

Supporting Information

On-chip Cytometry using Plasmonic Nanoparticle Enhanced Lensfree Holography

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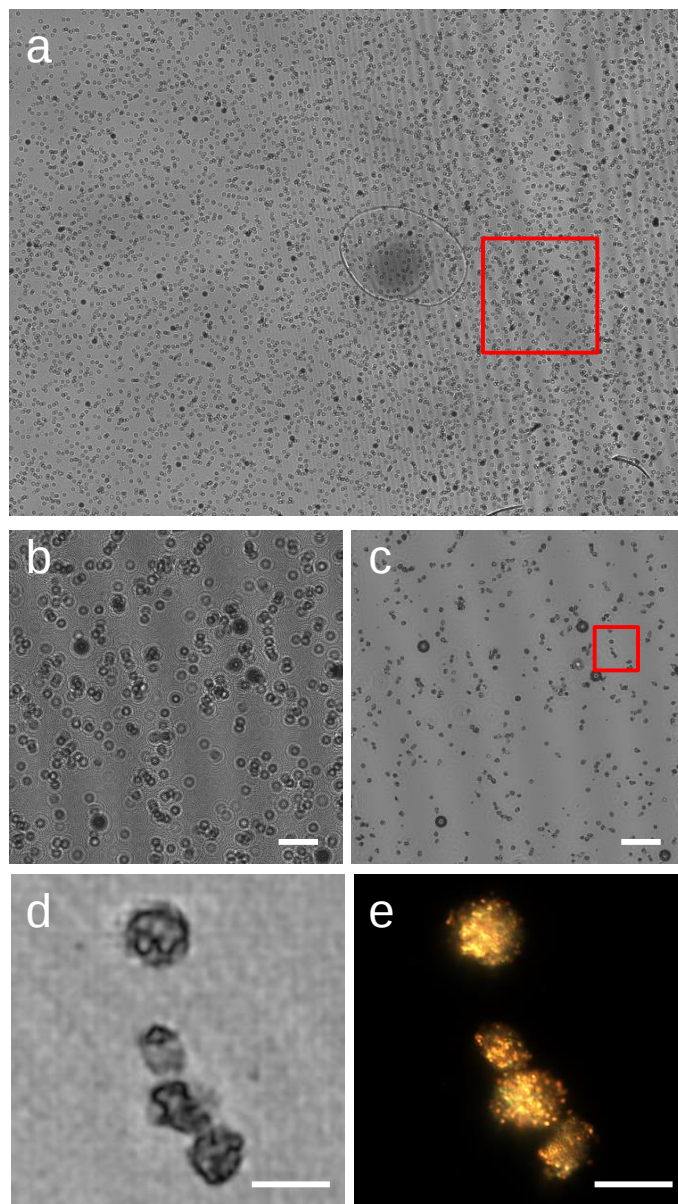


Figure S1. (a) Large FOV ($\sim 24 \text{ mm}^2$) of lensfree on-chip holography. (b) Enlarged SR hologram image of the region enclosed within the red square in (a). (c) Corresponding reconstructed amplitude image. Scale bar = $100 \text{ }\mu\text{m}$. (d) Enlarged amplitude image of the region enclosed within the red square in (c). (e) Darkfield scattering image of the same region of interest, obtained by a $60\times$ objective lens. Scale bar = $10 \text{ }\mu\text{m}$.

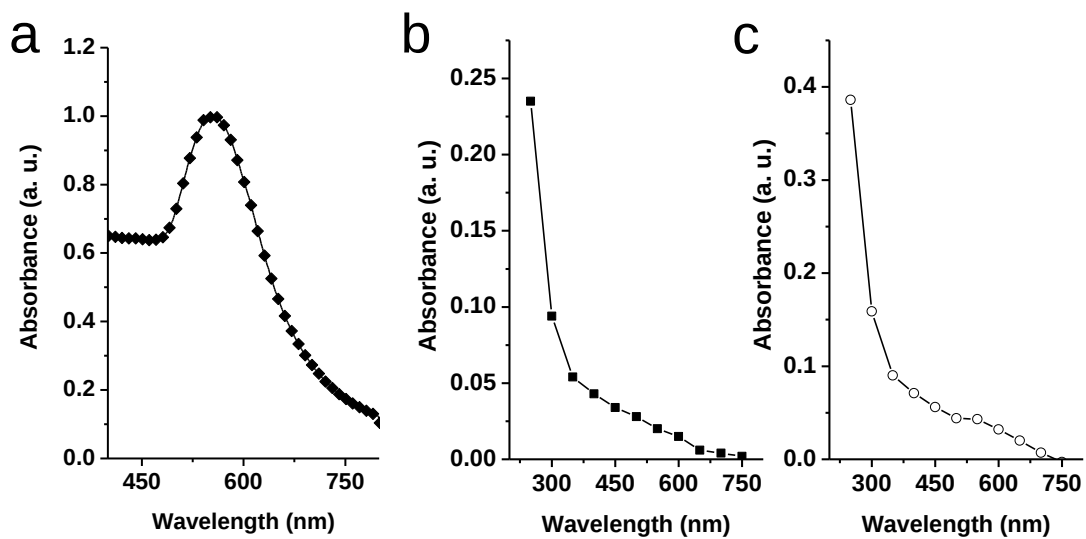


Figure S2. UV-vis absorption spectra of (a) 100-nm Au NP in water ($\lambda_{\text{max}} \sim 554$ nm), (b) unlabeled CD4, and (c) Au-CD4 cell suspension within PBS buffer.

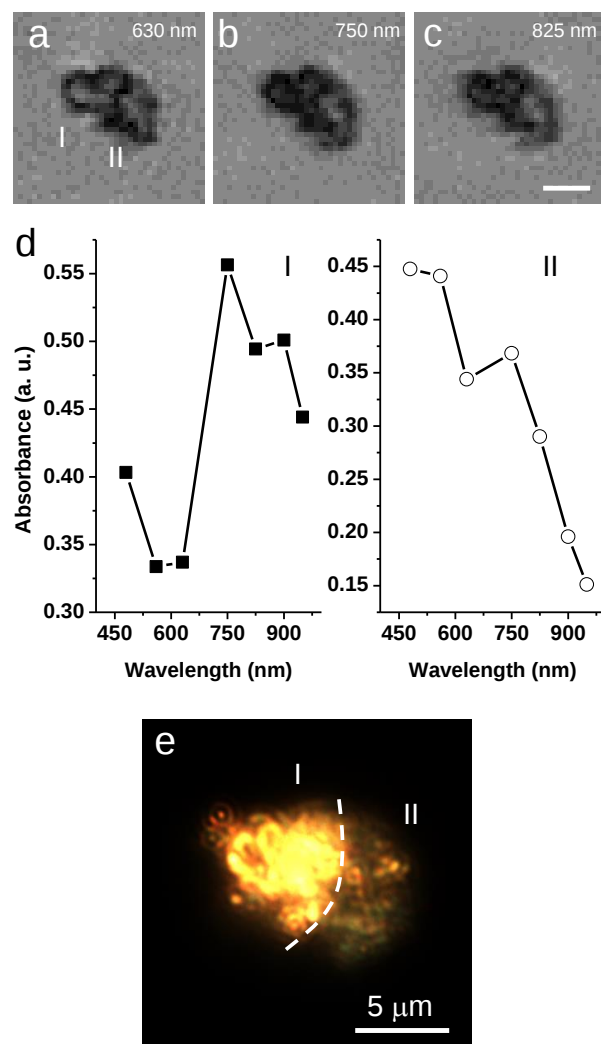


Figure S3. Correlation of lensfree holographic imaging with darkfield scattering microscopy at the subcellular level. (a-c) Reconstructed amplitude images of a single Au-CD4 cell illuminated at 630, 750, and 825 nm, respectively. Subcellular region I exhibited much stronger absorption than region II at 750 nm. Scale bar = 5 μm . (d) Different absorption patterns of region I and II measured by multispectral lensfree holography at seven different wavelengths. (e) A high-magnification darkfield scattering image of the same Au-CD4 cell, correlating well with the lensfree results of (d).

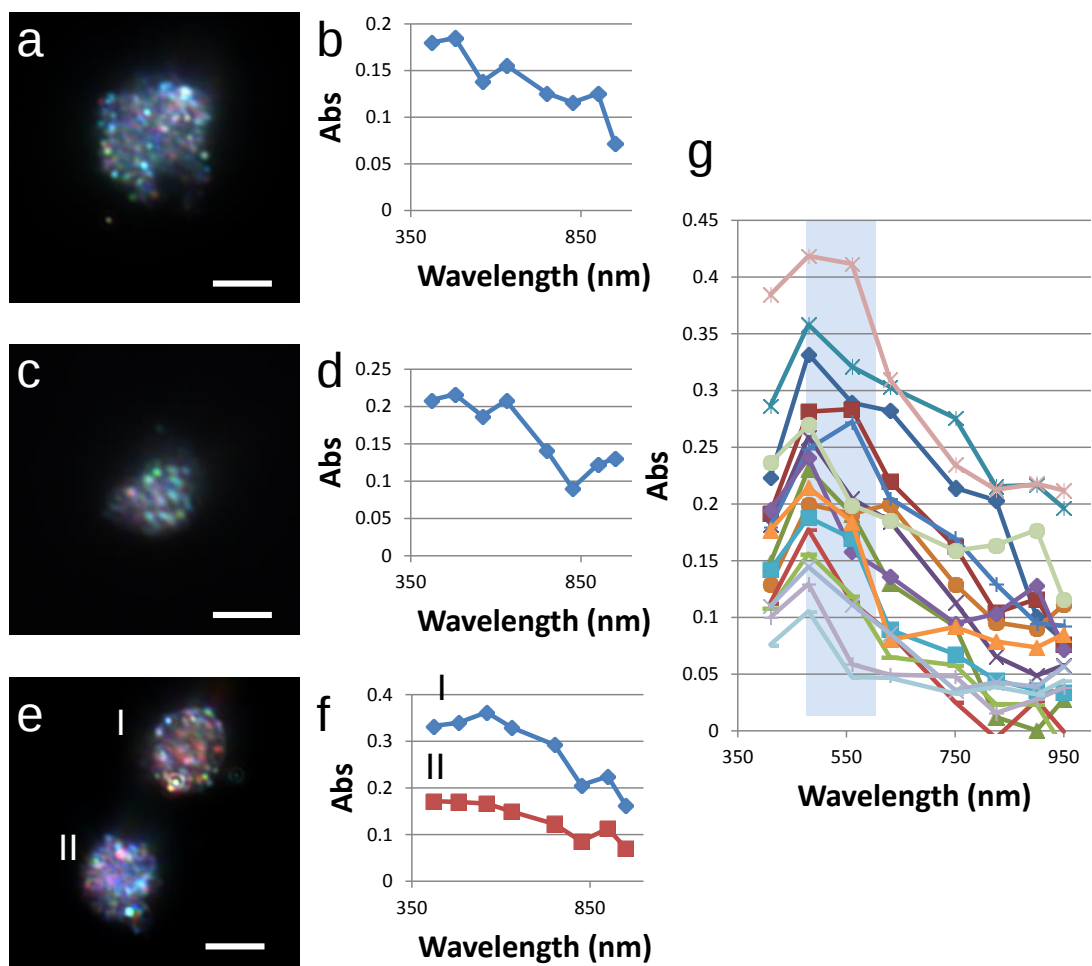


Figure S4. CD8 cells labeled by Ag NPs. (a,c,e) Darkfield scattering images of Ag-CD8 cells from three different regions. Scale bar = 10 μm. (b,d,f) Corresponding individual cell absorbance spectra measured by lensfree on-chip holography. (g) Absorbance patterns of 15 different Ag-CD8 cells. The light blue spectral band highlights the major absorption wavelengths of Ag-CD8 cells.

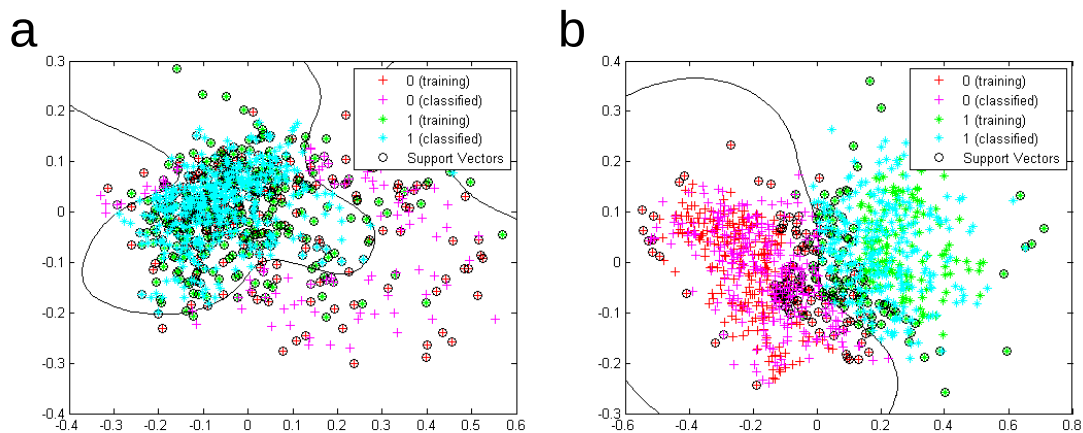


Figure S5. Classification of CD4 and CD8 cells by two-class SVM. (a) Before and (b) after metal NP labeling. The averaged classification accuracy before and after labeling is $59.4 \pm 0.9\%$ and $95.4 \pm 0.8\%$, respectively (5 repeats).