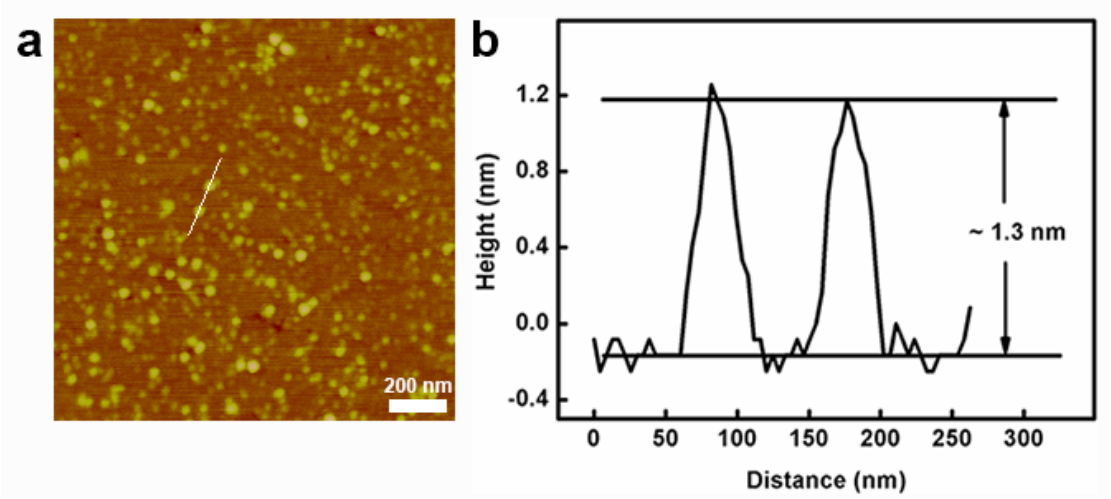


**Fig. S3** (a) AFM image and (b) height profile of the peptide-AuNCs-CpG conjugates deposited on mica substrates.

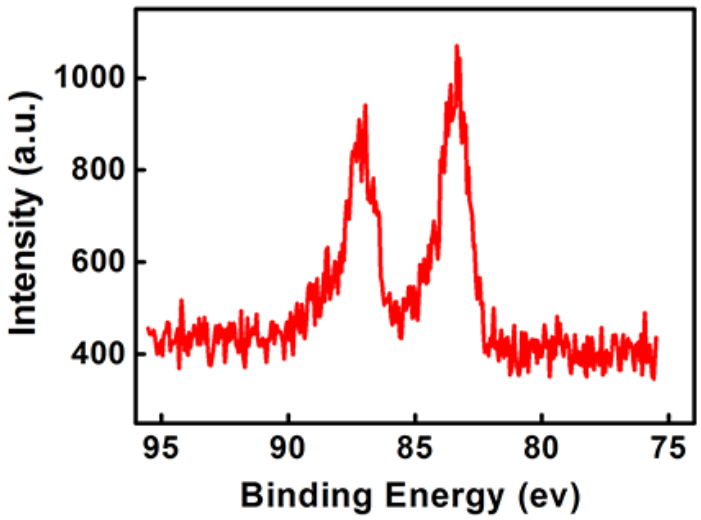


**Fig. S4** XPS spectrum of Au 4f the as-synthesized peptide-AuNCs-CpG conjugates.

**Fig. S5** Electrophoretic analysis of the peptide-AuNCs-CpG conjugates.

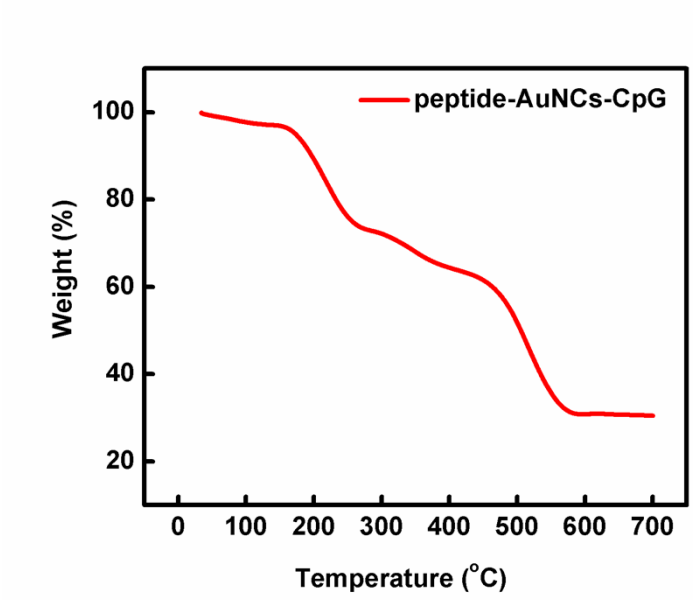


**Fig. S6** TGA of the peptide-AuNCs-CpG conjugates.

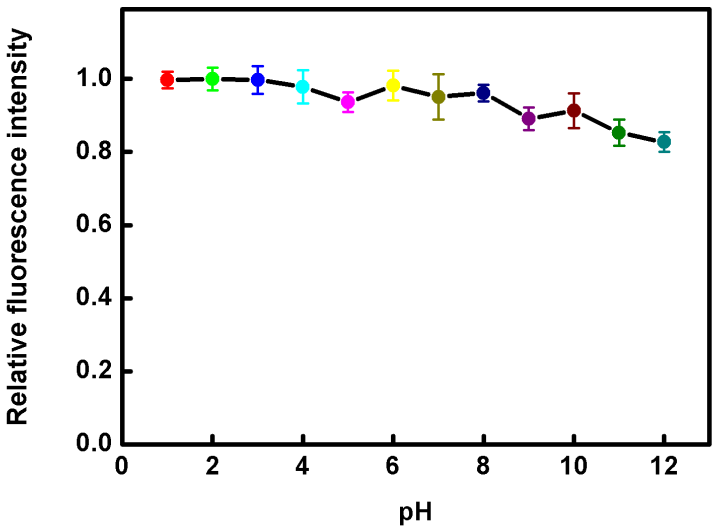


**Fig. S7** Fluorescence intensities of the peptide-AuNCs-CpG conjugates at different pH. The error bars represent variations among three independent measurements.

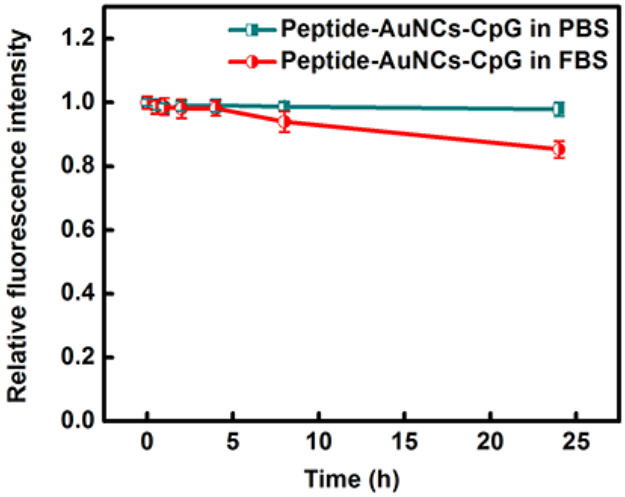


**Fig. S8** The fluorescence intensities as a function of time of the OVA-AuNCs-CpG conjugate in 50% FBS and PBS. The error bars represent variations among three independent measurements.

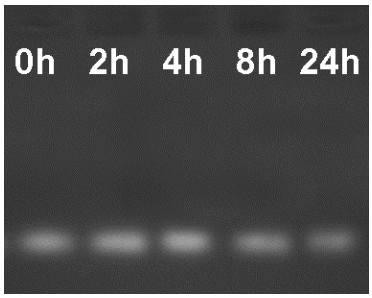


**Fig. S9** Electrophoretic analysis of the stability of peptide-AuNCs-CpG conjugates. The peptide-AuNCs-CpGs were incubated in 50% fetal bovine serum (FBS) at 37 °C for 2–24 h and then analyzed by gel electrophoresis.

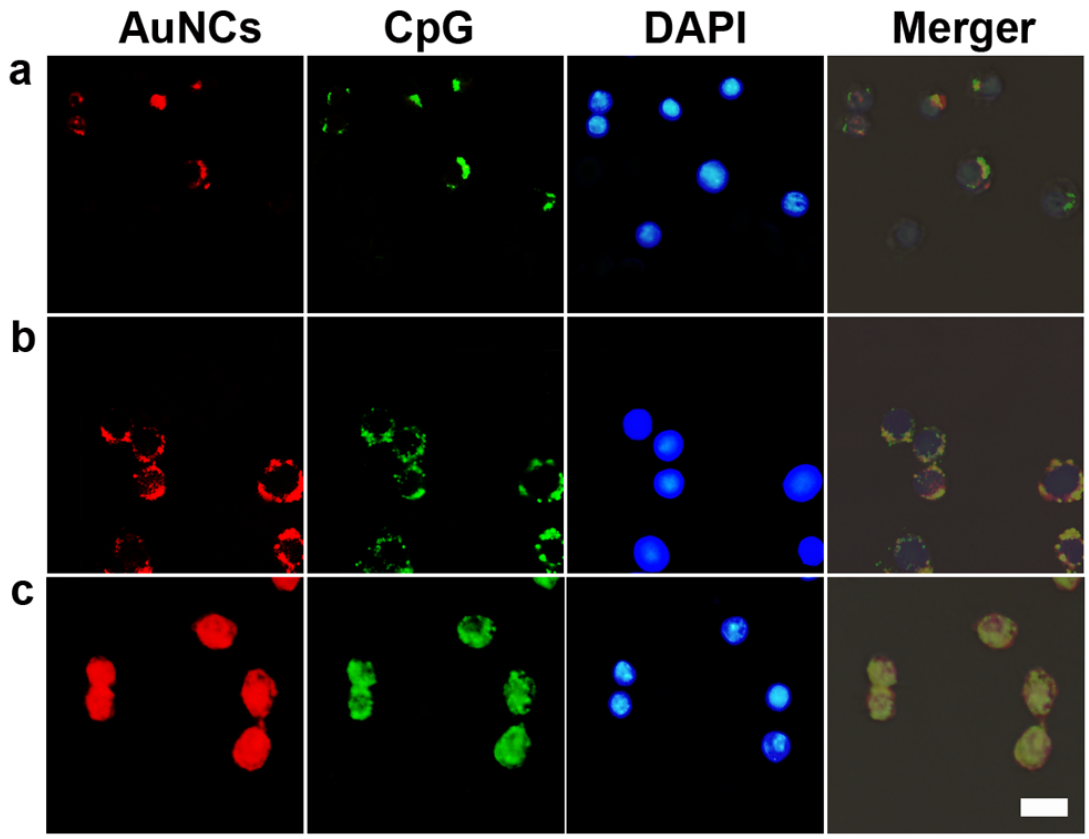


**Fig. S10** Fluorescence images of RAW264.7 cells treated with the peptide-AuNCs-CpG conjugates with FITC-modified CpG ODNs (50 μg $mL^{-1}$) for different times (1 h (a),4 h (b) and 8 h (c)). Scale bar: 20 μm.

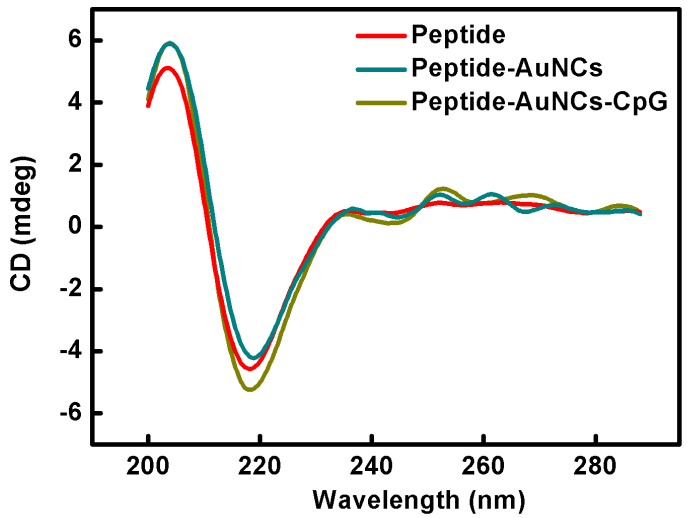


**Fig. S11** Circular dichroism (CD) spectra of peptide, peptide-AuNCs and peptide-AuNCs-CpG conjugates.