

S19. GENETIC SUSCEPTIBILITY IN ARSENIC TOXICOKINETICS

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Metalloid element arsenic is a widespread environmental toxicant and various forms of arsenic present in the air, water and soil due to natural and anthropogenic activities. The inorganic forms of arsenic (iAs), arsenite and arsenate, are the most toxic chemical species found in food and water. Human can expose arsenic mainly via drinking water and food supply. The other source of arsenic is the occupational exposure. Arsenic exerts its toxic effects on various tissues by binding to sulfhydryl groups of proteins. Acute and chronic exposure to arsenic is known to lead to non-cancer health effects and various cancer types including skin, bladder, liver and kidney. However, individuals and populations show differences in susceptibility to arsenic-related diseases and cancers due to the variations in arsenic metabolism.

In the human body, arsenic metabolism consists of a series reduction and methylation processes, and the main proteins and enzymes of this metabolism are glutathione S-transferases, arsenic (+3 oxidation state) methyltransferase (AS3MT) and multi drug resistance associated proteins (MRPs). Genetic variants in these proteins and enzymes due to polymorphisms have been shown to be related with different urinary arsenic metabolism patterns. Previous studies have shown that individuals who metabolize arsenic poorly may have higher risk for developing arsenic-related diseases and certain cancers than individuals who metabolize arsenic well.

In this study, some specific genetic polymorphisms in genes encoding proteins and enzymes involved in mechanisms of arsenic metabolism and their effects will be mentioned.