

Letters to the Editor

Correspondence re: C. Bolognesi *et al.*, Age-related Increase of Baseline Frequencies of Sister Chromatid Exchanges, Chromosome Aberrations, and Micronuclei in Human Lymphocytes. *Cancer Epidemiol. Biomark. Prev.*, 6: 249-256, 1997.

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I have studied with great interest the paper of C. Bolognesi *et al.* (1). The authors analyzed the level of CAs<sup>1</sup> in human lymphocytes depending on age, using the works of nine Italian laboratories. However, the authors wrote that the mentioned papers "were not specifically designed and carried out to evaluate the independent effect of aging on the occurrence of chromosome damage."

C. Bolognesi *et al.* cited 20 works concerning this problem (Ref. 1; Table 2) and 9 works of Italian laboratories. Among these 29 studies, 13 (44.8%) indicated no association between age and CA level in lymphocytes.

Analyzing the part of the article concerning the works of the Italian laboratories, I found some weak points: (a) an absence of data concerning the level of CAs in the cells of old people (70+ years); and (b) the distribution of subjects by age is extremely uneven, *e.g.*, the number of persons ages 60-69 years is very low (only 67—2.27% of the total number of persons). Laboratory CIT-MI studied 328 subjects of ages 1-19 years, 38 ages 20-59 years, only 2 ages 50-59 years, and no one aged 60+ years. Almost the same situation is seen in the studies of the ONC-CE and MDL-MI laboratories.

I suppose that having such data, it is premature to conclude positive correlation between age and CA levels in lymphocytes.

I'd like to present some results obtained by scientists of the former USSR published in Russian and possibly not available for Western readers (Table 1). All of these works were done using standard procedures. Two of them were designed and carried out to evaluate the effect of aging on the frequency of lymphocytes with CAs (2, 3). It is noteworthy that the level of lymphocytes with CAs in the cells of very old people (90-106 years) is the same as that in the blood of people ages 40-60 years. All of these papers refute the association between age and the frequency of CAs in WBCs (174,655 cells were analyzed obtained from 1,147 persons).

Taking into account the papers of Russian and Ukrainian investigators, we can conclude that among the cited 34 works,

only 16 (47.1%) indicate a positive association between age and the level of CAs in lymphocytes.

Russian investigators Bochkov and Chebotariov (3), in specially designed work, have shown no association between SCEs and age (age range, 0-53 years; mean number of SCEs/cell, 8.22; number of subjects, 107; number of cells scored, 4,600).

The above-mentioned paper and combined data of Tables 1 and 5 have shown that among 49 studies, only 25-26 (51.0-53.1% range because of  $\pm$  in the last paper in Table 1) indicate the increase of the mean number of SCEs with age.

Hence, I feel that the conclusion that the level of CAs and SCEs increases with age is premature, and this problem warrants additional investigations. Only MN frequency in lymphocytes increases with age due to aneuploidy phenomenon.

Table 1 Age-related frequencies of CAs in human lymphocytes

No. of subjects	Age range (yr)	Mean no. of cells with CAs (%)	Cells scored	References
42	90-106	1.81	4,200	2
57	60-89	1.68	5,700	
63	40-60	1.87	6,300	
437	0-70	1.19	80,000	3
30	6-16	1.74	4,600	6
149	14-45	1.47	26,180	
178	2-80	1.92	20,050	5
221	1-50	1.41	27,625	4

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<sup>1</sup> The abbreviations used are: CA, chromosomal aberration; SCE, sister chromatid exchange; MN, micronuclei; CIT-MI, Laboratorio di Citogenetica, Clinica Ostetrica e Ginecologia, University of Milan (Milan, Italy); ONC-CE, Istituto di Oncologia, University of Genoa (Genoa, Italy); MDL-MI, Istituto di Medicina del Lavoro, Clinica del Lavoro "Luigi Devoto," University of Milan.

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