

## Note on Environmental Toxicology

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### Commentary

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### DESCRIPTION

Environmental toxicology is the scientific study of the health effects of toxic chemical exposure in the natural, work, and living environments. The term also refers to the management of environmental toxins and toxicity, as well as the development of human and environmental safeguards. Chemicals must enter our bodies in order to cause health problems. There are three major "routes of exposure," or ways for a chemical to enter our bodies.

**Inhalation (breathing)**-Breathing in airborne chemical gases, mists, or dusts.

Contact with the skin or the eyes: Getting chemicals on the skin or in the eyes. They can cause skin damage or be absorbed into the bloodstream through the skin.

**Ingestion (swallowing)**-This can occur when chemicals have been spilled or settled on food, beverages, cigarettes, beards, or hands.

Chemicals enter our bloodstream and reach internal "target" organs such as the lungs, liver, kidneys, or nervous system.

A chemical substance comes in a variety of shapes and sizes. They can be solids, liquids, dusts, vapours, gases, fibres, mists, or fumes. The form of a substance has a lot to do with how it enters our bodies and the harm it can cause. A chemical can also take on new forms. Liquid solvents, for example, can evaporate and emit vapours that you can inhale. Chemicals can sometimes be found in forms that cannot be seen or smelled, making them difficult to detect. A contaminant's acute effect (the term "contaminant" refers to hazardous substances, pollutants, pollution, and chemicals) is one that occurs quickly after being exposed to a large amount of that substance. A contaminant's chronic effect results from long-term exposure to small amounts of a substance. The effect may not be immediately apparent in such a case. Chronic effects are difficult to quantify because they may not be visible for years. Long-term cigarette smoking, low-level radiation exposure, and moderate alcohol consumption are all thought to have long-term consequences.

For centuries, scientists have known that in sufficient quantities, almost any substance is toxic. Small amounts of selenium, for example, are required by living organisms for proper function, but excessive amounts can cause cancer. The effect of a chemical on an individual is determined by the chemical's dose (amount). This relationship is frequently illustrated by a dose-response curve, which depicts the relationship between dose and individual response. Many substances' lethal doses in humans have been determined using information gathered from homicide records, accidental poisonings, and animal testing.

The lethal dose-50 percent, or LD-50, is a dose that is lethal to 50% of a population of test animals. The LD-50 must be determined for new synthetic chemicals in order to provide a measure of their toxicity. The effective dose-50 percent, or ED-50, is a dose that causes 50% of a population to exhibit any significant response (e.g., hair loss, stunted development). Some toxins have a toxicity threshold below which there is no discernible effect on the exposed population. Contamination of the air, water, or soil with potentially hazardous substances can have an impact on any individual or community. Contaminants are chemicals that are found in greater quantities than would occur naturally in the environment. These contaminants can enter our bodies through a variety of residential, commercial, and industrial sources. Sometimes harmful environmental contaminants, such as mould or a toxic algae bloom, occur biologically. Because many building materials, consumer products, and fabrics emit formaldehyde, indoor environments consistently have higher concentrations than outdoor environments.