

CHEMICAL INDUCTION OF MUTAGENESIS AND CARCINOGENESIS

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1. Introduction

It is taken for granted that man strives to control his environment by the extensive use of energy sources. Many of these energy sources are chemical and result in unstable intermediates in side products. Areas which require large energy outputs for industrial purposes, automotive uses and a variety of other needs may be expected to contain harmful concentrations of chemical side products.

Most industrialized cities and cities with extensive automotive traffic have large areas containing variable amounts of chemical impurities, at all times. More rural areas may have seasonal or transitory periods where field burning or some equivalent action results in high concentrations of air or water borne impurities. Local zones having very high concentrations of chemical impurities may also exist for variable periods. Notably, kitchens and bathrooms may be exposed to a variety of potentially hostile chemicals such as an almost infinite variety of aerosols, aromatics and "germ-killing" agents most of which have unknown long range effects on man and other organisms.

Fossil fuels are being used at a rapid rate such that we may expect a world-wide and ever increasing amount of atmospheric impurities over the next several years. The major sources of chemical impurities comes from hydrocarbon combustion, insecticides and herbicides, cosmetics and cleaning agents including dyes, food additives and perhaps, indirectly, the extensive use of inorganic fertilizers.

Before proceeding, I wish to state working definitions of the basic genetic conditions, mutagenesis and carcinogenesis. DNA is localized in the chromosomes of organisms and is composed of four small molecules arranged in triplet information bits. A set of triplets comprises a basic information unit called a gene or cistron. In cellular function, the information contained in a cistron is transcribed onto a complementary RNA segment which, in turn, is translated into one amino acid. The amino acids are assembled into the same sequence as was contained in the cistron. If the triplet code is intact, then the condition is referred to as *wild type*. On the other hand, if the triplet sequence, composition

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