

Supporting Information:

Protein Coating Composition Targets Nanoparticles to Leaf Stomata and Trichomes

Eleanor Spielman-Sun[†], Astrid Avellan[†], Garret D. Bland[†], Emma T. Clement[†], Ryan V. Tappero,[‡] Alvin S. Acerbo,^{‡,§} Gregory V. Lowry*[†]

[†]Civil and Environmental Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213, United States

[‡]National Synchrotron Light Source II, Brookhaven National Laboratory, Upton, NY 11961, United States

[§]Center for Advanced Radiation Sources, University of Chicago, Chicago, IL 60637, United States

*Corresponding author:

Address: Carnegie Mellon University, Pittsburgh, PA 15213

Phone: (412) 268-2948

Email: glowry@cmu.edu

Number of Pages: 8

Number of Figures: 6

Number of Tables: 1

Table of Contents

Figure S1 – TEM images and UV-Vis spectra of exposure solutions	Page S2
Table S1 – Size distributions of AuNP exposure solutions	Page S3
Figure S2 – Microscope images of control stomata	Page S4
Figure S3 – Darkfield images trichome from of BSA-AuNP exposure	Page S5
Figure S4 – LM6M-AuNP exposure after 1 min rinsing	Page S6
Figure S5 – Microscope images of cit-AuNP exposure after 2 min rinsing	Page S7
Figure S6 – XFM maps of BSA-AuNP exposure after 2 min rinsing	Page S8

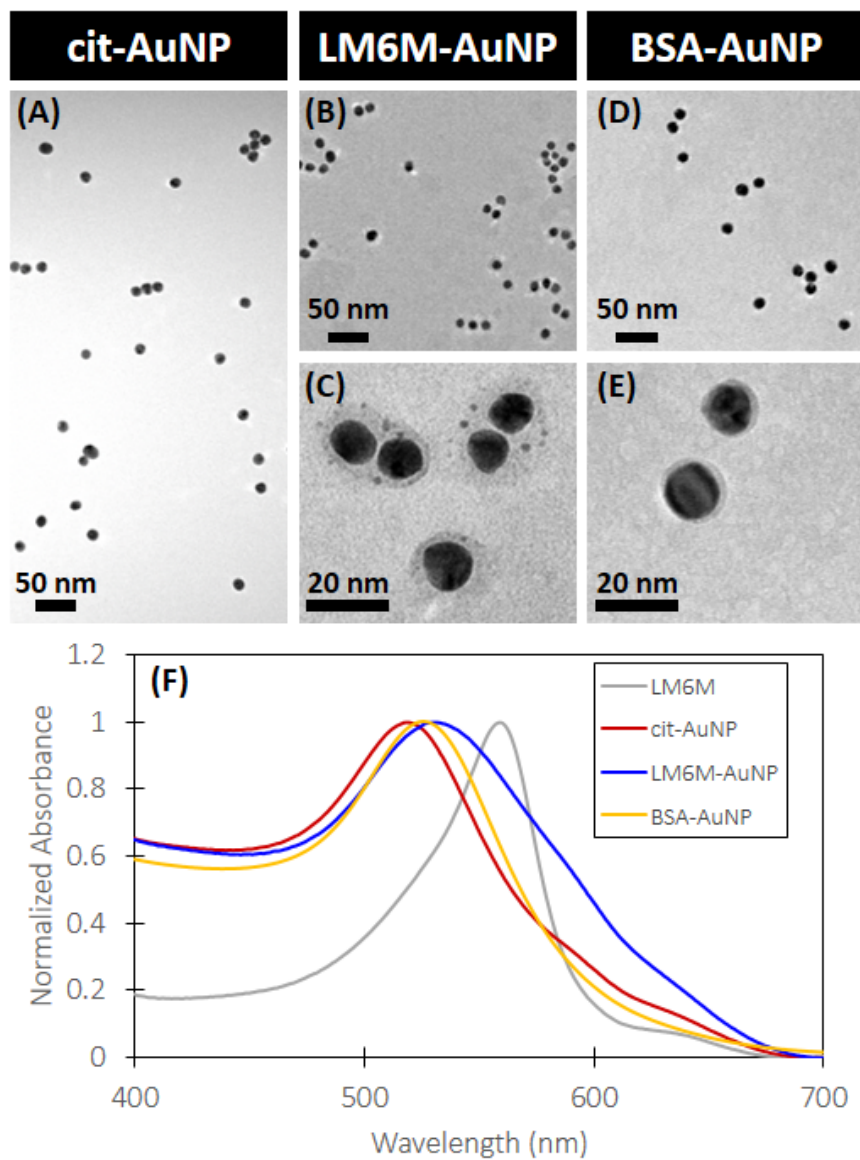


Figure S1: TEM images of (A) cit-AuNPs, (B, C) LM6M-AuNPs, and (D, E) BSA-AuNPs. (F) UV-Vis spectra of exposure solutions.

Table S1. Hydrodynamic diameters of AuNP exposure solutions. AuNP concentration was 100 mg/L.

Sample	Volume-weighted (nm)	Number-weighted (nm)	Z-average (nm)
cit-AuNP	13.8 ± 5.9	25.8 ± 7.6	19.4 ± 7.1
LM6M-AuNP	29.1 ± 8.2	81.2 ± 25.4	51.1 ± 14.5
BSA-AuNP	24.0 ± 10.0	18.1 ± 5.3	33.0 ± 8.6

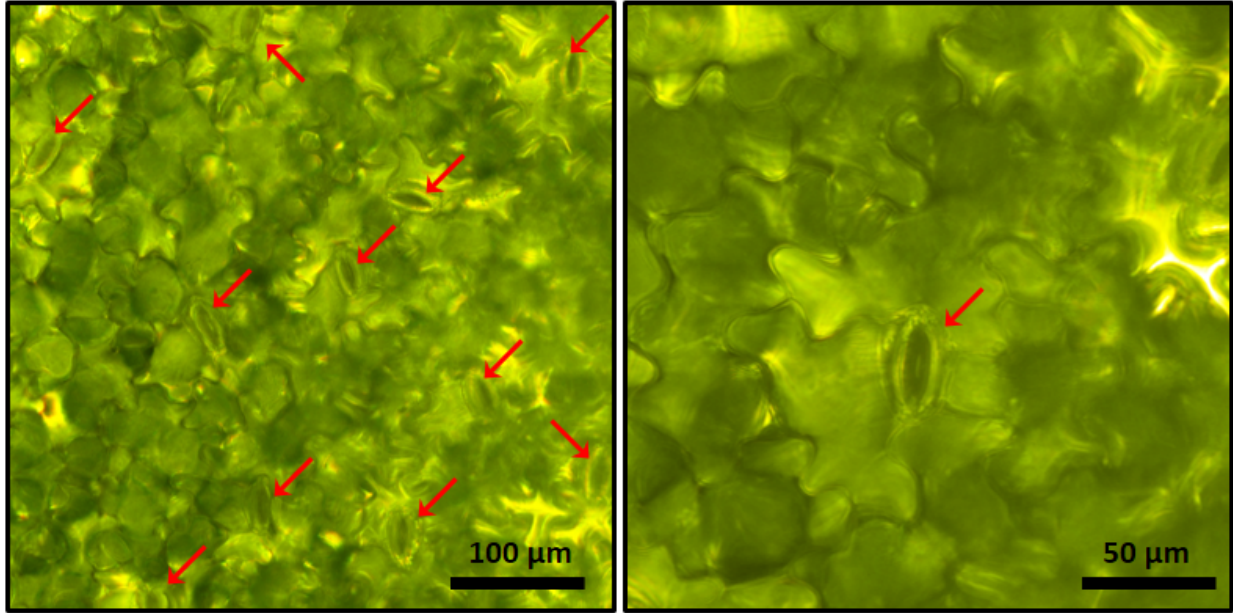


Figure S2: Light microscope images of *V. faba* leaf exposed via drop deposition to DI water as a control. Stomata are indicated with red arrows.

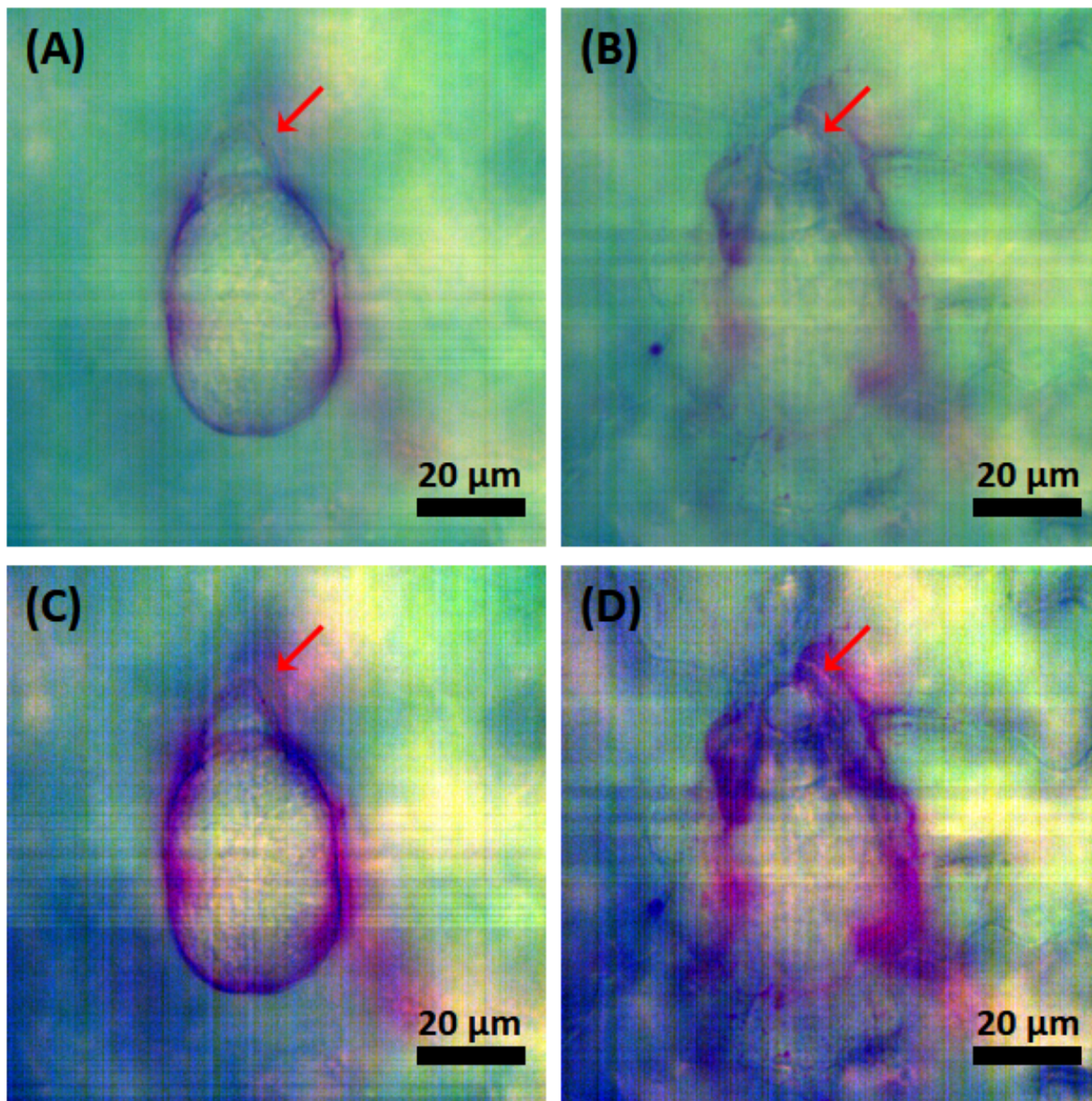


Figure S3: Darkfield microscopy images of a single trichome at different focal planes exposed via drop deposition to BSA-AuNP, cit-AuNP and then rinsed for 2 min in a basal salt solution. Red arrows indicate location of trichome base.

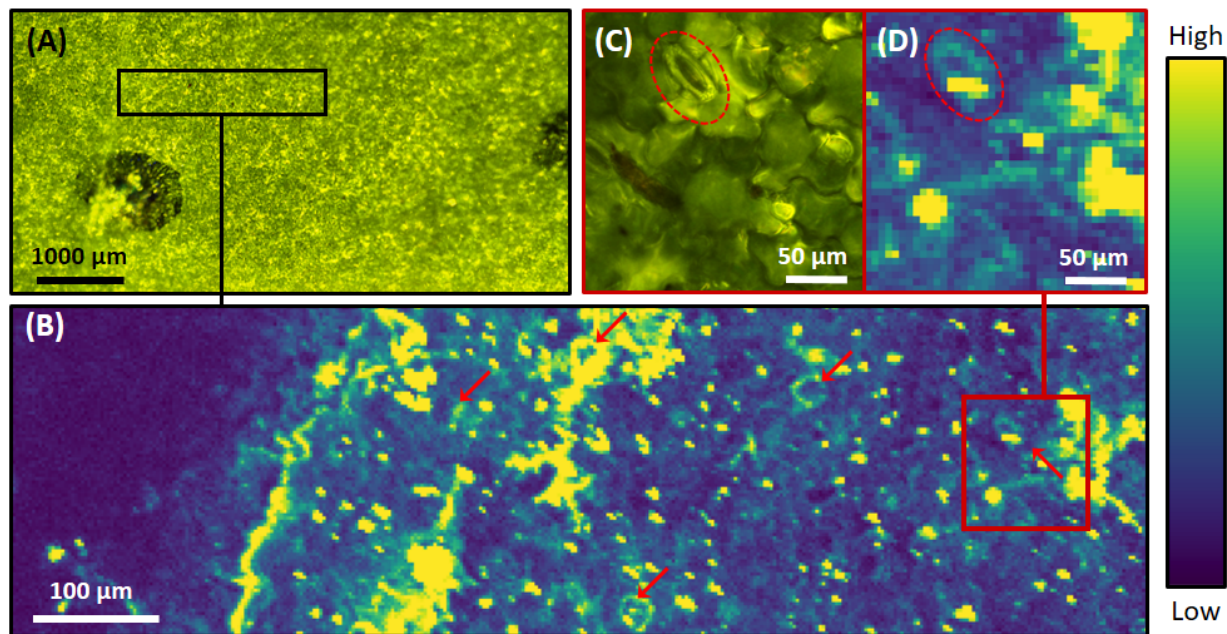


Figure S4: *V. faba* leaf exposed via drop deposition to LM6M-AuNP solution, then rinsed for 1 min in a basal salt solution. **(A)** Light microscope image of drop deposition zone (region between the two black dots) with region analyzed by XFM indicated by a black rectangle. **(B)** Elemental map showing total Au distribution (see color scale to right). Several stomata that were successfully targeted are indicated by red arrows. The region inside the red box is enlarged both as a **(C)** light microscope image and enlarged **(D)** Au XFM map, with one stoma indicated inside the red dashed oval.

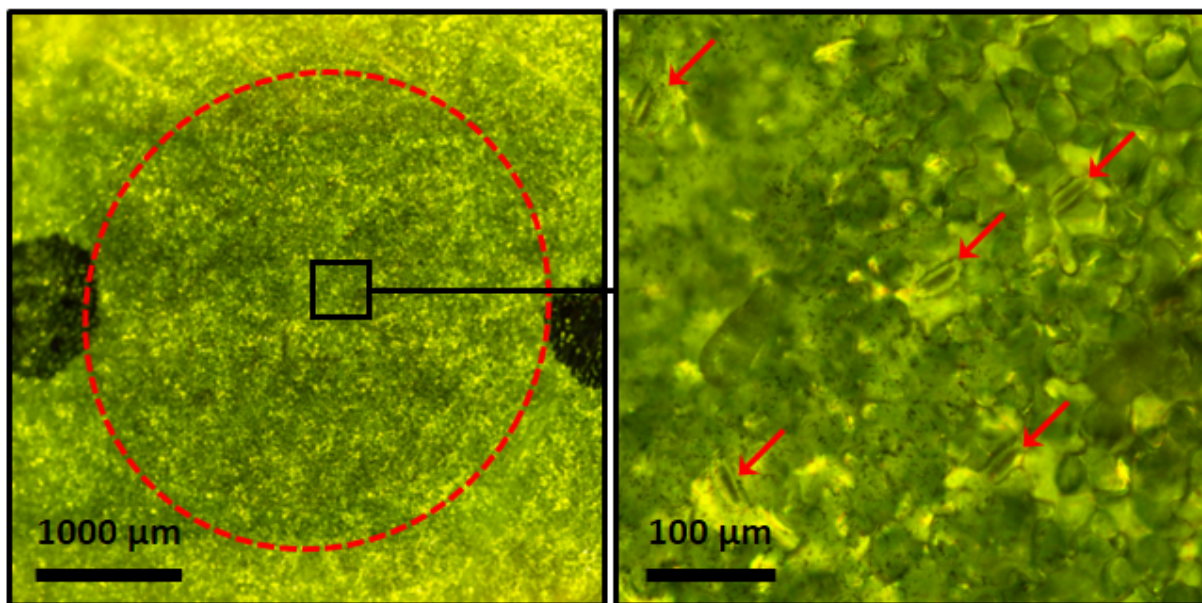


Figure S5: *V. faba* leaf exposed via drop deposition to cit-AuNP solution, then rinsed for 2 min in a basal salt solution. **(Left)** Light microscope image of drop deposition zone (indicated by the red dashed circle between the black dots). **(Right)** Magnified view of the leaf, with stomata indicated with red arrows.

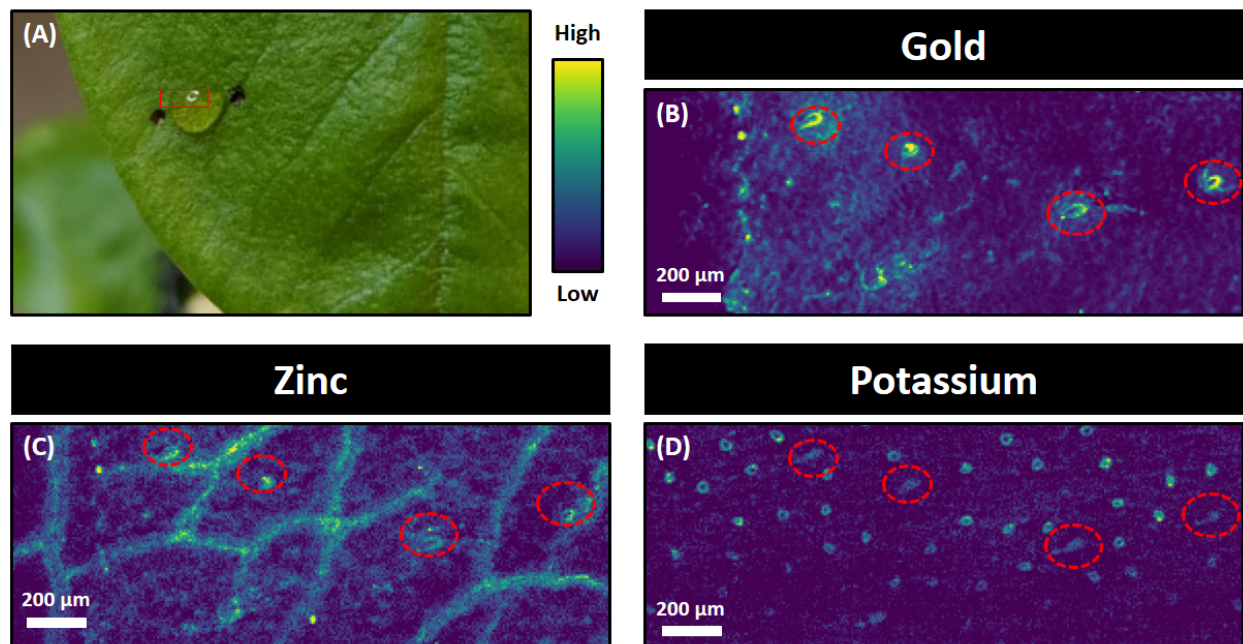


Figure S6: *V. faba* leaf exposed via drop deposition to BSA-AuNP solution, then rinsed for 2 min in a basal salt solution. (A) Photo of drop deposition with the region analyzed by XFM indicated with a red box. XFM maps showing (B) gold, (C) zinc, and (D) potassium distribution. Trichomes are highlighted with red dashed ovals.