THE BIOCHEMICAL APPROACH TO MUTATION MONITORING IN MAN

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1. Introduction

At present, there is no simple, inexpensive, direct way to determine whether an increase in the mutation rate in human populations has occurred or is occurring. The problem is increasingly serious with the ever more widespread use in our society of many potentially mutagenic agents. A widespread, highly mutagenic agent could have serious long term effects on the overall viability and fertility of a population, as well as increasing the incidence of specific genetic defects and diseases.

In order to protect human populations from the effects of potential mutagens, we must be able to make two kinds of measurements. First, we must determine the mutagenicity of specific environmental agents, preferably prior to their wide scale use, on a variety of experimental organisms. Second, we must be able to measure accurately the overall mutation rate in human populations, as a last check against a genetic emergency caused by previously undetected mutagens or mixtures of individually innocuous substances.

2. Tests on organisms other than man

Most work on the measurement of mutation rates has been done with nonhuman systems, both because of the greater number of organisms that can conveniently be studied, and because obviously it would be unethical to use humans as laboratory animals for the preliminary screening of potentially very dangerous materials. It is clear that the results of mutagenicity determinations on nonhuman systems cannot be blindly extrapolated to man. Organisms differ both in their inherent sensitivity to mutational damage, in their ability to repair mutation effects, and the ability to detoxify mutagens or to convert innocuous material into mutagens. However, from the standpoint of safety it would seem obvious that no material significantly mutagenic in a mammal should even be tested on man much less used in the environment, and that no material significantly mutagenic in *any* biosystem should be used in the environ-

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