Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic Supporting Information for:

Configurable Microfluidic Platform for Investigating Therapeutic Delivery from Biomedical Device Coatings

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The fluorescein-loaded np-Au films are mounted at the bottom surface of the microfluidic platform and the released molecules disperse into the microfluidic channel with the flowing carrier liquid (Figure S1). The carrier liquid is withdrawn from the inlet glass reservoir filled with deionized (DI) water to the outlet connected to a syringe pump. The flow rate inside the channel is maintained with the syringe pump. The amount of released small-molecule drug surrogate, fluorescein, is quantified from the intensity of recorded fluorescent images.

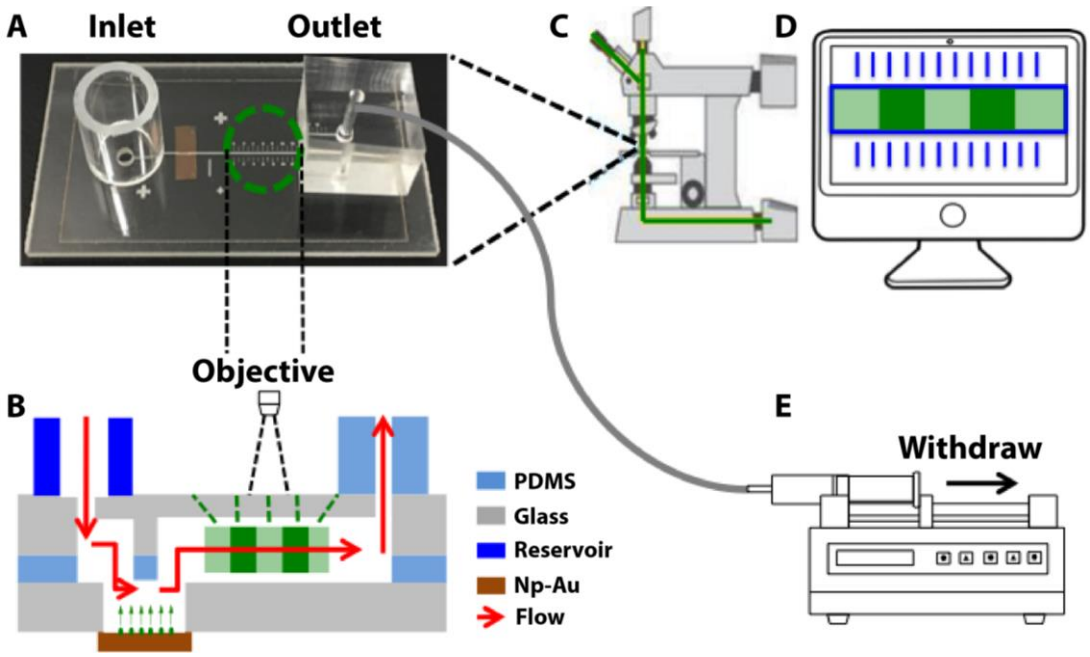

Figure S1. The microfluidic measurement platform with A) top view and B) cross-sectional schematic of the microfluidic device; C) the epi-fluorescence microscopy; D) captured fluorescence intensity on screen; E) syringe pump

The morphology of np-Au is usually characterized by features such as ligaments and pores. The pore size was typically between 20 and 120 nm and the pore surface coverage was uniform across the entire np-Au sample. The scanning electron microscopy (SEM) image of top view and cross-sectional view of standard np-Au is shown in Figure S2.

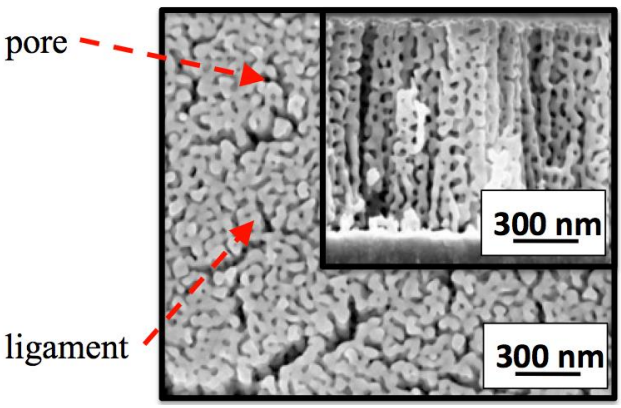

Figure S2. SEM image of top view of standard np-Au (Inset shows the cross-sectional view)

The calibration curve used for converting the measured fluorescence intensity to the corresponding concentration of fluorescein is shown in Fig S3.

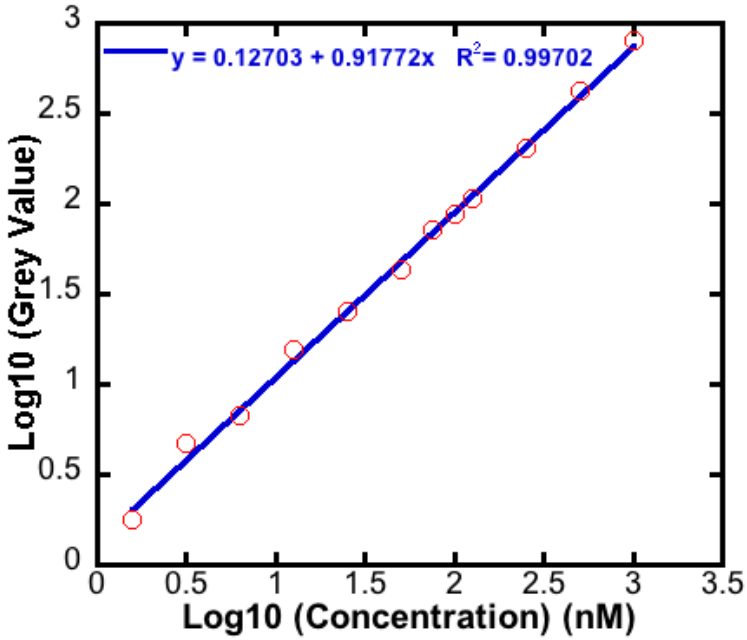

Figure S3. The calibration curve for fluorescein concentration and the corresponding fluorescence intensity (grey value)

In order to test the influence of phosphate buffered saline (PBS) on fluorescein release from np-Au, the microfluidic platform was tested with infused initially with DI water and subsequently with PBS. As seen in Figure S4, during the DI water infusion, the release rate was relatively slow and there was a burst release when PBS was introduced. Consistent with previous studies[1], as chloride ions has higher affinity to gold than fluorescein to gold, chloride ions in the elution medium replace physio-adsorbed fluorescein molecules, thereby resulting in the burst release.

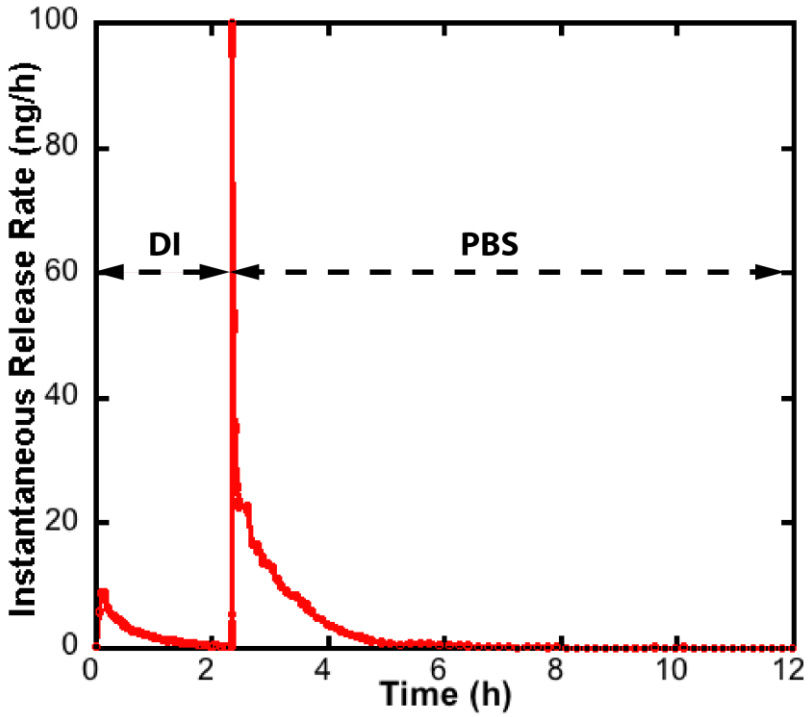

Figure S4. The fluorescein instantaneous release profile in deionized water and PBS

References

1. O. Polat and E. Seker, *J Phys Chem C*, 2015, **119**, 24812-24818.