Supplemental information for manuscript:

Molecular interaction studies of vascular endothelial growth factor with RNA aptamers

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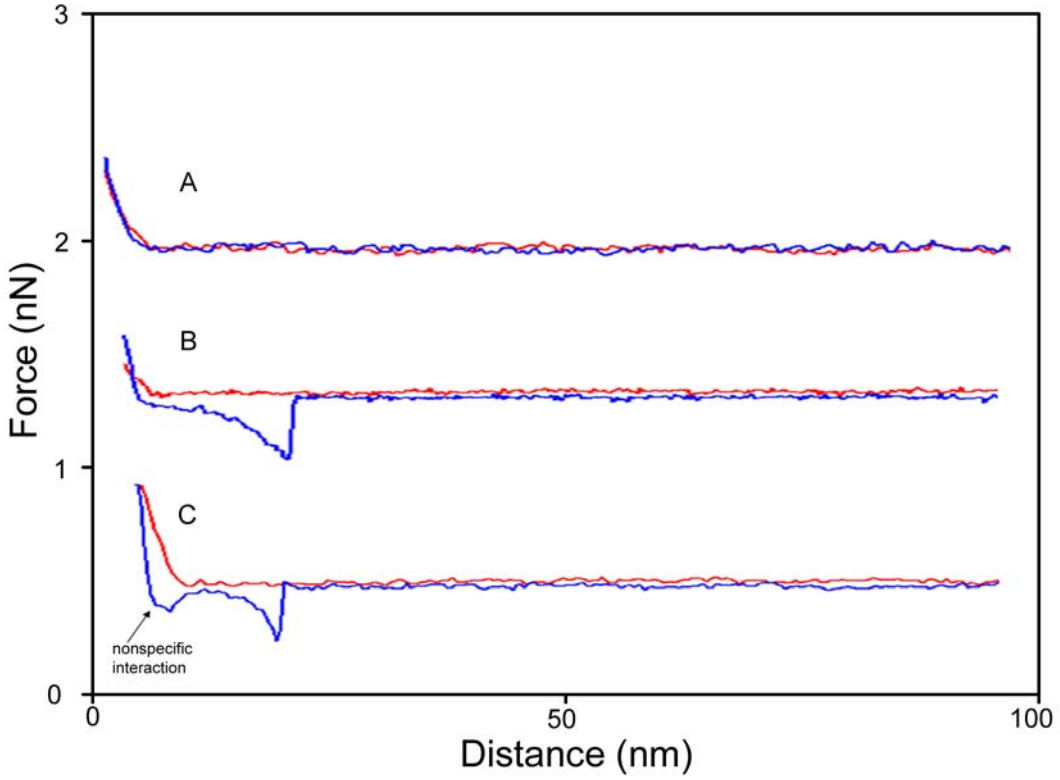

Figure S1: Typical AFM force–distance curves obtained in the experiments: (A) No tip surface adhesion when the tip encounters the OEG SAM on the surface (B) typical selected traces indicating a molecular recognition event and (C) a small amount of the traces showed a small non-specific adhesion force and were selected for analysis. Traces where the tip-surface sticking was >200 pN were not used.

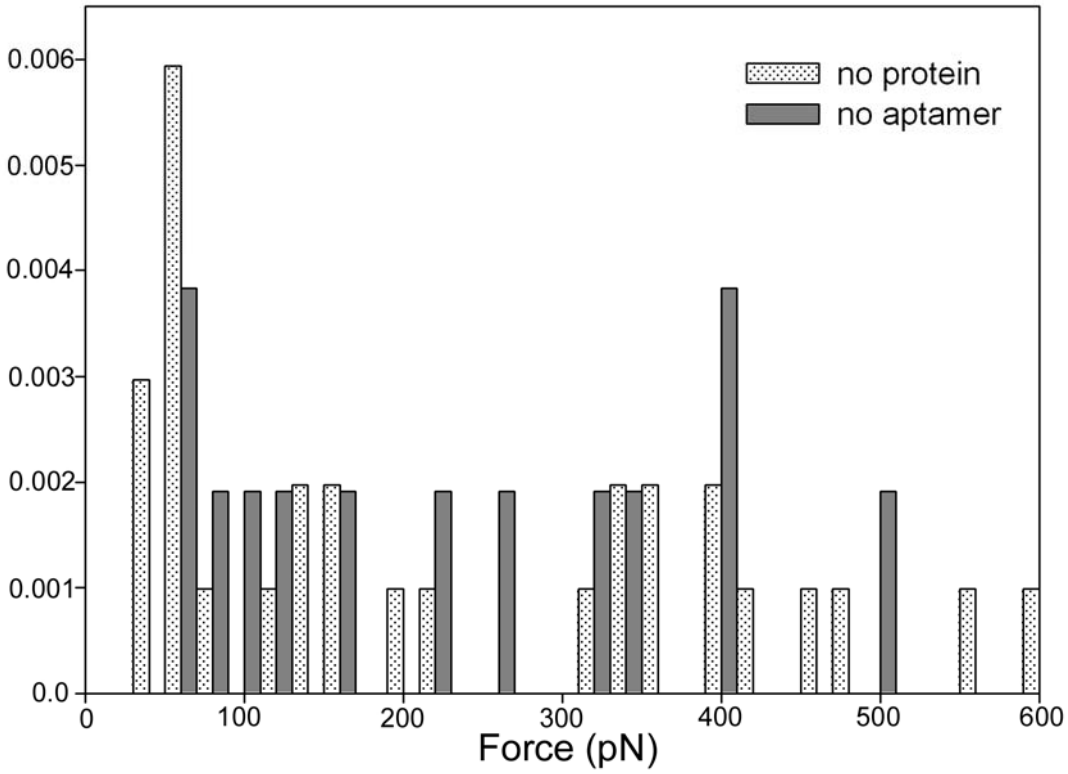

Figure S2: Histogram showing force distribution of two control experiments conducted by systems without protein attached on surface or without aptamer attached on cantilever. The Frequency is much lower than that of system with anti-$VEGF_{165}$ aptamer and $VEGF_{165}$ system (peak frequency is around 0.013). A small peak caused by surface-tip nonspecific interaction can be observed around 60 pN in both control experiments, and the forces detected are randomly distributed in the range between 80-500 pN.

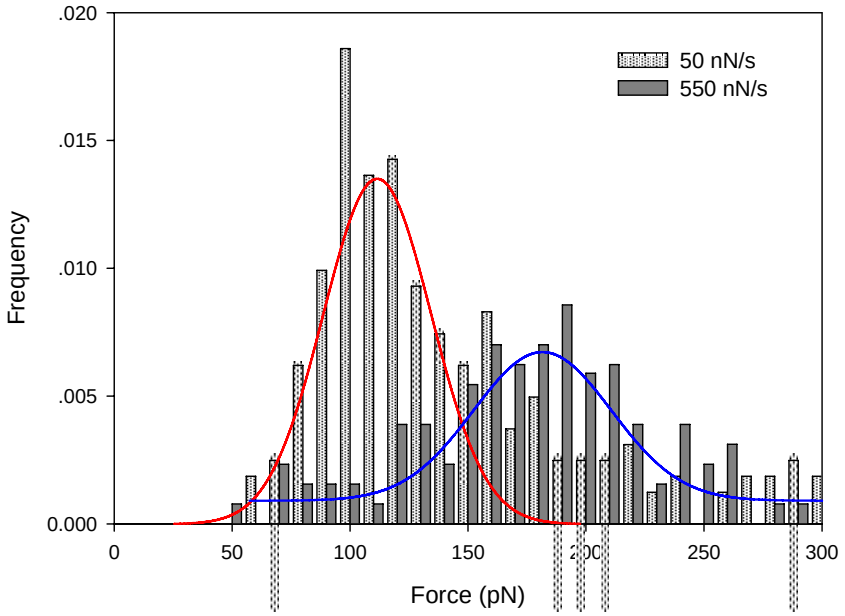

Figure S3. Histogram showing force distribution of anti-$VEGF_{165}$ aptamer and $VEGF_{165}$ system under different loading rates, the peak location is shifted from 112.3±2.4 pN to 181.5±4.7 pN, when the loading rate increases from 50 nN/s to 550 nN/s. The width of distribution is also increased from 34.4±3.8 pN and 55.7±6.0 pN. The total binding percentage in different loading rate experiments is roughly the same, in the range of 18%-20%.

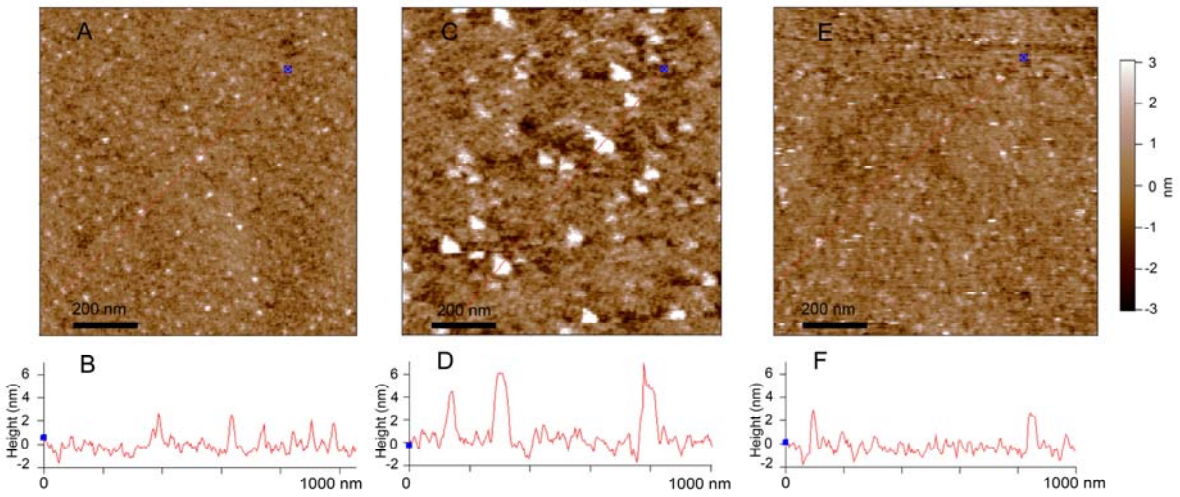

Figure S4. Images of $VEGF_{165}$ protein bound and unbound to thiolated-aptamer functionalized Au surface under different Mg^{2+} concentration. A, image of templated Au surface immobilized with thiolated anti-$VEGF_{165}$ aptamer after incubated with 5μM anti-$VEGF_{165}$ aptamer solution and rinsed with PBS binding buffer; B, protein were attached by anti-$VEGF_{165}$ aptamer modified Au surface by incubating above surface in 5 nM $VEGF_{165}$ protein in 0.1mM Mg^{2+} binding buffer, and rinsing with 0.1mM Mg^{2+} binding buffer; C, $VEGF_{165}$ protein was detached from the surface after the surface was rinsed with 10 mM Mg^{2+} binding buffer. The line profiles (D, E and F) across a 1000 nm section showing the height of the features observed on surface of A, B and C respectively.