

## Systemic Toxins Types and Effects

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### Commentary

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### DESCRIPTION

Toxic effects are classified based on their location. The effect may only occur at one location in some circumstances. The specific target organ is the name for this location.

Toxic effects can also occur at several locations. Systemic toxicity is the term for this. Systemic toxicity can take several forms.

- Acute Toxicity
- Subchronic Toxicity
- Chronic Toxicity
- Carcinogenicity
- Developmental Toxicity
- Genetic Toxicity (somatic cells)

### Acute toxicity

Acute toxicity occurs shortly after an exposure (seconds, minutes, hours, or days). A single dose or a series of doses given during a 24-hour period constitutes an acute exposure. In circumstances of acute exposures, death can be a big worry.

### Subchronic toxicity

Subchronic toxicity is caused by repeated exposure over a period of several weeks or months. For several medications and environmental chemicals, this is a frequent human exposure pattern.

### Chronic toxicity

Chronic toxicity is defined as chronic harm to certain organ systems that develops over months or years. Subclinical individual exposures may cause damage that goes unrecognized. The damage from this form of exposure steadily builds up (cumulative damage) with repeated exposures or long-term continuous exposure until the damage surpasses the threshold for chronic toxicity. Finally, the damage is severe enough that the organ can no longer function correctly, resulting in a variety of persistent toxic consequences.

- Chronic toxicity has the following effects:
- Cirrhosis in alcoholics who have been drinking for a long time.
- Chronic kidney damage in workers exposed to lead for several years.
- Long-term cigarette smokers get chronic bronchitis.
- Coal miners' pulmonary fibrosis (black lung disease). Forensic toxicology has a variety of applications, including:

### Genetic toxicity

Damage to DNA and alterations in genetic expression induce significant toxicity. Mutagenesis is the term for this process. A mutation is a genetic change, and the agent that causes the change is called a mutagen. Genetic alterations can be divided into three categories:

- An alteration in the DNA sequence of a gene is known to as a gene mutation.
- Changes in the chromosome structure are termed as chromosome aberrations.
- An increase or reduction in the number of chromosomes is known as aneuploidy or polyploidy.

The effect is heritable if the mutation develops in a germ cell. This means that the exposed person has no effect; rather, the effect is passed down to future generations. If the mutation occurs in a somatic cell, the exposed person may experience altered cell growth (for example, cancer) or cell death (for example, teratogenesis).

### Carcinogenicity

Carcinogenicity is a multistage process that leads to cancer through aberrant cell proliferation and differentiation.

Carcinogenicity is divided into two stages:

- A typical cell goes through irreversible modifications during initiation.
- Promotion—started cells are encouraged to become cancerous.

The mutation of the cellular genes that control normal cell functions produces the initial transformation that causes normal cells to undergo irreversible alterations. It's possible that the mutation will cause aberrant cell proliferation. It could be caused by the lack of suppressor genes, which normally limit aberrant cell proliferation. Growth factors, immunological suppression, and hormones are just a few of the additional components at play.

Benign tumours are benign tumours that grow only at the place of origin, do not invade surrounding tissues, and do not spread. They are usually curable.

Tumors that are malignant (cancer) infiltrate nearby tissues or spread to distant locations (metastasis). They're more difficult to cure, and they frequently result in death.