

Development of an *in Vitro*-Based Risk Assessment Framework for Predicting Ambient Particulate Matter-Bound Polycyclic Aromatic Hydrocarbon-Activated Toxicity Pathways

Dr. Yu-Cheng Chen and Dr. Pinpin Lin research teams analyzed PM samples with 22 PAH compounds obtained from residential areas close to industrial parks in central Taiwan, and estimated the risk of activating polycyclic aromatic hydrocarbon (PAH) toxicity pathways in different age groups by inhaling fine or coarse PM in different seasons. Most toxic effects of PAHs are believed to relate to the activation of the aryl hydrocarbon receptor (AhR). We utilized high-throughput screening *in vitro* data of PAHs to predict health risks associated with coarse and fine PM. And we integrated the ambient PM-bound PAH data and HTS *in vitro* data by using a bioanalytical equivalent concentration based mixture exposure model and a lung dosimetry model into a probabilistic framework, thereby enabling the prediction of the characteristics of potential risks of biological perturbations in toxic pathways. We find that children exposed to fine PM may have a risk of activating the toxicity pathways greater than that of adults exposed to fine PM. Particularly higher risks were observed in winter than in summer.

