PP59

Cytotoxicity of bacterial synthesized silver nanoparticles and yeast mediated TiO_2 nanoparticles

Peiris MMK[1], Ranatunga IU[2], Jayaweera PM[3], Soysa P[2], Fernando SSN[1], TDCP Gunasekara[1,4]

[1]Department of Microbiology, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka; [2]Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka; [3]Department of Chemistry, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka; [4]Center for plant materials and herbal products research, University of Sri Jayewardenepura, Sri Lanka

Background: Nanoparticles(NPs) have unique physicochemical properties facilitating clinical applications. Their therapeutic value depends on cytotoxicity of the nanoparticles to ensure human and environmental safety.

Objectives: To compare the invitro cytotoxicity of biosynthesized and chemically synthesized TiO_2 NPs and silver(Ag) NPs on two mammalian cell lines; Monkey Kidney Normal (Vero) and Human Rhabdomyocarcinoma (RD).

Methods: *Pseudomonas aeruginosa* ATCC 27853(P-AgNPs), *Escherichia coli* ATCC 25922(E-AgNPs), *Staphylococcus aureus* ATCC 25923(S-AgNPs), and *Acinetobacter baumannii* (confirmed clinical isolate)(A-AgNPs)were used to synthesize AgNPs. TiO_2 NPs were synthesized using Bakers' yeast(Y-TiO_2). As controls, chemically synthesized AgNPs (C-AgNPs) and TiO_2 NPs(C-TiO_2 NPs) were used. The in vitro cytotoxicity was studied using MTT assay and DNA fragmentation. Effective concentrations of NPs to achieve 50% cell death(EC50) were

Results: A dose-dependent cytotoxicity was observed by MTT assay after both Vero and RD cell lines were treated with NPs. The EC50 values for Vero cells were 200 µg/ml, 102.18 µg/ml, 36.53 µg/ml, 91 µg/ml, 49.7 µg/ml, 4.60 mg/ml and 5.53 mg/ml for A-AgNPs, E-AgNPs, P-AgNPs,S-AgNPs, C-AgNPs, Y-TiO_2 and C-TiO_2 NPs respectively. A-AgNPs, E-AgNPs, P-AgNPs, S-AgNPs, Chemical AgNPs, Y-TiO_2 and chemical TiO_2 NPs had EC50 values for RD at 10.95 µg/ml, 13.93 µg/ml, 37.86 µg/ml, 20.80 µg/ml, 87.26 µg/ml,13.28 mg/ml and 9.88 mg/ml respectively. DNA fragmentation was clearly observed in RD cells treated with the positive control and a weak banding pattern was observed in cells treated with biosynthesized NPs and chemically synthesized NPs. In contrast, fragmented DNA was not observed in Vero cells treated with negative control, positive controls (1 mM H_2O_2, 25 µg/ml Cycloheximide) or NPs.

Conclusions: A-AgNPs and TiO_2 NPs showed minimum cytotoxicity in Vero cell line. Further, A-AgNPs and E-AgNPs had the strongest anticancer potential. Y-TiO_2 NPs and bacteria mediated AgNPs have demonstrated promising results for further investigations as novel therapeutics.

Acknowledgement: This study was supported by the University of Sri Jayewardenepura and National Science Foundation of Sri Lanka under the research grant No: ASP/01/RE/MED/2017/30 and NSF/SCH/2018/09.