N,N’-bis(2-mercaptoethyl)isophthalamide Protects Human Kidney Proximal Tubule Cells against Cisplatin-induced Nephrotoxicity.

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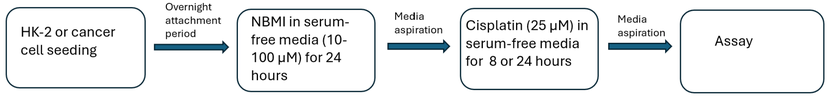
Objective

Cisplatin used in the treatment of ovarian and lung cancers causes severe nephrotoxicity as a dose-limiting adverse effect. So far, no drug has been approved to prevent cisplatin nephrotoxicity.

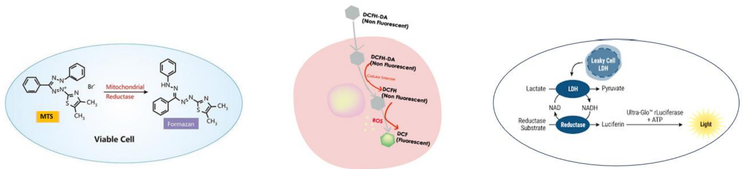
N,N’-bis(2-mercaptoethyl)isophthalamide (NBMI) is a novel lipophilic, non-toxic thiol compound with metal chelating and antioxidant properties.

The objective of our study is to investigate the effects of NBMI against cisplatin-induced toxicity in HK-2 non-cancerous human kidney proximal tubule cells, A2780 ovarian cancer cells, and A549 lung cancer cells.

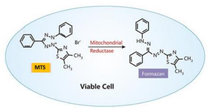
Methods



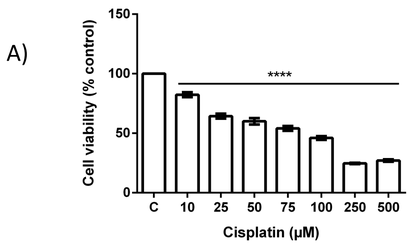
HK-2 human kidney cells

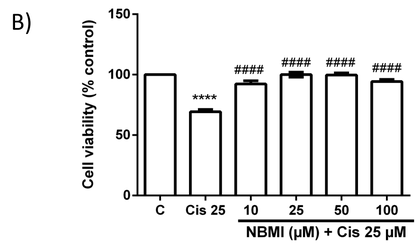


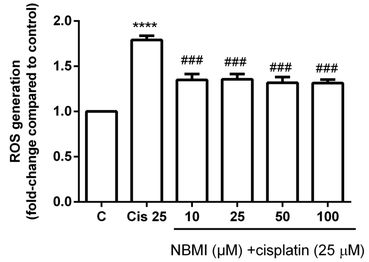
A2780 human ovarian cancer cells **A549 human non-small cell lung cancer cells**

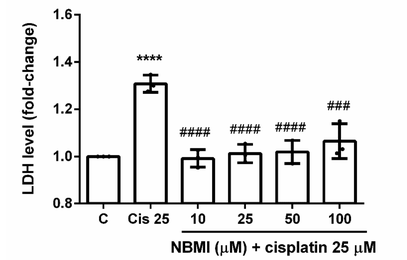


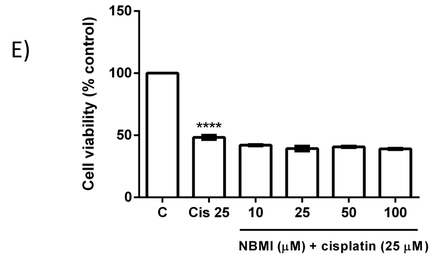
Results

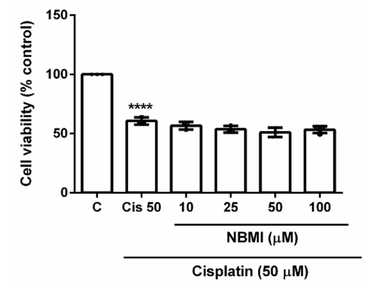












(A) MTS cell viability assay in HK-2 cells exposed to cisplatin alone (24 h) or (B) pretreated with NBMI (24 h) prior to cisplatin exposure (24 h). (C) ROS assay in HK-2 cells pretreated with NBMI (24 h) prior to cisplatin exposure (8 h). (D) LDH assay in HK-2 cells pretreated with NBMI (24 h) prior to cisplatin exposure (24 h). MTS cell viability assay in (E) A2780 cells and (F) A549 cells. Data are expressed as mean ± SD. ****p<0.0001 vs control, ###p<0.001 and ####p<0.0001 vs cisplatin alone group.

Conclusion

NBMI protects HK-2 human kidney proximal tubule cells from cisplatin-induced oxidative stress and cell death. NBMI does not interfere with the anticancer activity of cisplatin in cancer cells. Therefore, NBMI may be a promising chemoprotectant for cisplatin-induced nephrotoxicity in cancer patients.

Future Directions

1. Explore the mechanism behind the observed differential effects of NBMI in the non-cancerous and cancerous cells.
2. Conduct *in vivo* experiments to determine the physiological effects of NBMI against cisplatin-induced nephrotoxicity.