

Impacts of Exposure to Genotoxic Air Pollutants in Susceptible Populations

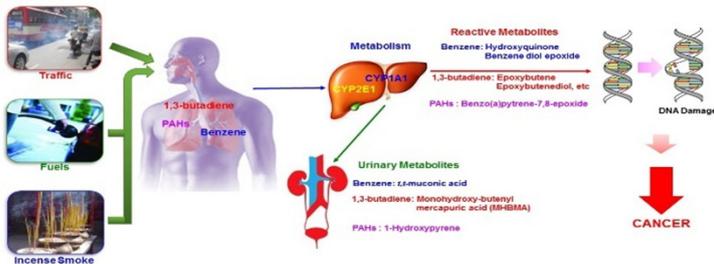
Air Pollution



Exposure to chemical pollutants in the environment is a major problem that impacts human health and disease development in many countries around the world, including Thailand. Genotoxic air pollutants have significant potential impacts on human health, e.g. polycyclic aromatic hydrocarbons (PAHs) have been associated with lung cancer, while volatile organic compounds (VOCs), such as benzene and 1,3-butadiene, have been associated with increased leukemia incidence.

These pollutants can be found in various sources, including traffic-related fuel combustion, as well as burning incense, a common practice associated with many religions and cultures in Thailand. It has been reported that exposure to these airborne pollutants may be associated with many adverse health effects including cancer.

Biotransformation of Benzene, 1,3-Butadiene and PAHs
DNA Damage : Mechanism of Carcinogenesis

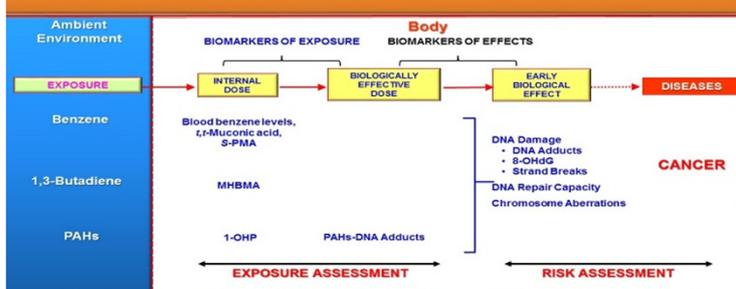


Health Impacts in Susceptible Populations

Molecular epidemiological studies were conducted to assess study the health impacts in exposed populations (e.g. traffic policemen, school children in Bangkok and temple workers) through the use of biomarkers of exposure and early biological effects to assess health risks in these populations. Results showed that :

- Traffic policemen, school children in Bangkok and temple workers exposed to higher levels of PAHs, benzene and 1,3-butadiene than the respective control populations.
- Levels of biomarkers of exposure (i.e., blood benzene, urinary *t,t*-muconic acid, urinary 1-OHP and urinary MHBMA) were higher in the exposed populations.
- Levels of biomarkers of early biological effects, e.g. DNA strand breaks and 8-hydroxydeoxyguanosine, were higher, while DNA repair capacity was lower in these exposed populations.

Exposure / Disease Paradigm



Research Outcomes

- Effectiveness in applying the use of biomarkers as shown in this study serves as a prototype for studying the possible health risk of environmental pollutants among populations in Thailand.
- Results from these studies have led to policy decisions to reduce exposure to these genotoxic compounds by the Pollution Control Department, the Ministry of Natural Resources and Environment of Thailand.
- The Department of Disease Control, Ministry of Public Health, has recommended that many temples reduce the use of incense sticks, or to use them in well-ventilated areas in order to reduce exposure levels for the general public.
- This research has been recognized for the tangible benefits it has brought to society in the "Science Towards Excellence" program in 2012.

