

In-Vitro Cytotoxicity Assessment Of Bismuth (III) Oxide (Bi₂O₃) As Potential X-Ray Contrast Media

Mohd Nor, N. A.¹, Mohd, Z.², Abdul Razak, H. R.², Eshak, Z.³, Ridwan, R.¹,
Md Saad, W. M.^{1*}

¹Department of Medical Laboratory Technology, Faculty of Health Sciences, Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia.

²Department of Medical Imaging, Faculty of Health Sciences, Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia.

³Imaging Centre (IMACE), Faculty of Pharmacy, Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia.

Water-soluble iodinated molecules, or 1,3,5-triiodobenzene are commonly used as used intravascular X-ray contrast media. However raised concerns in the safety of utilizing iodinated contrast media to iodine-intolerance patients have led searches of new contrast media. Exploration in nanomedicine field made engineered Bismuth (Bi) nanoparticles to offer new avenues as therapeutic and diagnostic tools. Bi has higher atomic number (Z=83) in comparison to gold (Z=79) possesses higher X-ray attenuation coefficient can be possibly exploited as dose and contrast enhancement in medical imaging. However, studies on principle of biological interactions and responses of Bi particles with mammalian cells are still inadequate. The aim of this preliminary study is to determine *in-vitro* cytotoxicity of Bi₂O₃ particles against iodine. Bi₂O₃ particles are characterized using scanning electron microscope (SEM). The cytotoxicity of Bi₂O₃ particles and iodine were evaluated using cell viability assay (MTT assay) and production of reactive oxygen species (ROS assay) upon 24 hours exposure to Chang liver cells. The results revealed Bi₂O₃ particles cause slight reduction in cell viability and elevated ROS in comparison to iodine. Hence, the data suggested Bi₂O₃ particles are considered toxic than iodine which import a new knowledge on Bi₂O₃ particles interaction with biological environment.

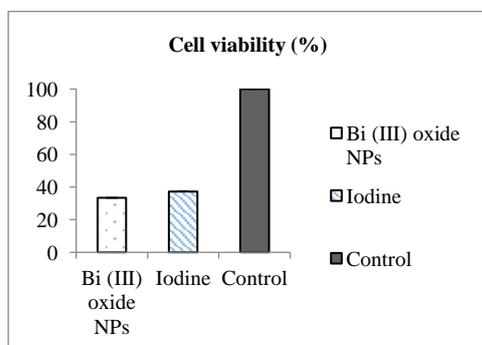


Fig. 1: Chang liver cells cell viability after 24 hours Bi₂O₃ particles and iodine exposure. Each value was expressed as means ± SEM, n = 4. All percentages of cell viability were statistically significant difference (p < 0.05), as compared to control group.

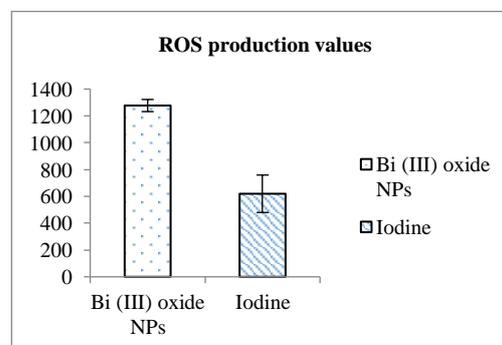


Fig. 2: ROS production by Chang liver cells after 24 hours Bi₂O₃ particles and iodine exposure. Each value was expressed as means ± SEM, n = 4. All percentages of cell viability were statistically significant difference (p < 0.05), as compared to control group.

References

1. Abudayyak, M., Öztaş, E., Arici, M., & Özhan, G. (2017). Investigation of the toxicity of bismuth oxide nanoparticles in various cell lines. *Chemosphere*, 169, 117–123, j.chemosphere.2016.11.018



Biographic Details

Name: Nur Amirah bt Mohd Nor

Title: Ms

Affiliation, Country: Universiti Teknologi MARA,
42300 Puncak Alam, Selangor, Malaysia.

Phone: +6017 5176286 E-mail: amyramnk299@gmail.com

Research interests: Nanomedicine, molecular biology