Supplementary Information

Curcumin conjugated gold nanoparticle synthesis and its biocompatibility

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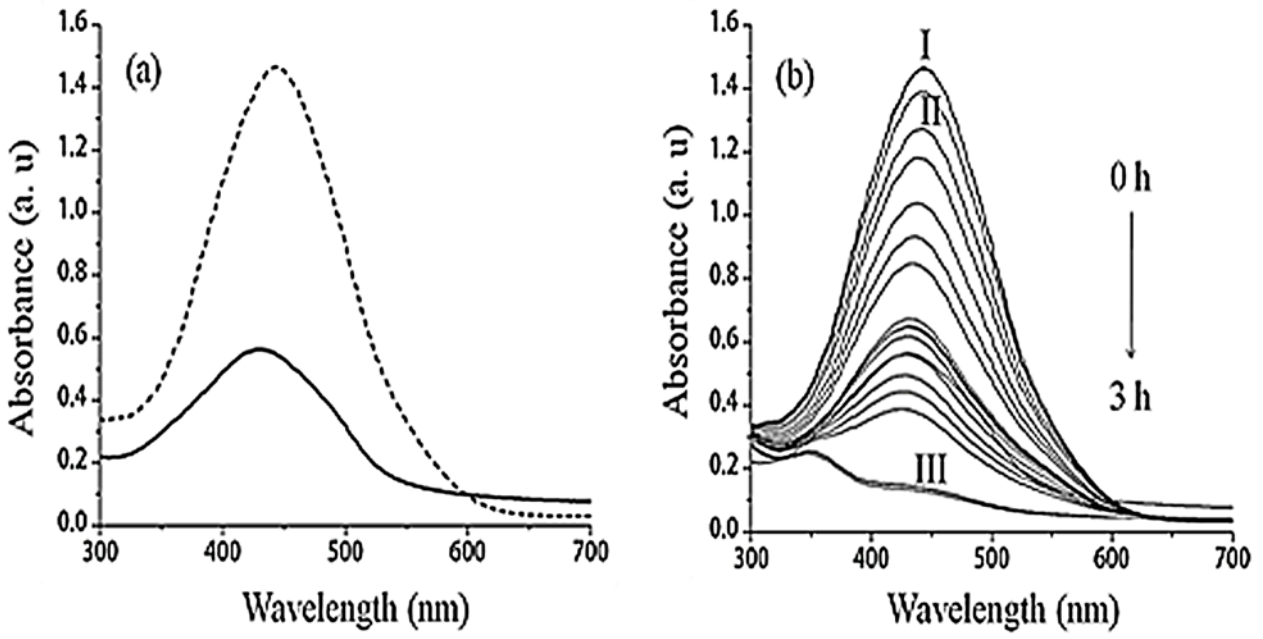


Fig. S1**.** pH dependent absorbance spectral changes of curcumin. (a)The UV-Vis spectra of curcumin (50μM) showing a red shift of 10 nm due to deprotonation, as the pH is increased from 5.8 (—) to 9.3 (---) . (b) Kinetics of degradation of curcumin (50μM, pH - 9.3) at 5 min time interval. No significant decrease in absorbance is observed at 15 min (II) while complete degradation results only at 120 min (III).It is important to note that the spectra at 0 and 5 min (I) overlaps signifying no degradation of curcumin within 5 min of increase in pH. Thus it is

clear that no significant degradation starts before 15 min and the complete degradation requires nearly 120 min.

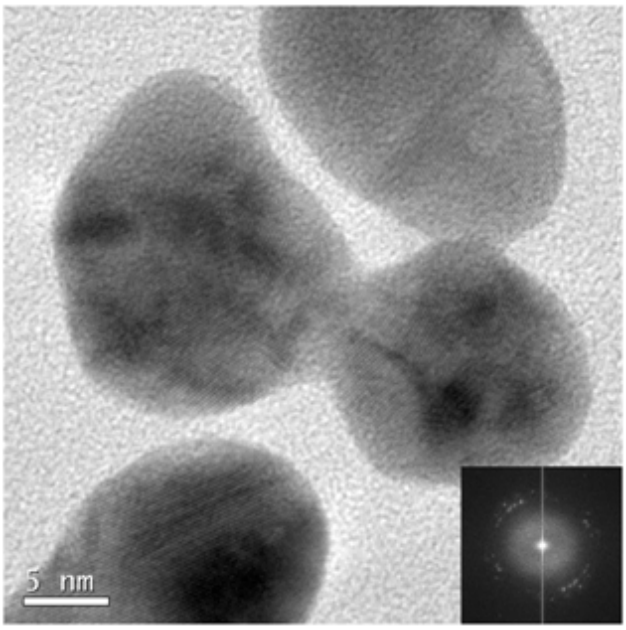


Fig. S2**.** HRTEM image of cAuNPs prepared when pH of curcumin is at 10.6, shows three nanoparticles aggregated together and the corresponding FFT.

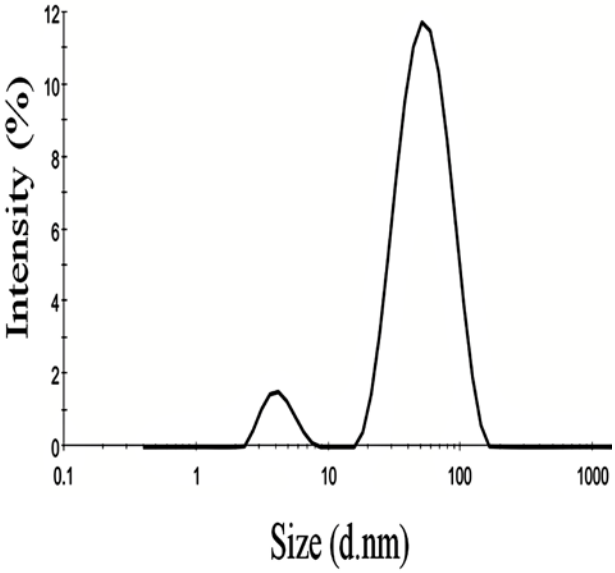
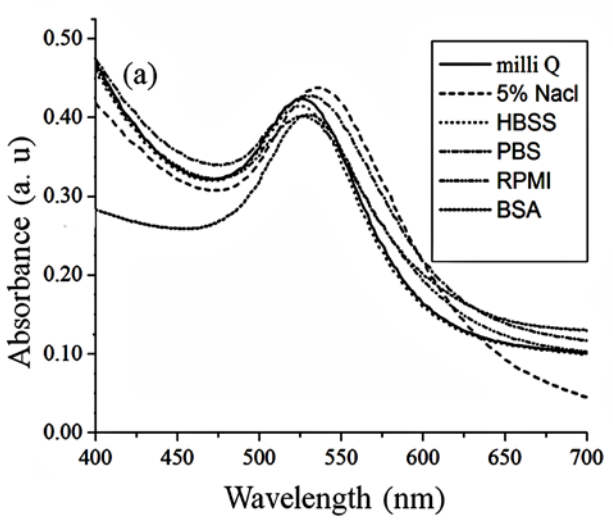
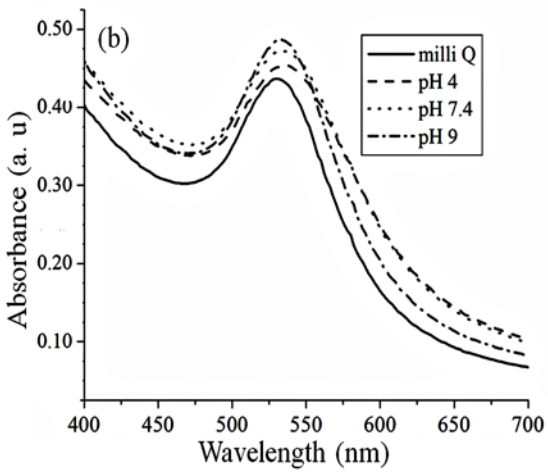
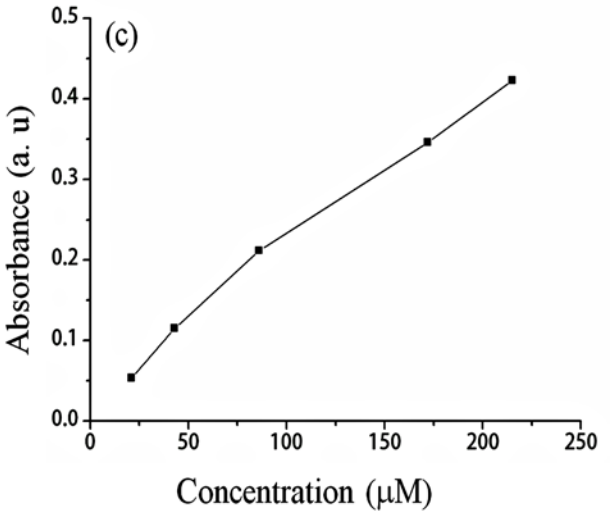
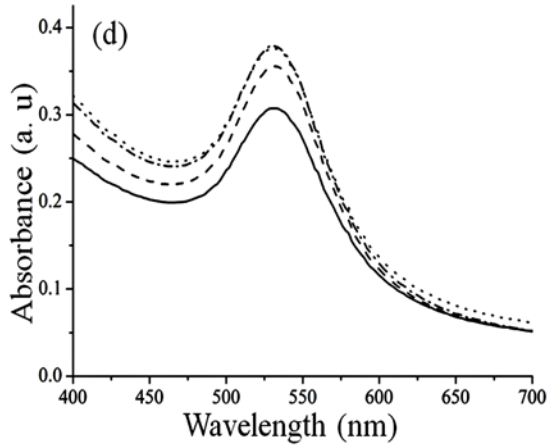


Fig. S3**.** The intensity size distribution plot shows that majority of the cAuNPs has an average hydrodynamic diameter of 58 nm when the pH of curcumin is 9.3.









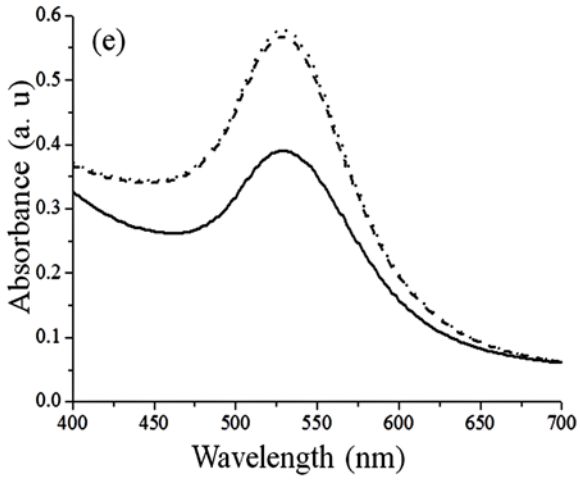


Fig. S4. Stability of cAuNP. Concentration of curcumin is 0.25 mM and $HAuCl_4$ is 1 mM (a,b) cAuNPs suspended in different buffers, medium and a wide range of pH show no significant change in SPR peak indicating its stability. (c) A linear increase is SPR intensity as concentration of cAuNPs increases also shows its stability at different dilutions. (d) The SPR spectra of cAuNPs from 0 day (—), 1 month (- - -) and 3 months (-.-.-.) shows a small increase in SPR intensity while remains constant at 6 months (. . .) without any change in plasmon wavelength demonstrating the high stability of cAuNPs at room temperature. (e) The constant and narrow plasmon wavelength of cAuNPs prepared as such (—) after isolation, resuspension at higher concentration (- - -) and filteration in 0.22 µm (. . .) filter illustrates the redispersibility and absence of any aggregate formation during centrifugation.

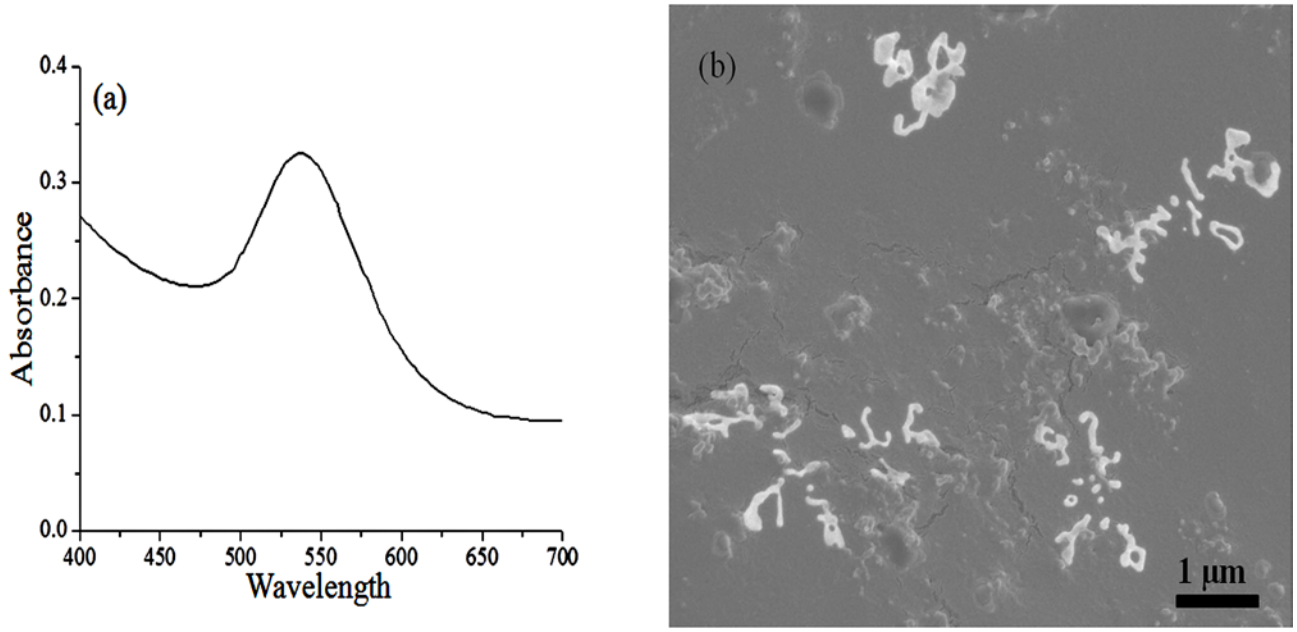


Fig S5. Seed mediated synthesis of cAuNPs. Concentration of curcumin is 0.25 mM and $HAuCl_4$ is 1mM (a) The SPR spectra of cAuNPs synthesised using citrate reduced AuNP seeds according to Zeigler's protocol shows a peak around 548 nm immediately after synthesis. Even though a burgundy red colour solution was produced immediately, the particles precipitated within 10 min. (b) The SEM picture of seed mediated cAuNPs

synthesised shows aggregated particles which might be the reason for immediate precipitation. This indicates that employing a seed might interfere with the ability of curcumin to cap and stabilize the AuNPs leading to aggregation and settling of particles even though curcumin can readily reduce $HAuCl_4$ to AuNPs.

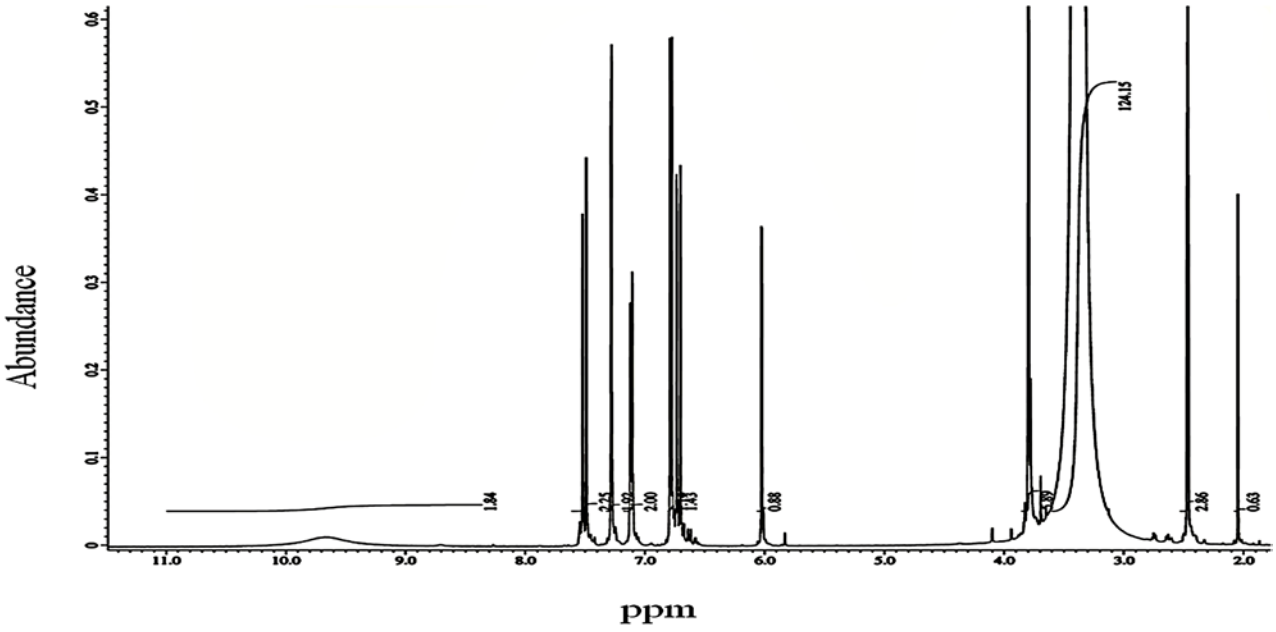


Fig. S6. ^{1}H NMR spectrum of curcumin in DMSO d6. The purity of curcumin is confirmed by ^{1}H NMR spectrum. Curcumin is dissolved in DMSOd6 and the spectrum recorded in a JEOL, LNMR instrument at ^{1}H resonance frequency of 500 MHz. The spectrum shows all the characteristic peaks corresponding to curcumin. The functional groups and corresponding chemical shifts are as follows.-OCH_3 (3.8), -CH (6.06), ArylH (6.74-7.51), Ph-OH (9.65).