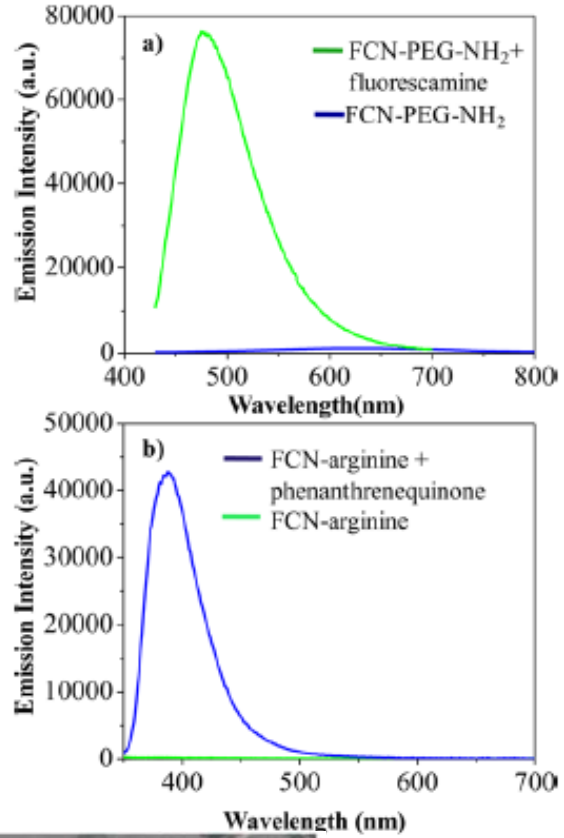
Synthesis of Yellow-Red Fluorescent Hydrophobic FCN. Hydrophobic FCN was prepared using a high temperature degradation method. Typically, 1 g of ascorbic acid was dissolved in 12 mL of oleylamine, taken in a three-necked round-bottomed flask. The solution was heated to 280 °C under continuous air flow through a syringe for 4 h. Next, the reaction was stopped and the temperature was lowered to room temperature. Hydrophobic FCN was then purified using acetone based precipitation and chloroform based redispersion. Typically, 700 mg of hydrophobic FCN was synthesized from 1 g of ascorbic acid. Finally, FCN solution was prepared in chloroform with theconcentration of 10−20 mg/mL.



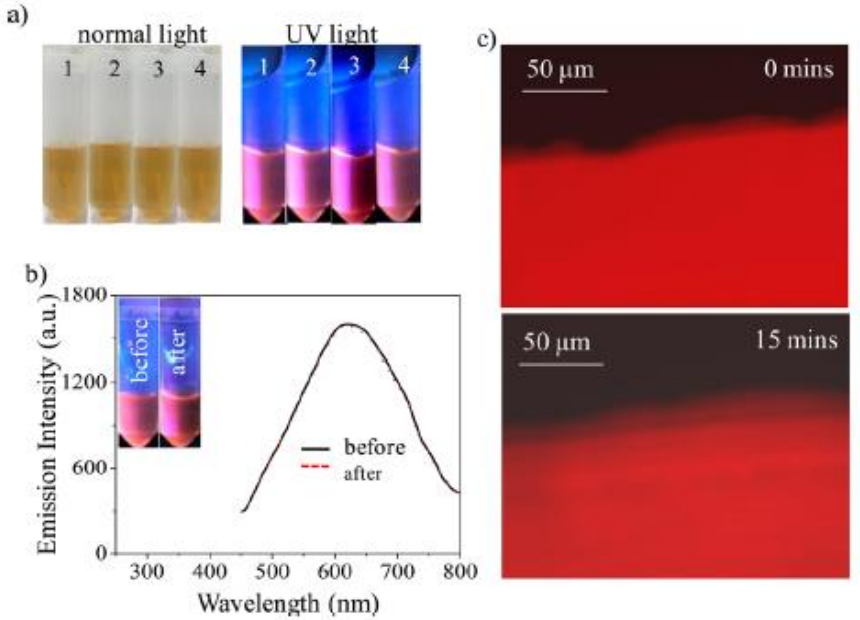
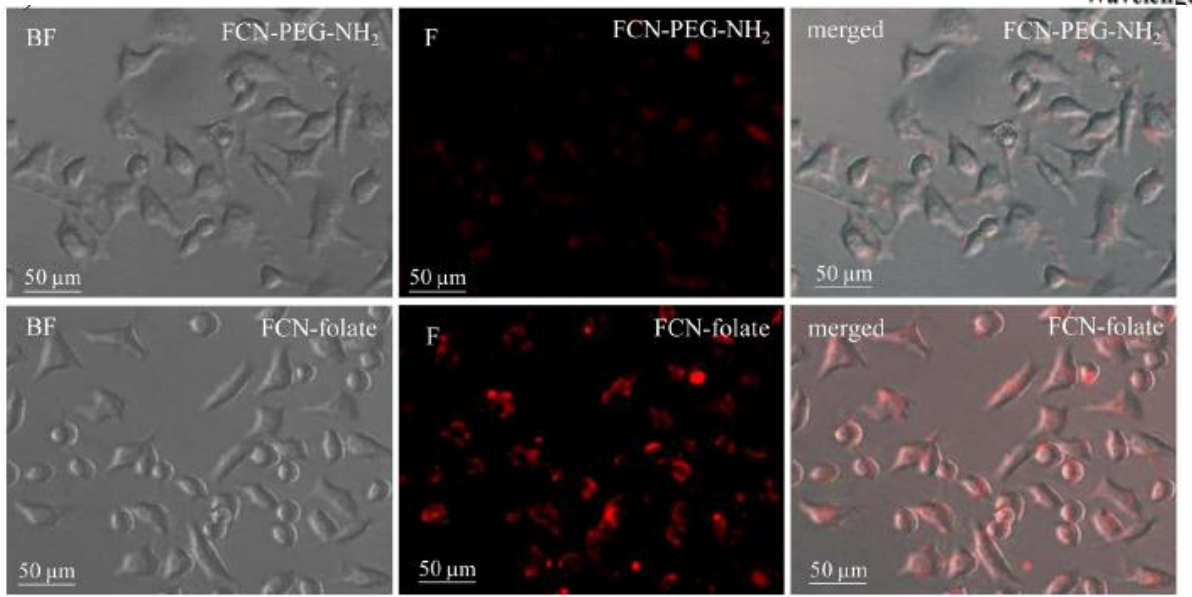


Figure 4. (a) Digital image of colloidal solution of functional FCNs under normal and UV light. (1) FCN-PEG-NH_2, (2) FCN-histidine, 3) FCN-glucose and (4) FCN-arginine. Functional FCN solutions are prepared in phosphate buffer of pH 7.4 and images are taken 1 month after preparation. (b) Fluorescence property of FCN-PEG-NH_2 before and after 1 h of UV light exposure. c) Fluorescence image of drop casted film of FCN-PEG-NH_2 before and after 15 min of UV exposure.



Successful synthesis of red fluorescent carbon nanoparticle-based functional nanoparticle and demonstrated their application potential as a fluorescent cell label. The reported functional carbon nanoparticle has <25 nm hydrodynamic size, high colloidal stability under physiological condition and they can be excited with blue and green light to capture their red emission. Polyethylene glycol and primary amine terminated carbon nanoparticle reported here can be transformed into desired nanobioconjugate using the commercially available reagents and protocols. The presented carbon nanoparticle synthesis and functionalization approach can produce milligram to gram scale of nanoprobes and can be extended for functionalization of other biomolecules of interest.