Conclusion

The objective of this study was to synthesis gold nanoparticles using indole-3-carbinol and to explore the antineoplastic, antitumor, antioxidant activities of biogenic gold nanoparticles (AuNPI3Cs). AuNPI3Cs were efficaciously characterized, which was spherical in shape and an average size of 6.858 nm. The *in vitro* toxicity study of AuNPI3Cs was assessed on brine shrimp, zebrafish and human lymphocyte. *In vivo* toxicity study was carried out on Swiss albino mice. The results of toxicity study revealed that AuNPI3Cs was nontoxic towards brine shrimp, zebrafish up to the dose level of 2000µg ml^{-1} and it is safe up to 4000µg kg-1 body wt in mice model. The anticancer study revealed the anti-proliferative, antineoplastic and apoptotic potentials of AuNPI3Cs towards Jurkat, MCF-7, EAC, DLA cells. Results of *in vivo* anticancer activity against EAC and DLA bearing mice showed reduction in tumor volume, angiogenesis and normalization of haematological, biochemical parameters, finally increase in lifespan of EAC and DLA bearing mice. AuNPI3Cs possess significant antioxidant activities compared to standard ascorbic acid. AuNPI3Cs revealed significant anti-inflammatory potential in *in vitro* as well as by reducing carrageenan induced paw oedema in mice. From the overall results it can be concluded that synthesized AuNPI3Cs using indole-3-carbinol is an effective antitumor, antioxidant agent and may have proper therapeutic application.