Screening tests for sensitisation potential – Direct Peptide Reactivity Assay (DPRA)

Allergy is the body's immunological reaction to what it mistakenly believes is an infection by a foreign organism, e.g. parasite. When the immune system recognizes the presence of non-self protein and perceives a threat it initiates sequences of biological pathways and mechanisms to capture and eliminate the foreign material.

Simple chemicals, such as chloroplatinates, are too small to elicit an immune response themselves; first they must bind to and thereby modify some of the body's own proteins, causing them to appear 'foreign' to the immune system.

The Direct Peptide Reactivity Assay (DPRA) is an *in chemico* technique that tests chemicals for their ability to react with protein and is used as a screening assay for sensitization potential – normally in combination with other, complementary screening assays that examine other parts of the biological pathway of sensitisation.

The DPRA was developed and validated for the testing of organic chemicals and, according to the DRPA Test Guideline published by the Organization for Economic Cooperation and Development (OECD, 2015), is "*not applicable for the testing of metals compounds since they are known to react with proteins with mechanisms other than covalent binding*".

Few metals had been tested in the DPRA; yet if found to be suitable for some metals and metal compounds it had the potential to provide a cheap, ethical test for screening of new PGM compounds for potential sensitization concerns.

IPA sponsored a programme of work at the University of Wisconsin in the USA to test various PGM compounds with known sensitisation potential – both sensitisers and non-sensitisers. The results of this research showed the DPRA generally performed well in distinguishing sensitising platinum compounds from non-sensitising platinum compounds. A smaller number of palladium compounds tested showed similar success. This work has been published in the peer-reviewed scientific literature as:

Hemming JDC, Hosford M and Shafer MM (2019) Application of the direct peptide reactivity assay (DPRA) to inorganic compounds: a case study of platinum species. *Toxicology Research*, **8**, 802-814.

References

OECD (2015) In chemico skin sensitization: Direct Peptide Reactivity Assay (DPRA). OECD guideline for the testing of chemicals. Test Guideline 442C, adopted 4 February 2015.