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Anticancer effect of green synthesized gold nanoparticles using leaf extract of *Abutilon indicum* on human colon cancer cell line HT-29

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The bio-inspired gold nanoparticles are extensively used as novel therapeutic and diagnostic modalities in nano-medicine especially to treat cancer. This study reports the biosynthesis of gold nanoparticles using *Abutilon indicum* leaf extract (AILE) and their anticancer effect. Gold nanoparticles were synthesized using 1 mM HAuCl₄ and 1% *Abutilon indicum* leaf extract and the synthesized gold nanoparticles were characterized by various techniques including UV-visible spectroscopy, DLS particle size analyzer, Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM), X-ray diffraction (XRD), thermal gravimetric analysis (TGA)/differential scanning calorimeter (DSC). The spherical gold nanoparticles were found to have an average size of 32 nm and the major phytoconstituents in AILE like N-H of amino acids or proteins were involved in the bio-reduction of gold nanoparticles. Further, the green synthesized gold nanoparticles exhibited dose dependent cytotoxicity against human colon cancer cell line HT-29 by MTT assay. Apoptotic cell death in nanoparticles treated HT-29 cells was observed by acridine orange/ethidium bromide (AO/EB), propidium iodide (PI), 4', 6-diamidino-2-phenylindole (DAPI), AnnexineV-Cy3 staining techniques. The loss of mitochondrial membrane potential as indicated by Rhodamine123, high levels of ROS intermediates as observed with DCF-DA and DNA damage as indicated by TUNNEL assay could have played a major role in apoptotic cell death in HT-29 cells following treatment with gold nanoparticles. Also caspase-3 was found to be activated in treated HT-29 cells confirming apoptotic cell death. These results provided an evidence for the anticancer activity of gold nanoparticles synthesized from *Abutilon indicum* which may prove to be a valuable tool in cancer nano-therapy.

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