

# Porphyrin and Doxorubicin Mediated Nanoarchitectonics of Copper Clusters: A Bimodal Theranostics for Cancer Diagnosis and Treatment *In Vitro*

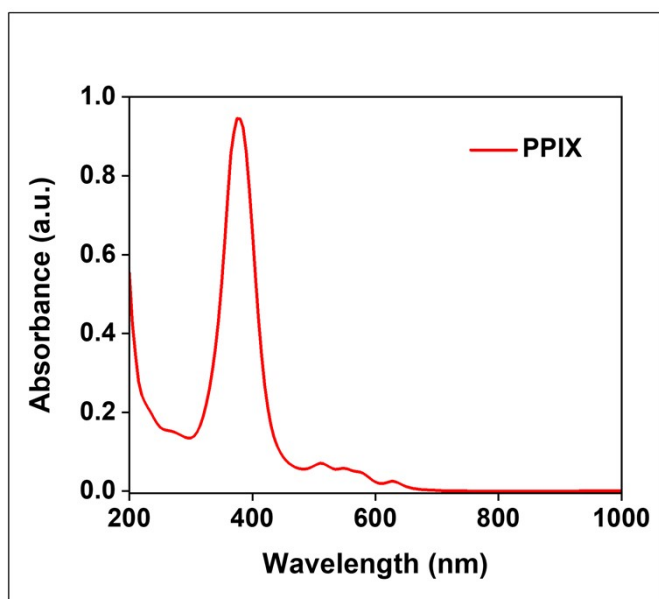
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Tharayil,<sup>a</sup> Ramapurath S Jayasree<sup>\*c</sup> and Lakshmi V Nair<sup>\*a,b</sup>*

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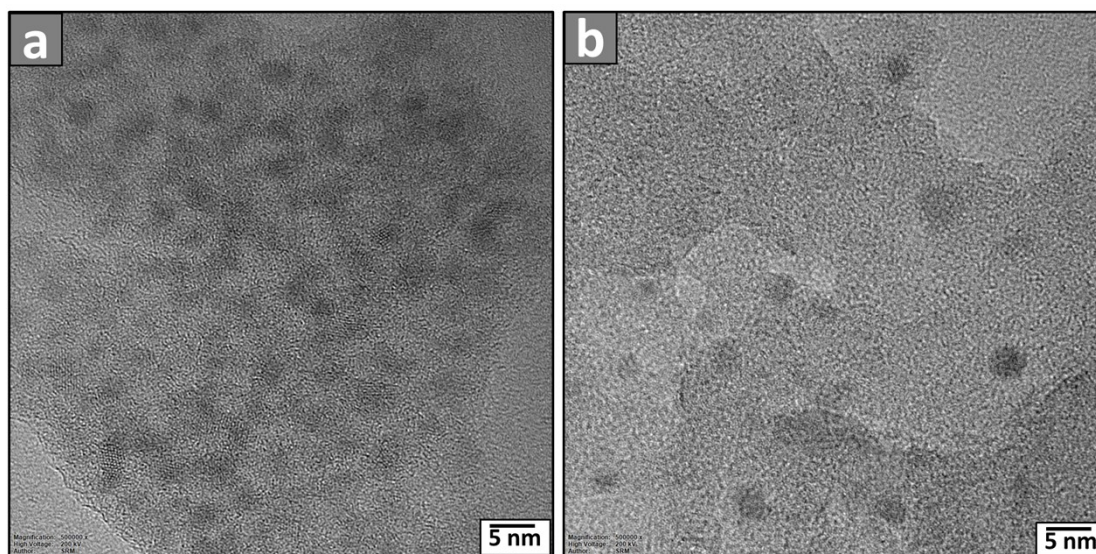
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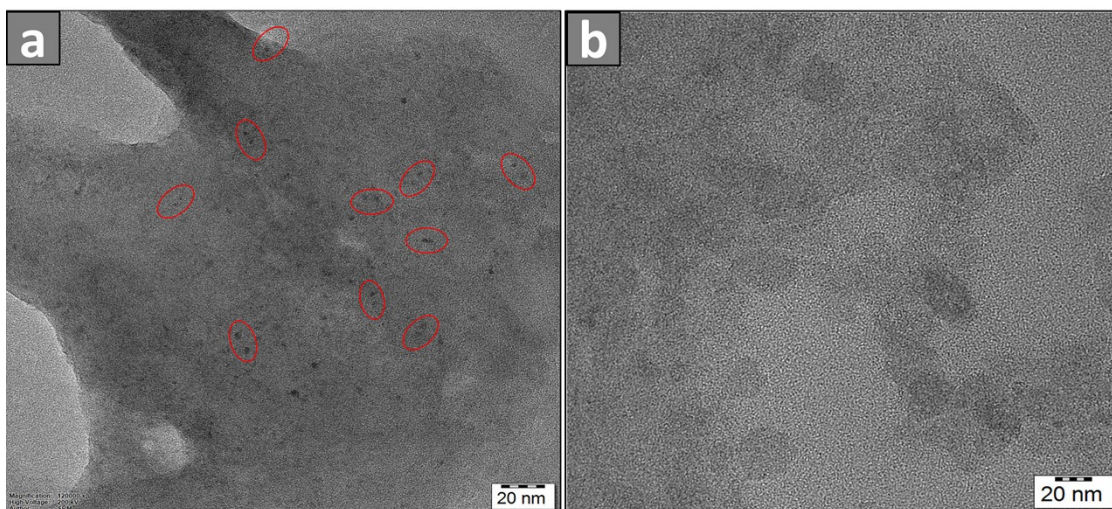
Email: [lvijayan@uab.edu](mailto:lvijayan@uab.edu), [jayasree@sctimst.ac.in](mailto:jayasree@sctimst.ac.in)



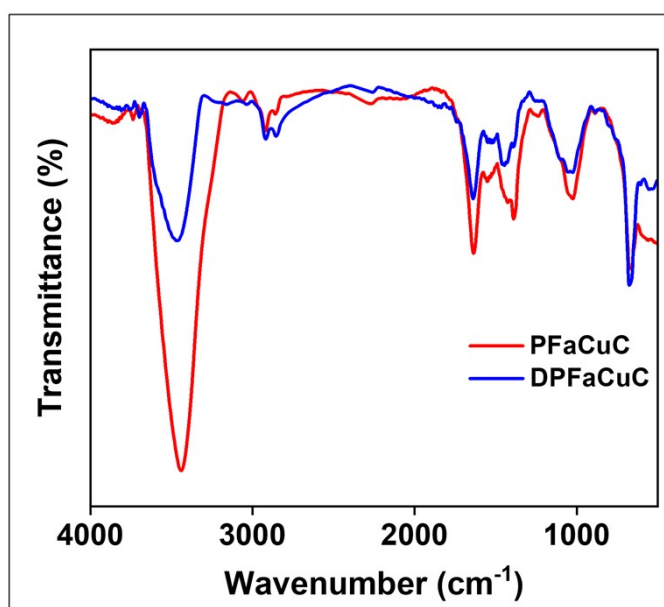
**Fig. S1** UV-Visible absorbance spectra showing characteristic absorptions of PPIX.



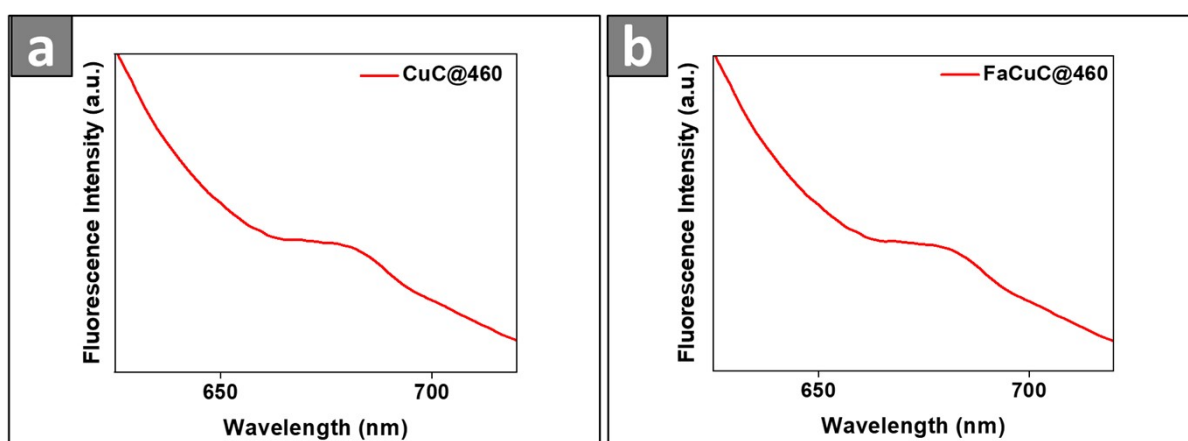
**Fig. S2** HRTEM images of (a) CuC and (b) FaCuC.



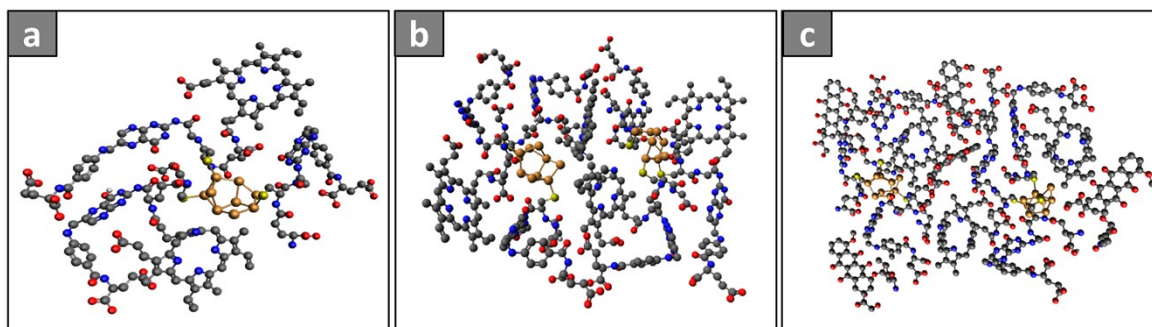
**Fig. S3** HRTEM images of (a) PFaCuC and (b) DPFaCuC.



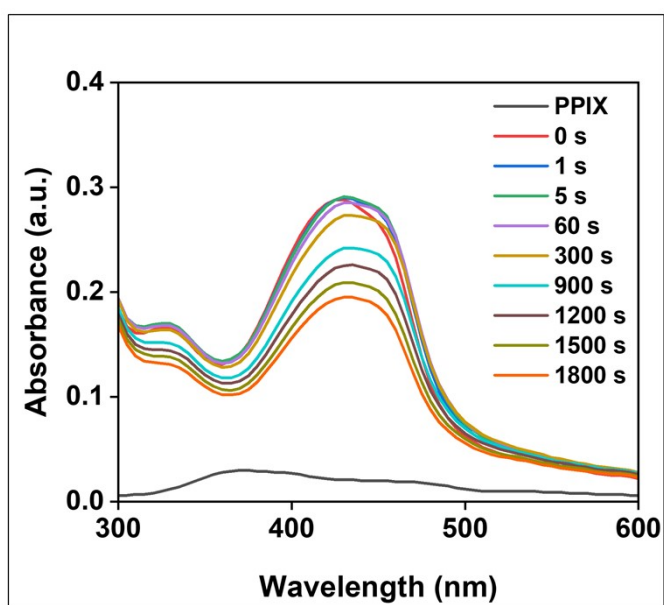
**Fig. S4** FT-IR spectra of PFaCuC and DPFaCuC.



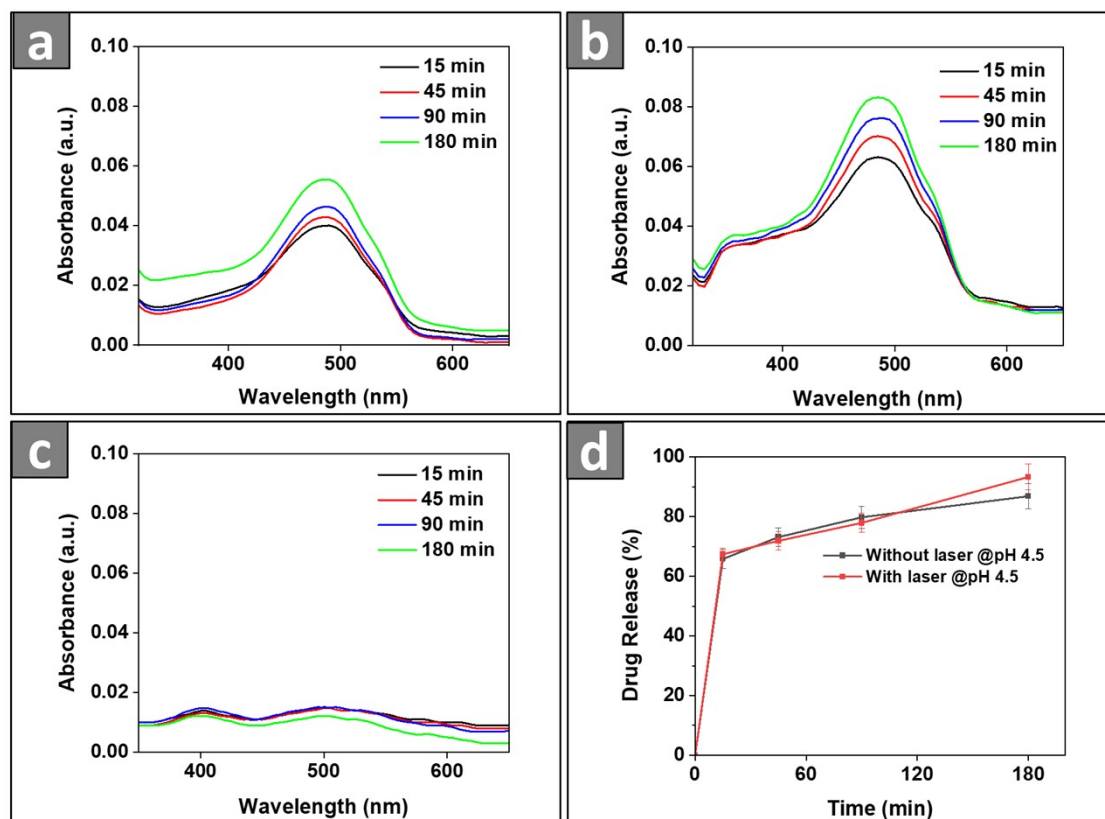
**Fig. S5** Fluorescence emission spectra of (a) CuC and (b) FaCuC at  $\lambda_{\text{ex}}$  at 460 nm.



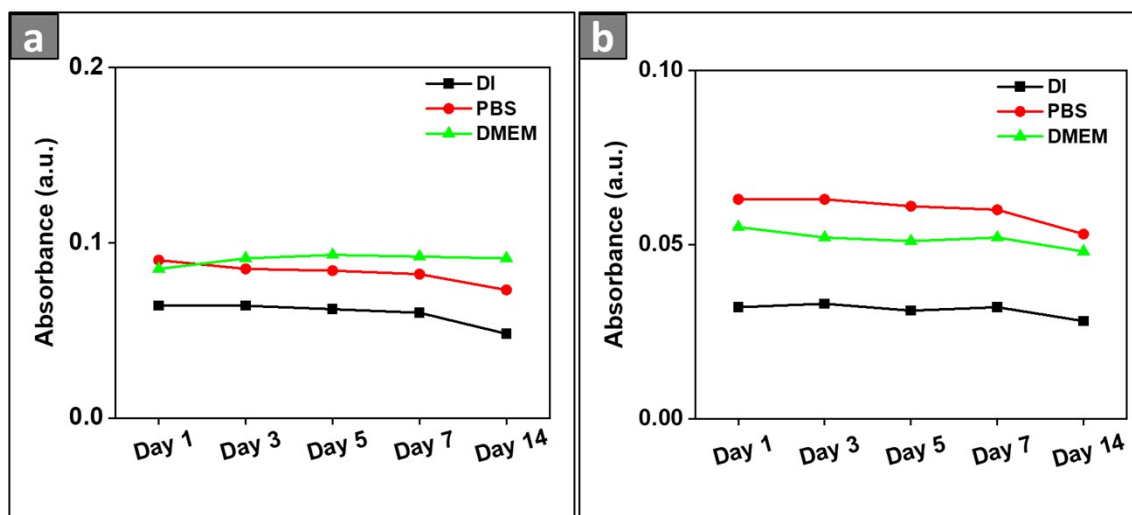
**Fig. S6** Formulation of the nanostructural assembly via Avogadro software for (a) PFaCuC (monomer), (b) PFaCuC (dimer), and (c) DPFaCuC.



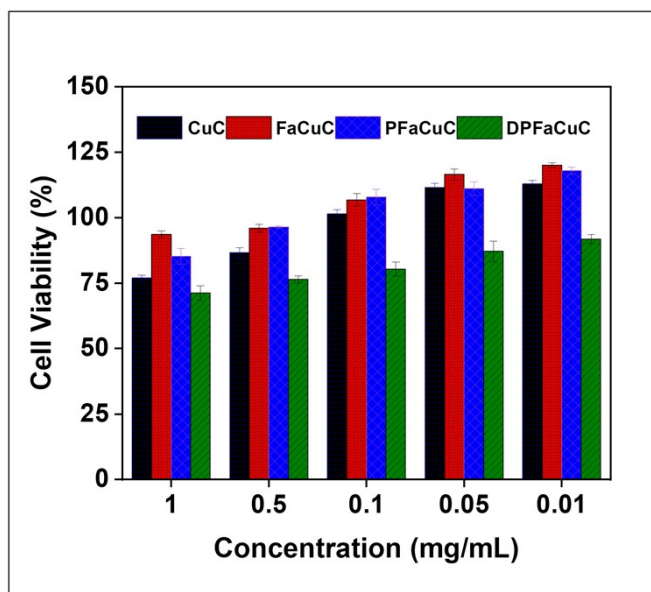
**Fig. S7** UV-visible absorbance spectra of singlet oxygen scavenger, DPBF, at different time intervals in the presence of PPIX.



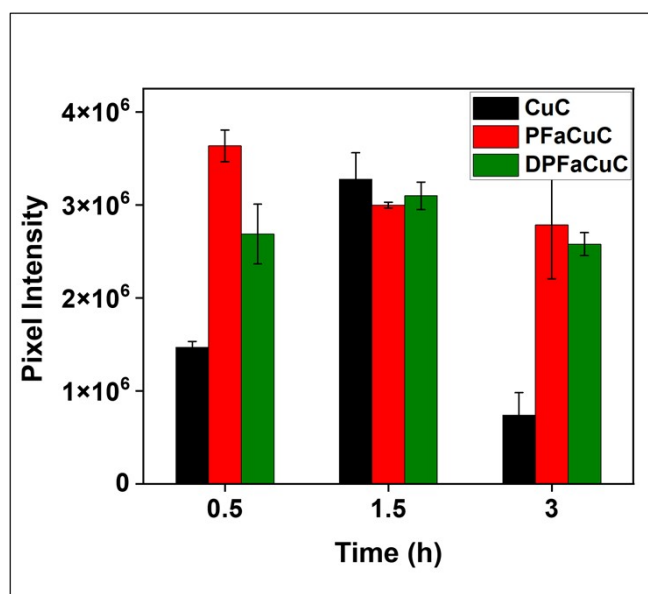
**Fig. S8** UV-Visible absorbance indicating drug release at different time intervals (15, 45, 90, and 180 min) at (a) pH 4.5 with laser, (b) pH 4.5 without laser, and (c) pH 7.4 without laser. (d) The change in the drug release (%) with time (min).



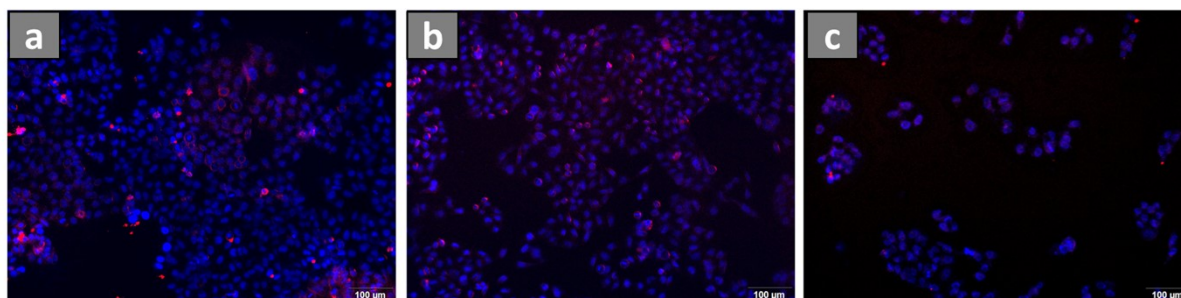
**Fig. S9** Stability studies of (a) PFAcCuC and (b) DPFAcCuC in DI water, PBS, and DMEM for 14 days.



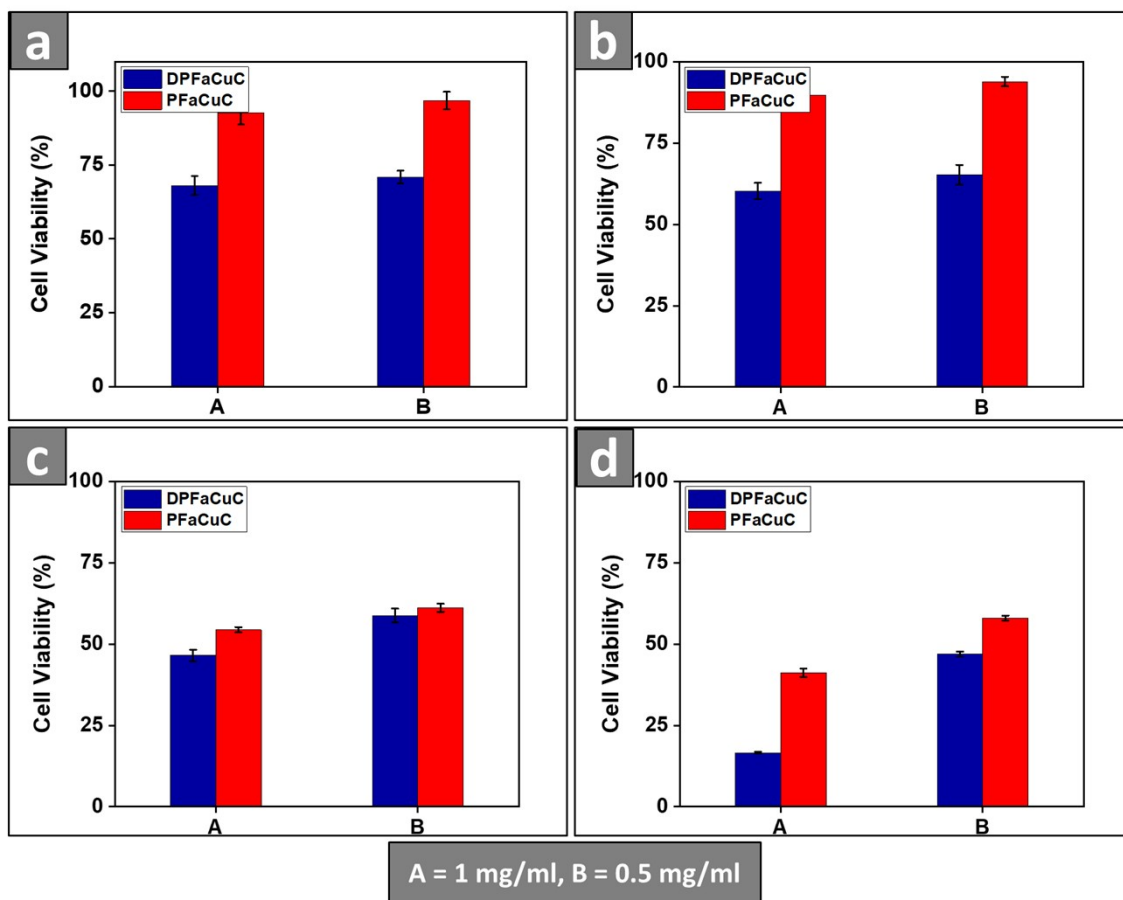
**Fig. S10** MTT assay for CuC, FaCuC, PFaCuC and DPFaCuC.



**Fig. S11** The pixel intensity measurements carried out on fluorescence images depicting material uptake in HeLa cells.



**Fig. S12** Cell uptake of CuC at (a) 0.5 h, (b) 1.5 h and (c) 3 h



**Fig. S13** Therapeutic efficacy of PFAcCuC and DPFaCuC using MTT assay with and without laser irradiation at  $1\text{ mg ml}^{-1}$  and  $0.5\text{ mg ml}^{-1}$  after the specified period of material incubation; (a) without laser, 0.5 h material incubation, (b) without laser, 3 h material incubation, (c) with laser, 0.5 h material incubation & (d) with laser, 3 h material incubation.