

EFFECT OF CYTOMEGALOVIRUS ON ADULT HUMAN CHROMOSOMES

M. SAKIZLI, G. LÜLECI, A. GÜNALP

Department of Molecular Biology, University of Hacettepe, Ankara, Turkey

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Summary. — The effects of cytomegalovirus infection on adult human chromosomes was studied in skin cell cultures. Chromosome No. 2 seemed to be affected specifically; chromosome abnormality distribution was independent of chromosome length.

Key words: cytomegalovirus; human chromosomes

In continuation of our previous study (Lüleci *et al.*, 1980) we investigated the effect of human cytomegalovirus (CMV) on adult human chromosomes.

Primary cell cultures were derived by the fragmentation technique from adult human skin tissue. In the present study we used cultures, free of mycoplasma contamination, at the 5th—10th passage level to avoid spontaneous chromosomal changes. The cell cultures were grown, infected and examined as described (Lüleci *et al.*, 1980). The CMV strain AD-169 used also was the same.

The numbers of abnormal and normal metaphases in infected and corresponding control cultures at different intervals are shown in Table 1. Anomaly types (Fig. 1, see Plate XXXVII) encountered and their frequencies are given in Table 2.

The amount of anomalies for each type of chromosome was determined. The numbers of observed and expected anomalies for each chromosome was compared to see whether there is any preference of CMV for any human chromosome (Table 3).

It is well known that human herpesviruses have oncogenic potentials. CMV, one of the members of this group has the characteristics of a DNA tumour virus (Rapp and Li, 1974; Stich *et al.*, 1964). Since virus-host in-

Table 1. Number of normal and abnormal metaphases at different intervals after CMV infection

Hr p.i.	Total	Metaphases Normal	Abnormal
48	45	23	22 (49%)
72	84	61	23 (27%)
96	60	40	20 (33%)
Control	31	30	1 (3%)

Table 2. Anomaly types induced by CMV infection in the chromosomes of adult human cells

Anomaly types	No. of anomaly types			Total
	48 hr	72 hr	96 hr	
Gap	34	21	14	69
Break	7	5	2	14
Deletion	2	5	5	12
Translocation	2	—	7	9
Fragmentation	5	2	—	7
Deformation	3	—	1	4
Ring	—	—	2	2
Aneuploidy	6	23	4	33
Polyploidy	—	7	2	9
Endoreduplication	—	1	1	2
Markers	—	—	—	—
Total	59	64	38	161

teractions proceed at the chromosomal level during oncogenesis, it was of interest to know whether CMV exerts any specific effect on chromosomes.

Our results demonstrated that the anomaly distribution among chromosomes did not correlate with their size. When the length-corrected anomaly

Table 3. Distribution of chromosomal anomalies in CMV-infected adult human cell cultures

Chromo- some No.	48 hr		72 hr		96 hr		Total		
	I	II	I	II	I	II	I	II	III
1	4	4.22	4	2.61	6	2.89	14	9.48	7.58
2	10	4.01	7	2.48	3	2.75	20	9.01	11.39
3	2	3.41	6	2.12	4	2.34	12	7.67	8.02
4	4	3.15	2	1.95	5	2.16	12	7.07	8.70
5	5	3.04	3	1.88	2	2.08	10	6.83	7.51
6	2	2.95	0	1.82	2	2.02	4	6.62	3.09
7	5	2.68	1	1.66	0	1.84	6	6.02	5.11
X	0	2.56	1	1.58	2	1.75	3	5.75	2.67
8	4	2.46	2	1.52	1	1.69	7	5.53	6.48
9	0	2.40	0	1.48	0	1.64	0	5.39	0
10	0	2.29	0	1.42	2	1.57	2	5.15	1.99
11	3	2.30	1	1.42	0	1.58	4	5.17	3.96
12	0	2.33	0	1.44	2	1.60	3	5.23	2.94
13	3	1.87	1	1.15	2	1.28	6	4.20	7.33
14	1	1.78	2	1.10	1	1.22	4	3.99	5.13
15	1	1.73	0	1.07	1	1.18	2	3.88	2.64
16	1	1.68	0	1.04	0	1.15	1	3.77	1.86
17	1	1.62	0	1.00	1	1.11	2	3.65	2.81
18	1	1.46	1	0.90	0	1.00	2	3.29	3.11
19	2	1.34	0	0.82	0	0.91	2	2.99	3.42
20	0	1.28	0	0.79	0	0.87	0	2.87	0
21	0	0.95	0	0.58	1	0.65	1	2.13	2.40
22	1	1.02	0	0.63	2	0.70	3	2.29	6.72
Total	50		31		37		121		

I — Anomaly values observed.

II — Anomaly values expected.

III — Length-corrected anomaly values.

values were compared statistically with each other, No. 2 chromosome seemed to be damaged more frequently. The anomalies in No. 2 chromosome were found mostly on the q arm and 70–80% of these anomalies were gaps. Chromosome No. 9 exhibited no abnormality and this fact suggests a specific distribution. We can thus conclude that No. 2 chromosome of adult human cells might be attacked specifically by CMV. In a similar experiment we found that foetal chromosomes are more sensitive to this virus, abnormality distribution is independent of chromosomal length and, in contrary to adult chromosomes, foetal chromosomes No. 3 and No. 21 seem to be attacked more frequently (Lüleci *et al.*, 1980). Further investigations are required to reach a conclusion about any specificity of interactions between human chromosomes and human CMV.

References

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