Intercorrelations and sources of variability in three mutagenicity assays: a population-based study.


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The purpose of this study was to evaluate the intercorrelation between three genetic assays in 112 subjects. The group was pooled from two originally separate but homogeneous subgroups of 56 persons each. Procedures included assays for hprt mutant frequencies, micronuclei in human lymphocytes, and mutations at the glycophorin A (gpa) loci. We found no statistically significant or biologically important intercorrelations among the three biomarkers. We did, however, observe significant correlations between log(e) hprt mutant frequency and cloning efficiency (inverse correlation for these 2 variables), age and log(e) hprt mutant frequency, an inverse relationship between cloning efficiency and age, and an important differential sex effect favoring a greater micronuclei frequency in females than males. No significant correlations between the covariates of interest and glycophorin A variant frequencies NN or NO were observed. Using multivariable linear regression, age was found to account for the majority of the variability in hprt mutant frequency (greater than sex and/or smoking); for micronuclei data, only sex contributed a statistically significant and biologically important proportion to the total variation. We conclude that despite observing no significant intercorrelations between the three assays performed simultaneously from the same individuals in a large population database, a significant correlation between age and hprt mutant frequency and an inverse association between cloning efficiency and hprt do exist; furthermore, we verified the strong differential sex-specific effect on micronucleus frequencies.