

Supporting electronic information

Wheat germ agglutinin modified magnetic iron oxide nanocomplex as cell membrane specific receptor target material for killing breast cancer cells

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SI 01 Synthesis of iron oxide nanoparticles (Fe_3O_4 NPs; NC₁): One gram of $\text{FeCl}_2 \cdot 4\text{H}_2\text{O}$ and 2.7 g of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ were taken in 20 ml of water in a two neck RB flask and the solutions were purged with N_2 . Five ml of ammonia solution (25 % GR), 2 ml of hydrazine hydrate and 43 ml of water were taken in another RB flask and the contents were purged with N_2 . The latter was added through a dropping funnel to a mixture of iron chloride solution dropwise under vigorous stirring. The reaction temperature was maintained at 90 °C for 30 min. Four grams of citric acid in 10 ml of water was later added to the solution and the heating was continued for another 1.5 h at 90 °C. A black product was formed which was taken out with the help of a magnet and the product was washed with water and dried under vacuum.

Synthesis of silica coated Fe_3O_4 nanoparticles ($\text{Fe}_3\text{O}_4@\text{SiO}_2$ NPs; NC₂): Thirty milligrams of NC₁ were dispersed in 100 ml of water and 1 ml of hydrazine dihydrate was added to it. The suspension was sonicated for 30 min and then 0.4 ml of TEOS was added. The mixture was refluxed at 90 °C for 3 hours. The silica coated iron oxide NPs (NC₂) were separated under magnet and washed with ethanol and dried.

Synthesis of FITC tagged Fe_3O_4 nanoparticles ($\text{Fe}_3\text{O}_4@\text{SiO}_2@\text{FITC}@\text{SiO}_2\text{-NH}_2$; NC₃): FITC (11.5 mg) was dissolved in ethanol solution containing APTS. This mixture is called DYE solution. In another vial, 10 mg of NC₂ were dispersed in 1 ml ethanol containing 60 μl of ammonia. To this, 20 μl of DYE solution was added and sonicated for 30 min. The particles are separated under magnet and then dispersed in 500 μl of ethanol. This magnetic particle mixture was added to a solution of APTS in toluene dropwise and vigorously stirred for 4 h. The product formed was collected under magnet and washed several times with ethanol to remove any unreacted FITC.

SI 02 PXRD and magnetization for NC₃

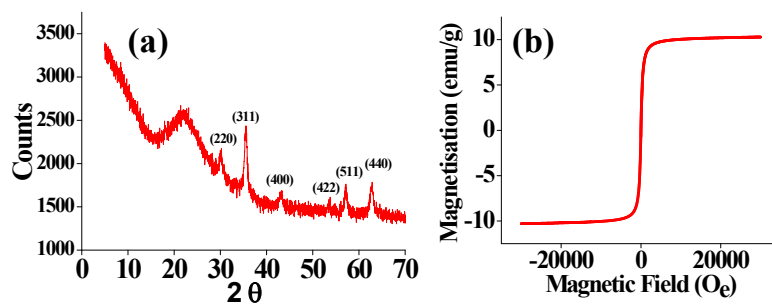


Figure S01 (a) PXRD and (b) Magnetization for NC₃

SI 03 Characterizations of the purified WGA

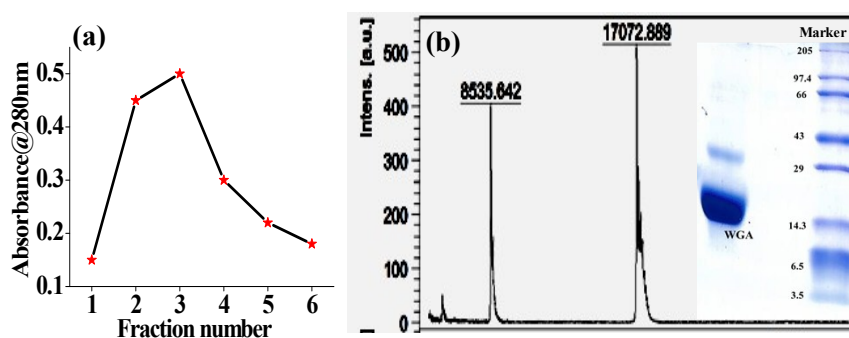


Figure S02: (a) Absorbance value of WGA collected through different fractions from column (b) MALDI spectra of purified WGA. Inset shows the SDS-PAGE of WGA

SI 04 Fluorescence microscopy images of NC₄ and NC₅

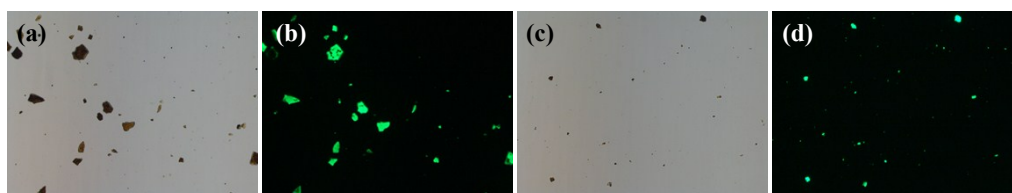


Figure S03: (a, c) Bright field and (b, d) fluorescence image of NC₄ and NC₅ respectively

SI 05 Stability of NC₅ in different pH mediums

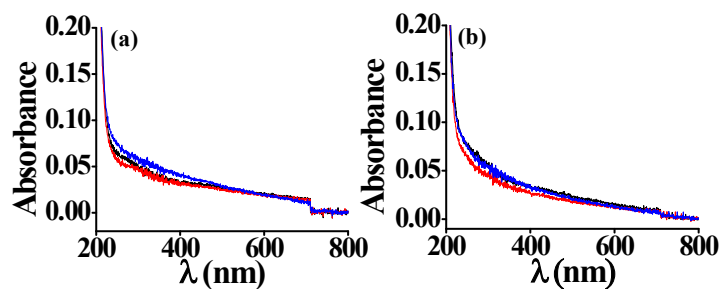


Figure S04: Stability of NC₅ in 10 mM PBS in (a) pH = 5.0 and (b) pH = 7.4 at different time points. Color code: (—) 12 hrs, (—) 24 hrs and (—) 36 hrs.

SI 06 Stability of NC₅ in 10% FBS

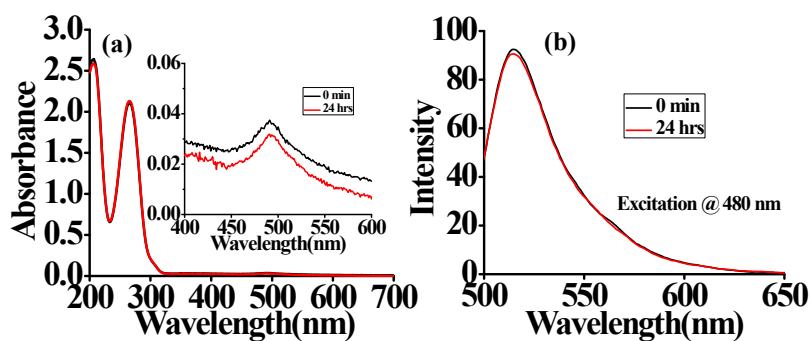


Figure S05: (a) UV-Visible spectra and (b) Fluorescence spectra of NC₅ before (black line) and after incubation of 24 hrs in 10% FBS (red line)

SI07: Comparison of cell viability of NC₅ (100 µg) on different cells

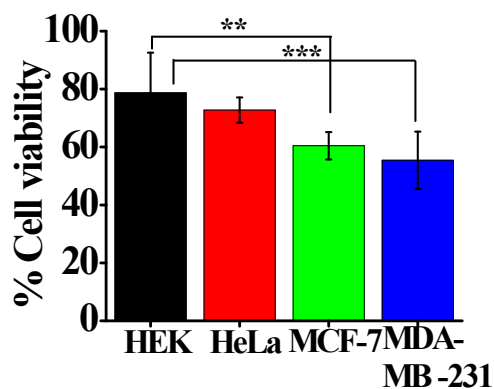


Figure S06: Cell viability of NC₅ (100 µg) on four cells HEK, HeLa, MCF-7 and MDA-MB-231.

SI 08 Cell internalization of NC₃ by fluorescence microscopy

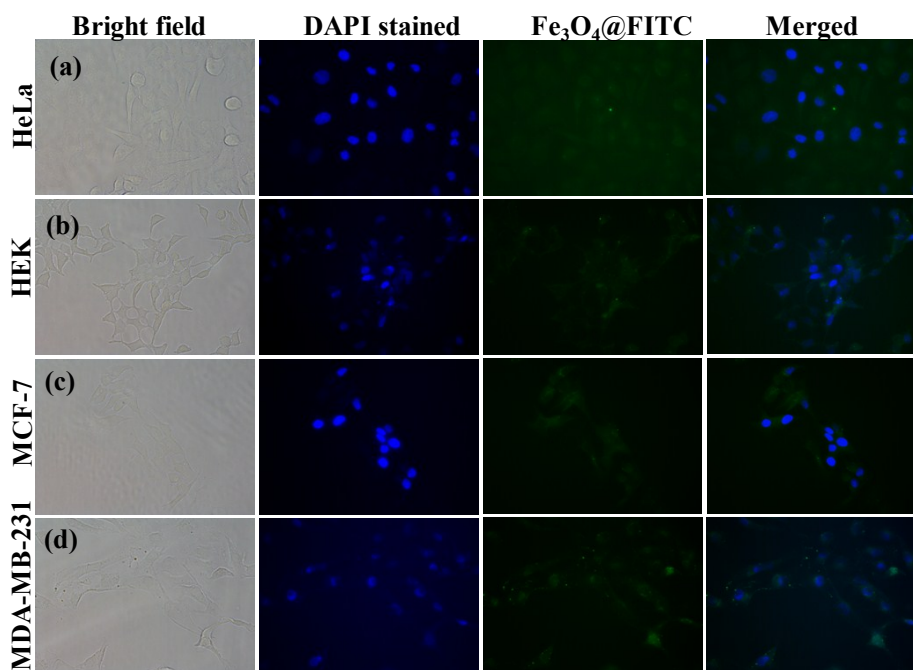


Figure S07: Fluorescence microscope images of different cell lines when treated with NC₃. Both the x and y axis were labelled accordingly

SI 09 Photographs of magnet kept under cell culture dish

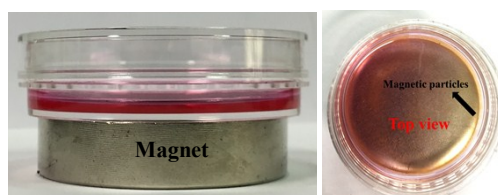


Figure S08: Side view and top view of cell culture dish incubated with magnet