Electronic Supplementary Information (ESI)

Monitoring the dynamics of hemeoxygenase-1 activation in head and neck cancer cells in real-time using plasmonically enhanced Raman spectroscopy

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Electronic Supplementary Information 1

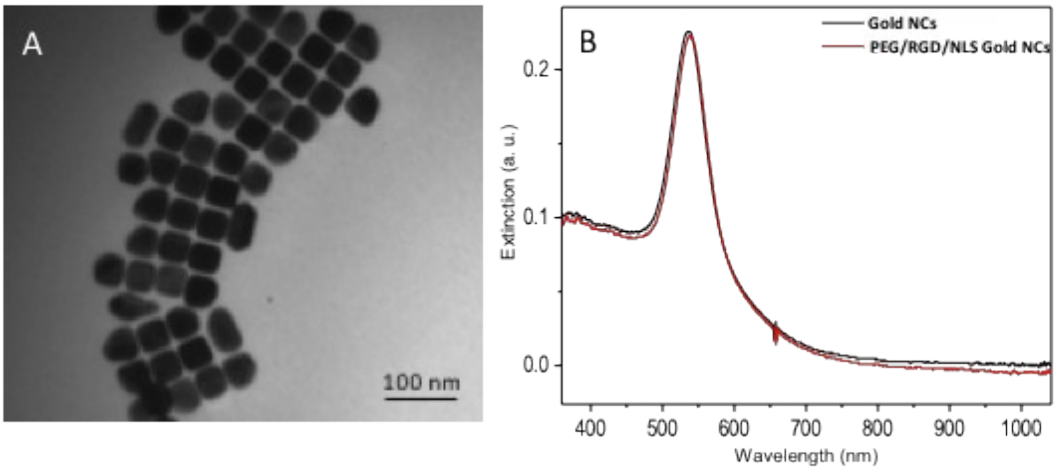

Figure S1. TEM image (A) and corresponding extinction spectra (B) of gold NCs before and after conjugation with PEG/RGD/NLS.

Electronic Supplementary Information 2

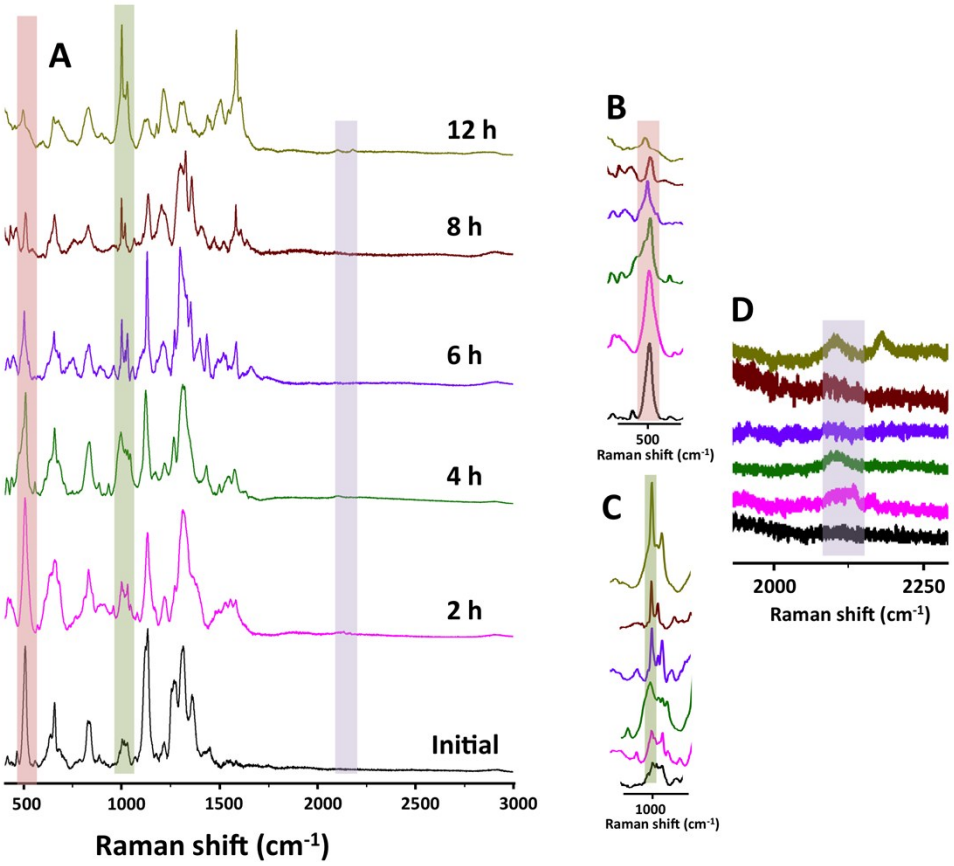

Figure S2. (A) Real-time PERS spectra taken from PEG/RGD/NLS/AuNCs internalized HSC-3 cells while being treated with cisplatin (75 μM). B, C and D are the enlarged views of the PERS spectra showing the disulfide vibration (~502 cm^{-1}), phenylalanine ring breathing vibration (1001 cm^{-1} in proteins and carbonyl vibration (~2115 cm^{-1}) in CO, respectively.

Electronic Supplementary Information 3

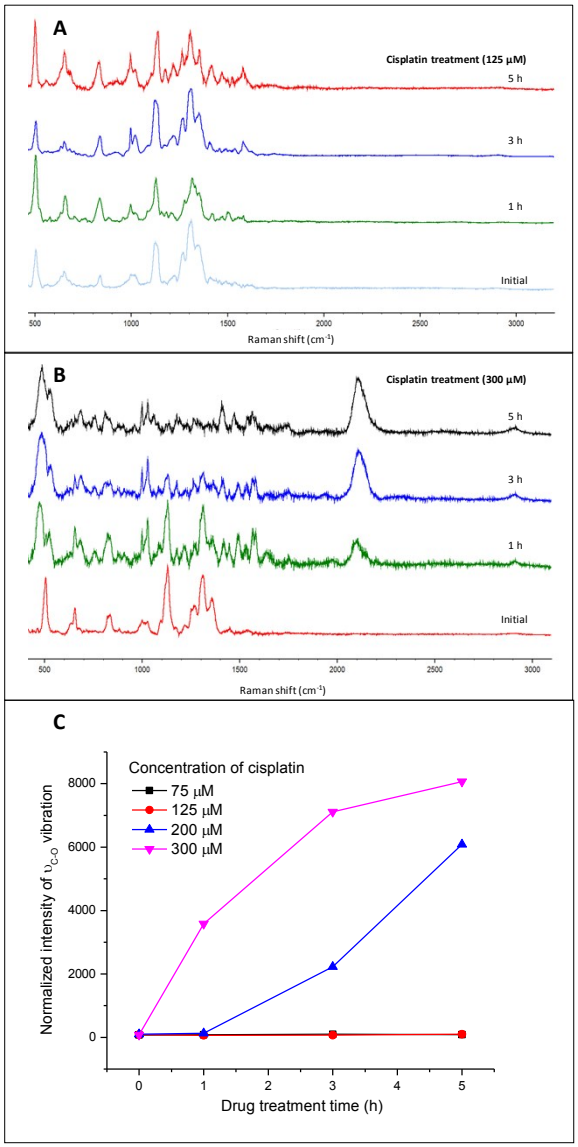

Figure S3. Real-time PERS spectra taken from PEG/RGD/NLS/AuNCs internalized HSC-3 cells while being treated with cisplatin at concentrations (A) 125 μM and (B) 300 μM. (C) Plot showing the normalized intensity of vibration of C-O stretching vibration collected as function of drug treatment time at different drug concentrations.

Electronic Supplementary Information 4

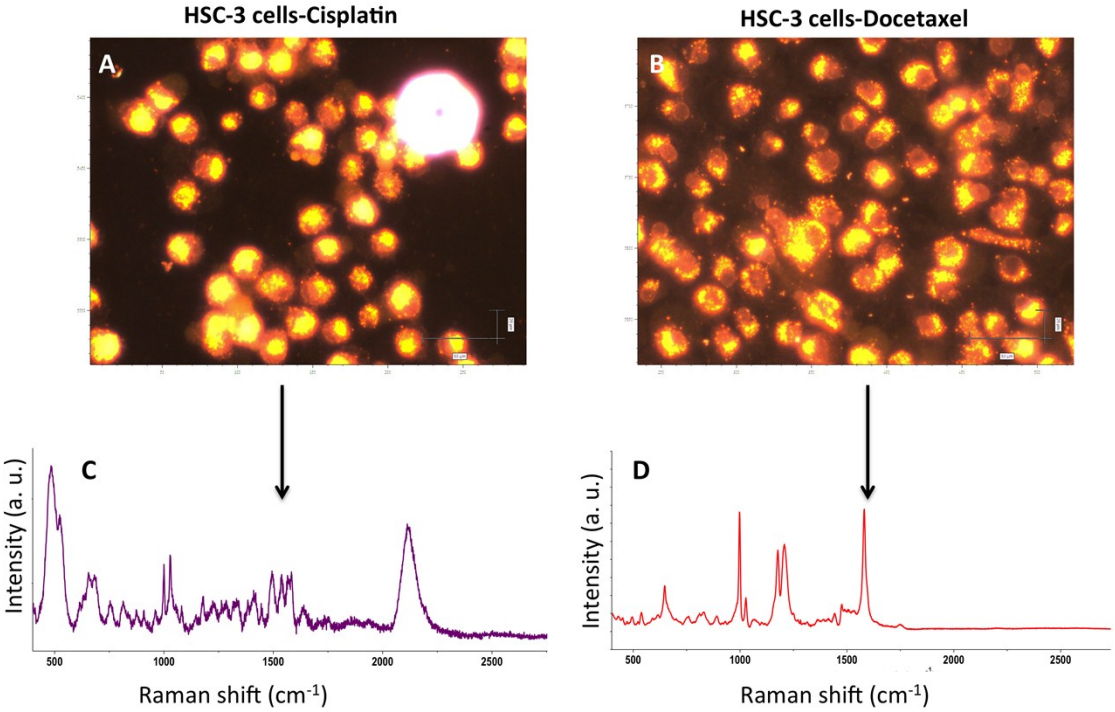

Figure S4. A and B are the dark field images of HSC-3 cells exposed to 200 µM of cisplatin and docetaxel drugs, respectively. C and D are the PERS spectra collected from the HSC-3 cells after 4 h treatment of cisplatin and docetaxel respectively.

Electronic Supplementary Information 5

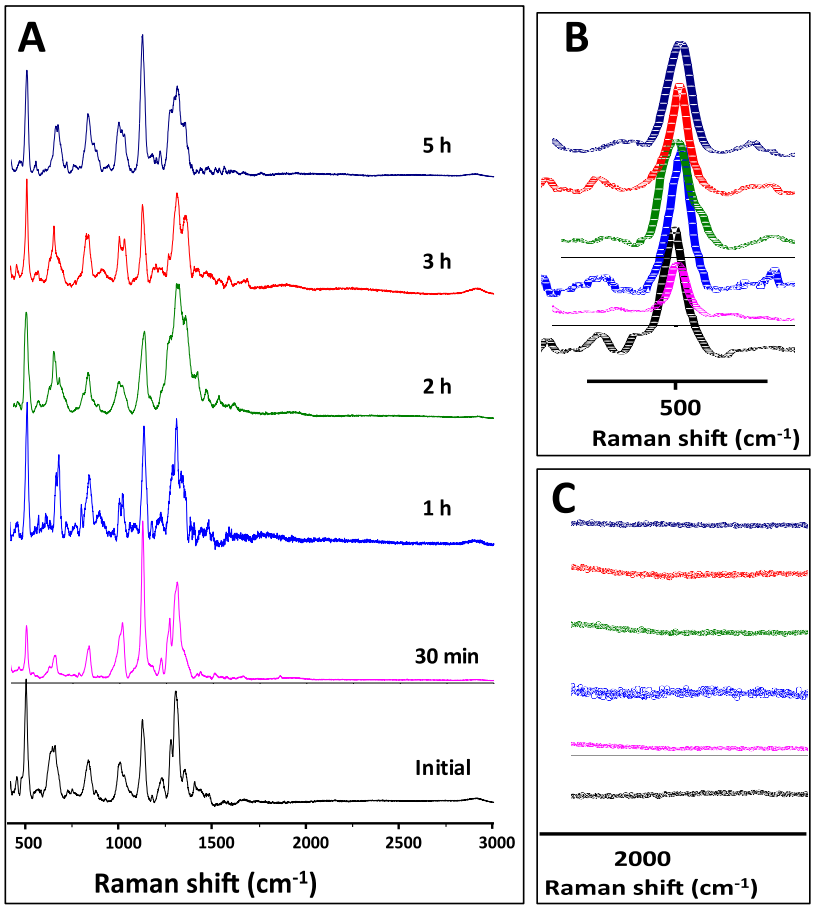

Figure S5. (A) Real-time PERS spectra taken from PEG/RGD/NLS/AuNCs internalized HSC-3 cells (no drug treatment). B and C are the enlarged views of the PERS spectra showing the disulfide vibration (~502 cm^{-1}) in proteins and carbonyl vibration region (~2115 cm^{-1}), respectively. Absence of distinct CO vibration indicates less HO-1 induction and activation under normal condition (no external stress).

Electronic Supplementary Information 6

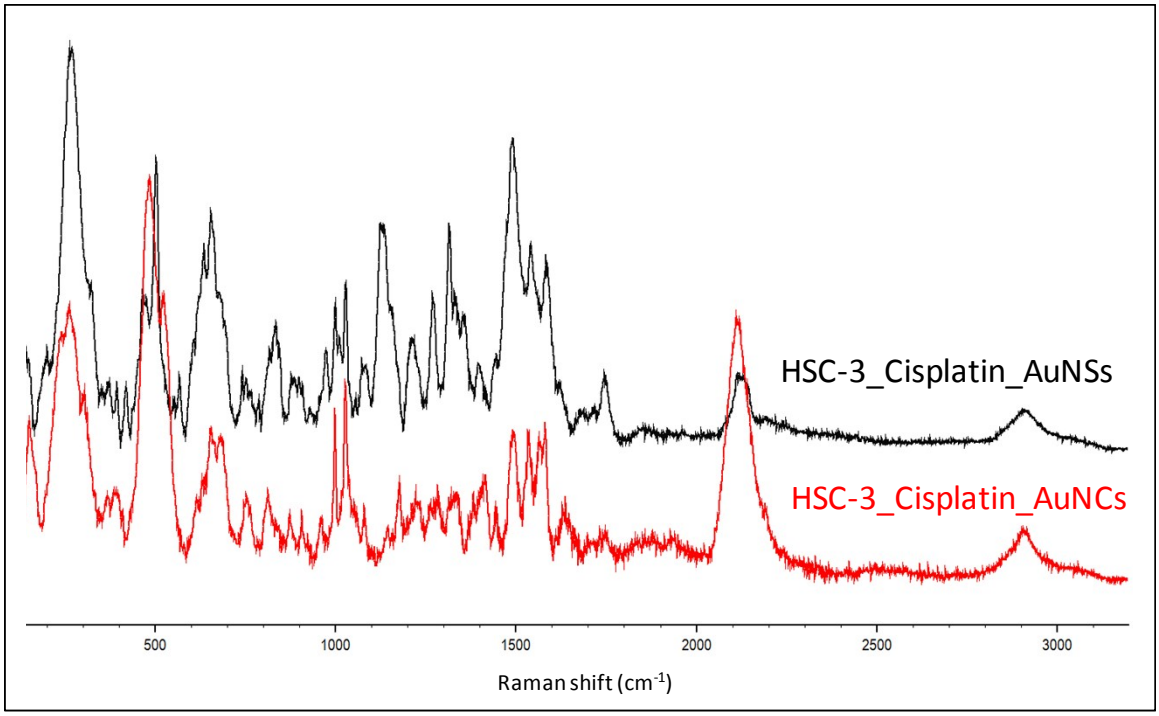

Figure S6. PERS spectra taken from PEG/RGD/NLS/AuNCs (red trace) and PEG/RGD/NLS/AuNSs (black trace) internalized HSC-3 cells after 5 h of cisplatin treatment (200 μM).

Electronic Supplementary Information 7

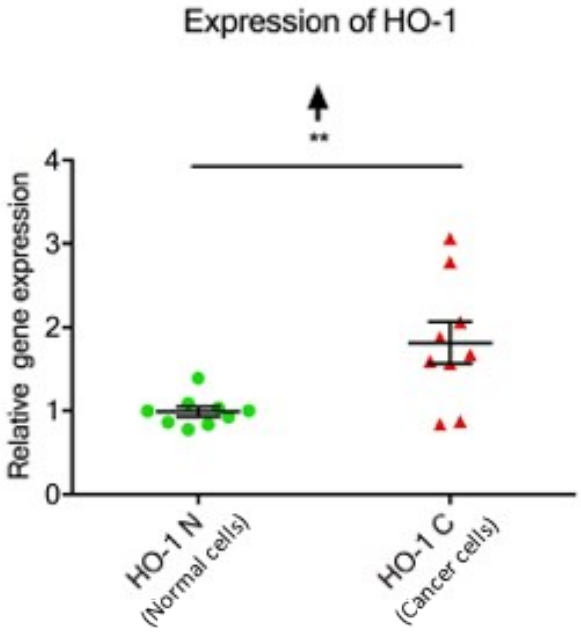

Figure S7. In silico analysis of HO-1 expression in head and neck normal (green) and head and neck cancer (red) cells was obtained using Oncomine.