Lead, when taken into the body, may be deposited in the bones When the intake of lead stops, the stored portion is excreted until it is virtually eliminated from the system In chronic poisoning the excretion rate usually rises until it balances the absorption rate

In the case of lead poisoning, biochemical tests performed on the body fluids would indicate the amount that is being circulated in the blood, excreted in the urine, or stored in the bones if an autopsy was made

An important difference between inhalation as route of entry and ingestion or skin absorption is that through inhalation the material enters the arterial blood directly, whereas with ingestion or skin absorption the material enters the venous blood and is carried through the right portion of the heart where it is then diluted by the entire venous system and passed through the lungs and then pumped by the left portions of the heart to the brain and other organs

Reactive gases and vapors are altered within the body and are eliminated to a large extent in forms other than those in which they are absorbed The toxicological action may be exerted either by the substance in its original form or by its detoxification products

Nonreactive gases and vapors are not altered to any appreciable extent in the body and are eliminated in the same chemical form in which they are absorbed The aliphatic hydrocarbons, such as propane and heptane, are examples of that type

Mode of action

Industrial poisoning may be classified as one of three types acute, subacute, or chronic The classification is based on the rate of intake of harmful materials, rate of onset of symptoms, and the duration of symptoms

- Typically, acute poisoning is characterized by rapid absorption of the offending material and the exposure is sudden and severe For example, inhaling high levels of carbon monoxide or swallowing a large quantity of cyanide compound will produce acute poisoning The death or survival of a victim through the critical period occurs suddenly Generally, acute poisoning results from a single dose which is rapidly absorbed and damages one or more of the vital physiological processes The development of cancer long after recovery from acute radiation damage is called a delayed acute effect

Frequently repeated and extended exposures, over a period of several hours or days, results in subacute effects, depending on the dose rate

- Chronic poisoning is concerned with the continued absorption over a long period of time of a harmful material in small doses, each dose, if taken alone, would barely be effective Chronic poisoning is characterized by the harmful materials remaining in the tissues, continually injuring some body process The rate of intake exceeds the rate of excretion or detoxification, thus chronic poisoning can also be produced by exposure to a harmful material which produces irreversible damage, so the injury accumulates, rather than the poison The symptoms in chronic poisoning are usually different than those seen in acute poisoning by the same toxic agent

It is readily apparent that not all individuals react in the same manner to the same amount of a harmful material According to Stokinger (see "References"), "The atypical, or idiosyncratic, response to chemicals has always been a cause for unusual concern in those responsible for the control of hazardous exposures to individuals" Predictive tests can be used in pre-employment placement examinations to screen out the hypersusceptible individuals against future injurious exposure to the company's products

Type of harmful effects

Narcosis, irritation of the respiratory tract, and asphyxiation characterize the acute effect produced upon exposure to toxic gases, vapors, and fumes All organic solvents, upon extended high level exposures, are capable of producing a gradual continuous paralysis of the central nervous system, which is expressed in loss of consciousness, or voluntary movements Death may result from respiratory failure

Many symptoms of narcosis and asphyxiation are quite similar in that the primary effect in each is to impair the functioning of the brain—in narcosis by direct action and in asphyxiation by denying the brain sufficient oxygen Mild exposure to chemical agents producing asphyxiation and narcosis are