Identification of arsenic trioxide-resistant genes in cisplatin-resistant mesothelioma cells using CRISPR screening

Aims: To explore the potential drug resistance mechanisms to arsenic trioxide (ATO) in cisplatin-resistant mesothelioma (MPM) using CRISPR screening

Background: In 2004, the United States of Food and Drug Administration approved platinum-based chemotherapy as the standard-of-care treatment of unresectable MPM. Novel treatment is needed after failing of this treatment. The research institution has investigated the potential role of ATO as a salvage treatment.

Methodology:
Four human MPM cell lines and their corresponding cisplatin resistant cell lines were used for the study. A CRISPER gene knockout library was introduced into the above cells by infection. These cells were subsequently challenged with different concentrations of cisplatin and ATO. Next Generation Sequencing was performed to analyze gene knockout.

Impact: Results of the project implied that CRISPR screening is not readily applicable to MPM cells.

Result and Conclusion:
The research institution generated a good quality CRISPR knockout library but infection was not successful. The institution changed the direction to explore the reasons for unsuccessful infection, which was due to intrinsic biological properties of the MPM cells.