Dual Aptamer-Functionalized 3D Plasmonic Metamolecule for Thrombin Sensing

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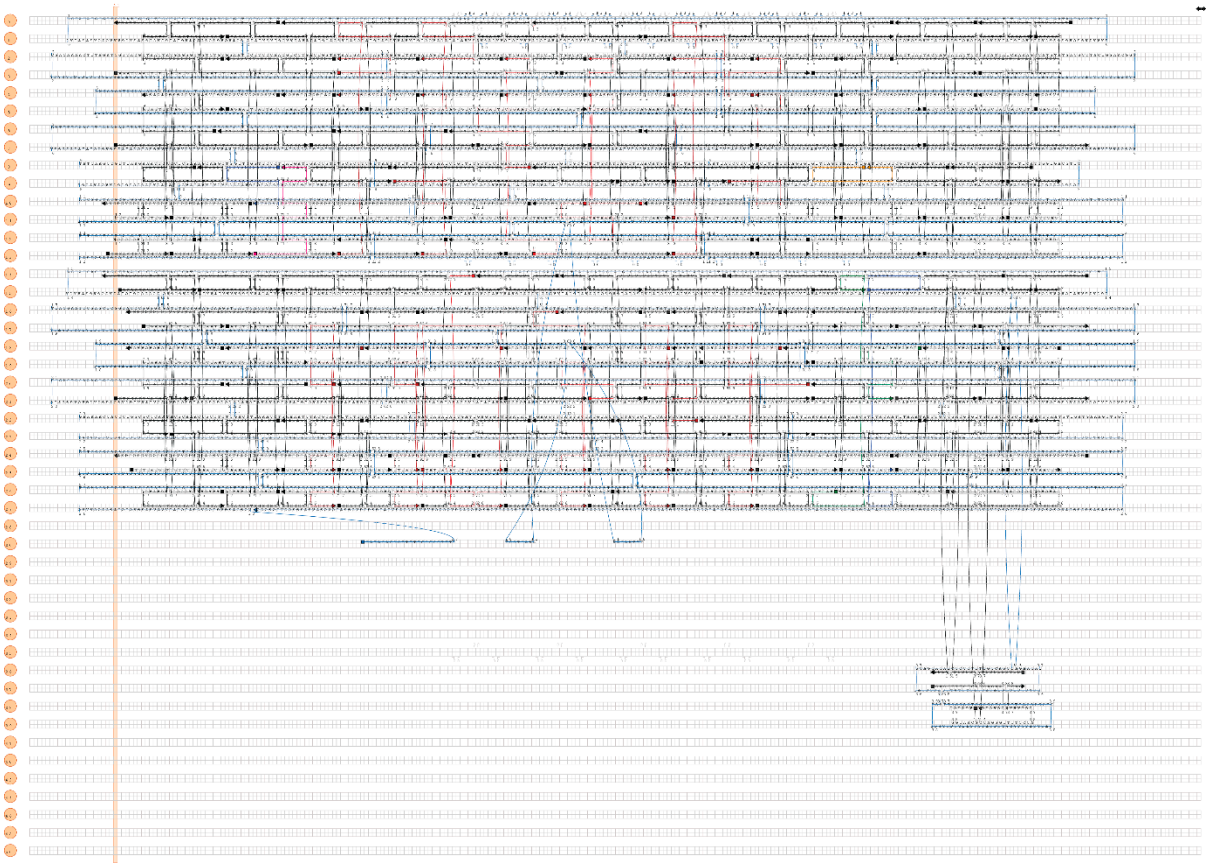

Figure 1. Strand routing diagram of our X-shaped 3D plasmonic metamolecule.

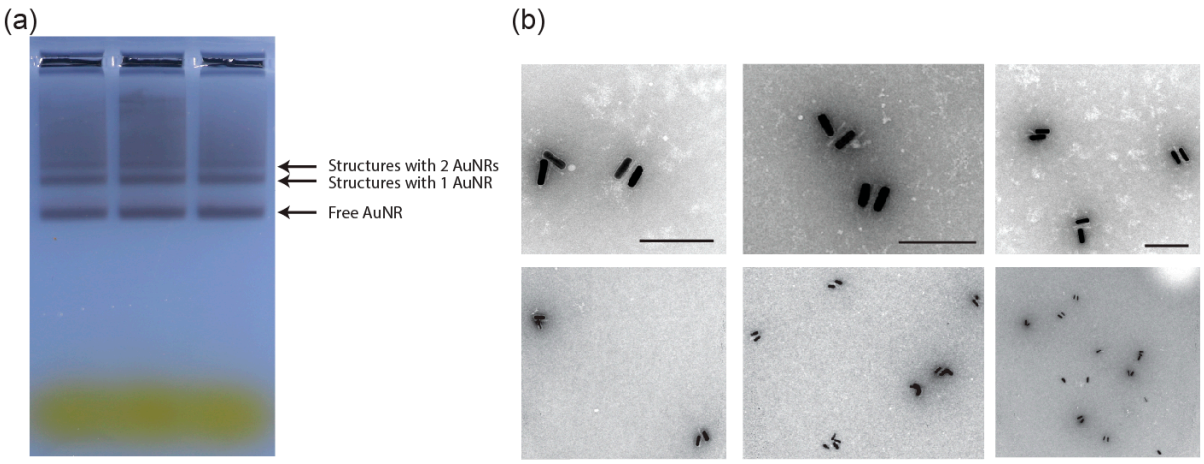

Figure 2. Gel purification and characterization of gold nanorod (AuNR) conjugated metamolecules. (a) 0.7% agarose gel showing clear separation of metamolecules with one or two AuNRs from unbound access AuNRs. After purification, we usually recovered 300 µl of metamolecules at 100 pM concentration which is enough for ~10 measurements. (b) Transmission electron microscopy (TEM) images of metamolecules purified from 2 AuNRs band. Scale bars: 200 nm.

Table 1. Parameters for Hill equation fit of circular dichroism (CD) response curve against thrombin.

For $y = V_{max} \times \frac{x^n}{k^n + x^n}$,

	Value	Standard Deviation
V_{max}	0.97985	0
k	1.29809	0.17423
n	1.31353	0.31208

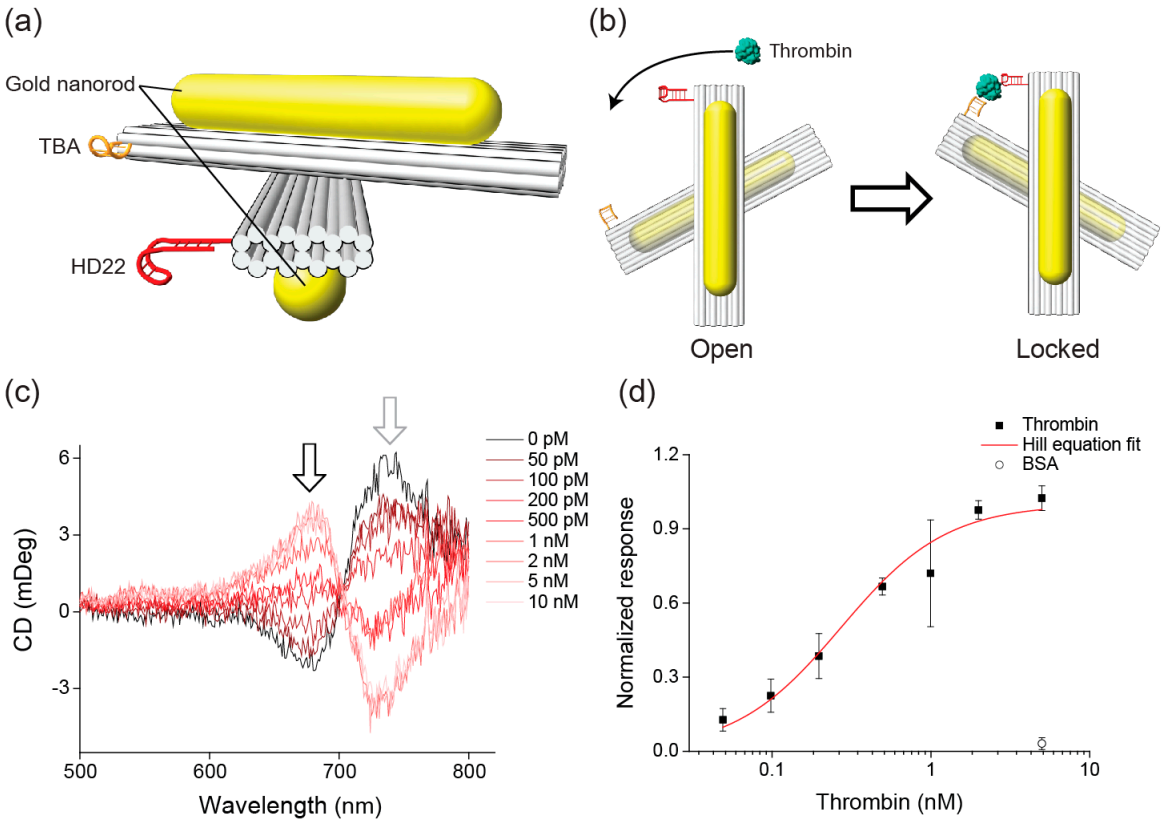

Figure 3. Thrombin detection with metamolecule that locks into with left-handed chirality. (**a**) Design of the 3D metamolecule. It has same structure with our metamolecule in the main manuscript except for the position of aptamers. (**b**) Conformation change of the metamolecule in the presence of thrombin. It locks into a left-handed state. (**c**) CD spectrum from 5 pM of metamolecule in the presence of different concentrations of thrombin. As the concentration of thrombin is increased, CD spectrum shifts from right-handed (black line) to left-handed (light red line). (**d**) Normalized response-concentration curve (black dots) with its hill equation fit (red line). Hill coefficient was 1.3±0.13 while K_d was 0.18 nM.

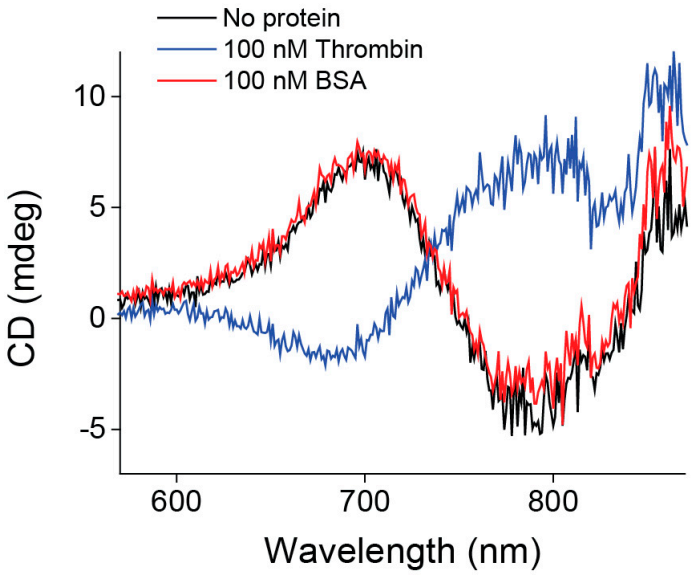

Figure 4. CD spectra of metamolecule in the presence of thrombin or bovine serum albumin (BSA). We observed no noticeable difference when we added 100 nM of BSA to the metamolecules. We note that this experiment was performed with 20 pM of structures.