Supporting Information for

Fluorescent Gold Clusters as Nanosensors for Copper Ions in Live Cell

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Figure S 1. The photographs show Au-BSA in the absence of copper (A) and in presence of alkaline solution of copper (B).
Fluorescence quenching of the Au-BSA by cations at different pH conditions:

Quenching of Au-BSA at acidic (pH 2) condition (Figure S 2.A) and at basic (pH
12) condition (Figure S 2.B). $Q_0$ and $Q$ are the fluorescence intensities in the absence and presence of cations.

Figure S 3. Selectivity of Cu$^{2+}$ in presence of Ni$^{2+}$ and Co$^{2+}$ at pH 7.4. A, B, C are the effect on the fluorescence in presence of Co$^{2+}$, Ni$^{2+}$, Cu$^{2+}$ respectively. D represents the effect in the presence of both Co$^{2+}$ and Ni$^{2+}$. E represents when both Ni$^{2+}$ and Cu$^{2+}$ are present. F is the effect due to the presence of Cu$^{2+}$ and Co$^{2+}$. G shows the effect when Cu$^{2+}$ was added in to the system containing both Co$^{2+}$ and Ni$^{2+}$. $Q_0$ and $Q$ are the fluorescence intensity in the absence and presence of cations. The plot indicates the excellent selectivity of Cu$^{2+}$ in presence of other competing cations.
Supplementary Material (ESI) for Analyst
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Figure S 4. The figure shows fluorescence recovery of the tryptophan (present in BSA) by the addition of glycine after quenching with Cu$^{2+}$. 
(A) FT-IR spectrum of Au- BSA

(B) FT-IR spectrum of Folic Acid (FA).
**Figure S 5.**

The FT-IR spectra of the Au-BSA nanoclusters (A), the free folic acid (B) and the Au-BSA-FA (C). The two characteristic amide peaks at 1642.3 cm$^{-1}$ and 1565.3 cm$^{-1}$ confirms the conjugation of the FA on to the Au-BSA cluster.
Figure S 6. Fluorescent microscope image of the HeLa cells incubated with 25 μL Au-BSA (A) and its higher magnification image (B). The samples were then incubated with 1mM Cu^{2+} (C) and its higher magnification image (D). The cell nuclei were stained with Hoechst. The red emission initially observed (B) due to Au-BSA was quenched after incubating with Cu^{2+} (D). The scale bar is 20μm.
Figure S 7. Fluorescent microscope image of the HeLa cells incubated with 1mM copper (A) and its high magnification image (B). Incubation with 25 μL Au-BSA (C) and its high magnification image (D). The cell nuclei were stained with Hoechst. No red emission from the Au-BSA observed which were quenched by the presence of Cu$^{2+}$. The scale bar is 20 μm.