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Commentary

Pharmacokinetic Analysis of Naphthalene and Its Derivatives

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DESCRIPTION

The endocrine system is a physiological regulatory mechanism made up of a number of ductless glands that produce hormones that serve as messengers to coordinate cell communication. The system regulates reproductive processes, growth and development, and metabolic processes. Human physiopathology has become increasingly interested in how some substances interfere with endocrine processes [1]. These substances, often known as Endocrine-Disrupting Chemicals (EDCs), are both manmade and natural substances that may change how the endocrine system performs certain functions. The EDCs may target any organ of the endocrine system. The effects of EDC on typical human physiology could be caused by genetic or non-genomic mechanisms, as well as receptor- or non-receptor-linked pathways.

The main mechanisms of the EDCs are their individual tendencies to interact with endocrine receptors that have been established. These receptors could be membrane-bound receptors or intracellular transcription factors that are triggered by the binding of an associated hormone and have an impact on the physiopathological processes either positive or negative manner. Numerous chronic illnesses, including cardiovascular issues, diabetes, reproductive issues, cancer, and nervous system disorders have been linked to the EDCs. The EDCs come from a variety of sources, such as industrial, agricultural, and household sources. Alkyl phenols and polychlorinated biphenyls are two examples of industrial EDCs [2]. Agricultural EDCs include things like pesticides, herbicides, and insecticides, whereas domestic EDCs include things like phthalates, naphthalene, and bisphenol A. Naphthalene is a bicyclic aromatic hydrocarbon chemical that typically exists as a vapor and is frequently found in houses in the form of mothballs, toilet deodorant blocks, and outside air as a byproduct of natural combustion through fossil fuel and vehicle exhaust. Commercially, it is used to make polyvinyl chloride polymers, dyes, resins, and tanning chemicals for leather. Examples of naphthalene derivatives that might also contribute to environmental concentrations of naphthalene-related toxicants include 1-methylnaphthalene and 2-methylnaphthalene [3]. They can be found in tar, asphalt, and wood smoke.

They are also employed in the manufacture of resins and dyes, among other compounds. Naphthalene-1,2-diol and naphthalene-1,2,6,7-tetrol are two more naphthalene derivatives. It has been demonstrated that naphthalene and its derivatives undergo metabolic transformation *via* the actions of cytochrome P450 enzymes to generate reactive compounds capable of inducing a variety of diseases, including oxidative stress. Through numerous research, exposure to naphthalene and its derivatives has been linked to poisoning, the production of unfavorable physiological changes, morbidity, and mortality. Although naphthalene and its derivatives have been linked to several human toxicities, little is known about how they affect pharmacokinetics and endocrine function [4]. Therefore, the purpose of this study was to examine the toxicological and predictive pharmacokinetic endpoints of naphtha and its derivatives. This study was carried out to assess the risk value of naphthalene and its derivatives' pharmacokinetic and toxicological endpoint features, as well as to assess the most fundamental human implication, which is the disruption of the hormone system. According to the study's findings, all compounds studied, with the exception of naphthalene-1,2-diol, are P-glycoprotein substrates, which means that P-glycoprotein can transport them outside of the cell. Additionally, they have no effect on the exfiltration of other substances from the cell since they do not block the transporter activity of any of the protein subtypes (I or II). According to the findings of the research, naphthalene is hazardous to people. Additionally, it has been demonstrated that naphthalene and its derivatives alter the body's hormonal balance and endocrine function [5]. This in turn may be the cause of a number of endocrine disorders and diseases brought on by naphthalene. It is advised that more experimental research be done to determine the toxicological effects of naphthalene and its derivatives on endocrine function.

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