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Determination of polycyclic aromatic hydrocarbon and its monohydroxilated metabolites in human liver cells using gas chromatography and high performance liquid chromatography with mass spectrometry

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Human cell-based models can provide important information on exposure and risk from chemical contaminants. Measurement of the amount of chemical contaminant entering the cells and how effectively it is metabolised and removed can be useful towards our understanding of chemical health risk assessment. The aim for our study is to quantify intracellular uptake and metabolism of polycyclic aromatic hydrocarbons (PAHs) in a human liver carcinoma cell line (HepG2 cells) exposed to environmentally relevant concentrations of the pure model compound and contaminated soils. A number of PAH and their monohydroxilated metabolites, including 3-hydroxybenzo[a]pyrene, 1-naphthol and 1-hydroxypyrene were found in human liver cells following exposure. Biotransformation of PAHs in human liver cells increased with increasing dose. Cell exposure close to 0 h and to 24 h contact times was also investigated, both at low and high dosage. Benzo[a]pyrene was found to be toxic to cells; however, remaining PAHs in this study did not cause any significant changes in cell viability (or cytotoxicity) and their ability to recover. Chemical characterisation of PAHs and its metabolites was done using high performance liquid chromatography coupled to a high resolution mass spectrometer (HPLC-HRMS) and gas chromatography with mass spectrometry (GCMS). The ability to quantify chemical uptake and fate using human cell line based models will contribute to a more refined chemical risk assessment.

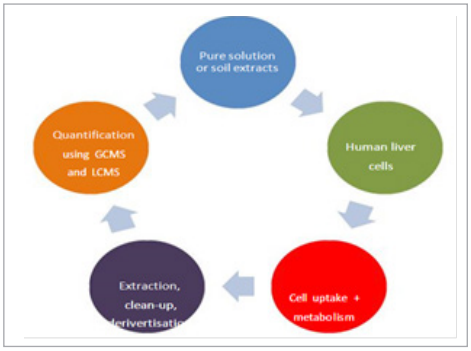

Figure 1: *Quantification of PAHs uptake and metabolism in human liver cells (HepG2) using Gas Chromatography and Liquid Chromatography with Mass Spectrometry*

Recent Publications

- Peng C, Muthusamy S, Xia Q, Lal V, Denison M S and Ng J C (2015) Micronucleus formation by single and mixed heavy metals/loids and PAH compounds in HepG2 cells. Mutagenesis. 30 (5): 593-602.

Biography

Vincent Lal has his expertise in Environmental and Analytical Toxicology and passion in improving human health and wellbeing. His work is based on chemical risk assessment using *in vitro* technologies. He has several years of research, teaching, consultancy and administration experience in commercial and education institutions.

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