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LETTER TO THE EDITOR

POSSIBLE REASONS FOR SPONTANEOUS INCIDENCE OF MICRONUCLEUS IN RODENTS

Sir,

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Micronucleus is similar to the nucleus, but smaller, formed in the cell due to damage of chromosomes by external factors. Incidence of micronuclei is scored in different cell lines as a parameter to evaluate the genotoxicity of chemicals and radiation. Bone marrow micronucleus assay in rodents, particularly in mice, has been the most popular technique used to screen the chemicals for their toxic potential. It is not that only exposed subjects show micronuclei, even untreated ones also show some of them. Hence, the incidence of micronuclei is compared between treated and untreated. Untreated buccal mucosa cells of man showed an average of 0.41% spontaneously induced micronuclei (1). Cole et al (2) reported that 0.16% of micronucleated cells are seen among the polychromatic erythrocytes (PCEs) in bone marrow of mice. In rats, 0 to 6.00% of micronucleated PCEs have been found in untreated controls (3). Furher, it was found that males are more sensitive than females in showing spontaneously induced micronuclei (4). Hence the present study was carried out to examine the possible role of exogenous factors influencing the occurrence of micronuclei in control animal models that are frequently employed in micronucleus assay.

Six mice and 12 rats were used in this study. Smears of bone marrow were prepared from femora (5), with a slight modification where 5% bovine albumin in phosphate buffered saline (P^H 7.2), was used as suspending medium (6). Smears were stained in May-Gruenwald-Giemsa at P^H 6.8. Slides were screened under oil immersion objective. Two thousand PCEs/animal were scored for the incidence of micronuclei. Normochromatic erythrocytes (NCEs) and micronucleated NCEs (MNNCEs) met during analysis were also recorded.

Our study on incidence of micronuclei in untreated, revealed that an average of 3.50 and 3.75 micronucleated PCEs (MNPCEs) appear/2000 PCEs scored in the bone marrow smears of mice and rats respectively. Micronuclei have also been found in normochromatic erythrocytes (NCEs), having an average of 3.83 and 1.33 in untreated mice and rats respectively. We have also seen that males are comparatively more sensitive than females, eventhough the data were not significantly different (data not shown). In this regard female sex hormones may have a protective role against micronuclear induction to certain extent.

It is not exactly known what actually induces micronucleus in untreated subjects. Spontaneous chromosomal damage is known to occur in untreated mice (6) and such fragments may convert themselves into micronuclei. Certain other interesting phenomena such as karyorrhexis and budding from the nucleus have been known to form micronuclei in the cells (7). Some chemicals like DNA alkylating agents known to induce apoptosis which involves karyorrhexis as one of the preceeding steps (8). Experiments using such chemicals, therefore, alter the actual scoring of micronuclei, since those formed (many in number) due to karyorrhexis also would be scored besides the actual ones. Other posible reasons may be due to unseen chemicals which freely exist in the nature. In humans and other non-laboratory animals, this may be one of the important causative factors which induce micronucleus. Exposure to unrecognised radiation, pesticides, smoking (9), alcoholism and other combined factors are the main inducers of micronuclei. In laboratory animals, this may be due to exposure to low dosage of pesticides present in the paddy husk used for bedding (not in all laboratories). This is further supported by the reports on pesticide induced micronuclei in bone marrow cells of mice (10). However, our data obtained from animals housed without paddy husk bedding indicate that, this may not be the only reason, as there was no significant difference in the incidence of micronuclei between groups. In some laboratories saw dust bedding is also used, which may be having certain complex chemicals like resins, may be responsible for induction of micronuclei.

The above mentioned factors have been neglected in micronucleus research. Our observations suggest that exposure to unseen chemicals in laboratories may alter the incidence of micronuclei since, exogenous factors coupled with the administration of test chemical could lead to a "combined effect" in *in vivo* system. Since, exogenous factors may accelerate/ inhibit the genotoxicity of a test chemical, it will result in erroneous conclusions and variable data between laboratories. It is necessary therefore to take precaution while interpreting the data obtained from nonmutagens or weak mutagens.

TABLE I: Spontaneous incidence of micronucleus in mouse and rat bone marrow cells.

Animals	*Number of animals*	*Total number of PCEs scored*	*Total number of NCEs scored*	*Total number of MNPCEs*	*Total number of MNNCEs*
Mouse	6	12000	9779	21	23
Rat	12	24000	20484	45	16

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