Cell types	Cell origin	Genetic deficiency	Electrophoretic mobility (μm/sec/V/cm) (No. of observations) ± standard error	*P* value	Mean number of chromosomes
MS2	Human skin fibroblast	HGPRT-	−1.39 (76) ± 0.015	< 0.01	46
B82/MS2	Clonal hybrid line		−1.25 (71) ± 0.014		2×53+19
B82	L929 mouse fibroblast	TK-	−1.15 (63) ± 0.018	< 0.05	53
MS58	Human skin fibroblast	balanced translocation *X*/chr 14	−1.13 (57) ± 0.019	< 0.001	46
TG2/MS58	Clonal hybrid line		−1.29 (88) ± 0.020	> 0.05	2×48+1
TG2	Syrian hamster BHK fibroblast	HGPRT-	−1.24 (83) ± 0.014		48
MS64	Human skin fibroblast	Hydrocephalus	−1.38 (67) ± 0.012	< 0.01	46
A9/MS64	Clonal hybrid line		−1.52 (75) ± 0.013	< 0.05	57+1
A9	L929 mouse fibroblast	HGPRT-	−1.63 (59) ± 0.024		56
MS63	Human skin fibroblast	G6PD- mediter. variant	−1.37 (36) ± 0.017	0.02	46
TG2/MS63	Mixed hybrid population		−1.28 (68) ± 0.023		2×48+3
TG2	Syrian hamster BHK fibroblast	HGPRT-	−1.24 (83) ± 0.014	$0.02 > P < 0.05$	48
MS58	Human skin fibroblast	Balanced translocation *X*/chr 14	−1.13 (57) ± 0.019	< 0.001	46
A9/MS58	Clonal hybrid line		−1.57 (65) ± 0.016		56+1
A9	L929 mouse fibroblast	HGPRT-	−1.63 (59) ± 0.024	> 0.02	56

HGPRT-, hypoxanthine guanine phophoribosil transferase deficient; TK-, thymidine kinase deficient; G6PD-, glucose-6-phosphatedehydrogenase deficient

cell hybrids, however, have indicated that surface antigens and T-antigens are expressed in the hybrids when carried by one of the parents[6], and their synthesis in the hybrids depended on the number of chromosomes from the parental line carrying the marker[4]. In this connection, if the electrokinetic properties of the hybrids studied can be associated with products of genes on a certain chromosome or chromosomes, our results indicate that such chromosomes have probably been eliminated. Studies on early cell hybrid populations, which carry a larger number of human chromosomes but are low in cell numbers, were not made, since the electrophoretic mobility measurements required a larger number of cells than available.

Résumé. Nous avons comparé e comportement électrocinétique des cellules hybrides des fibroblastes diploïdes de la peau humaine et aneuploïde d'une souris ou d'un hamster avec celui des cellules de leurs lignées. Les résultats montrent que les changements significatifs observés dans les propriétés électrocinétiques des hybrides interspécifiques ne peuvent pas être dus à la présence de quelques chromosomes humains dans le génôme hybride.

B. F. DEYS[7], L. KIREMIDJIAN and M. J. KOPAC

New York University, Department of Biology, Graduate School of Arts and Science, 951 Brown Building, 100 Washington Square East, New York (N.Y. 10003, USA), 27 March 1972.

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[7] Research Fellow at the Yeshiva University, New York. Present address: Laboratory for Radiobiology, Eerste Halmers Straat 98, Amsterdam (The Netherlands.)

Chromosomal Pattern of Asparaginase Sensitive Leukemia and its Resistant Variant

The asparaginase resistant line of EARAD1 leukemia which is originally sensitive to L-asparaginase therapy, was produced by repeated passages in hosts treated with suboptimal doses of asparaginase and subsequently carried out in untreated hosts[1]. The resistant line shows a high degree of resistance to L-asparaginase. Asparagine synthetase activity, which is supposed to be responsible for the development of resistance, is slightly higher in the resistant tumour[1–6]. The present report deals with the gross chromosomal alteration which may be a reflection of genetic change from asparaginase sensitivity to asparaginase resistance, in a asparaginase sensitive leukemia and its resistant variant.

Materials and method. The studies were carried out with a radiation induced and asparaginase sensitive transplantable ascites leukemic tumour (EARAD1) and its resistant variant (EARAD1-Res) in both sexes of isogenic hybrid mice (C57BL/6×A)F1. The size of inoculum is 1×10^6 leukemic cells in 0.5 ml per mouse. We

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The percentage of marker chromosome in asparaginase sensitive leukemia and its resistant variant

Number of passage	Cells with marker Chromosome (%)[a]	
	Sensitive	Resistant
0	75	7
1	10	1
2	0	0
3	19	5
4	1	1
5	85	0
6	92	0
7	95	4
8	97	0

[a] Subtelocentric chromosome is not present in the tissues of mouse strain used.

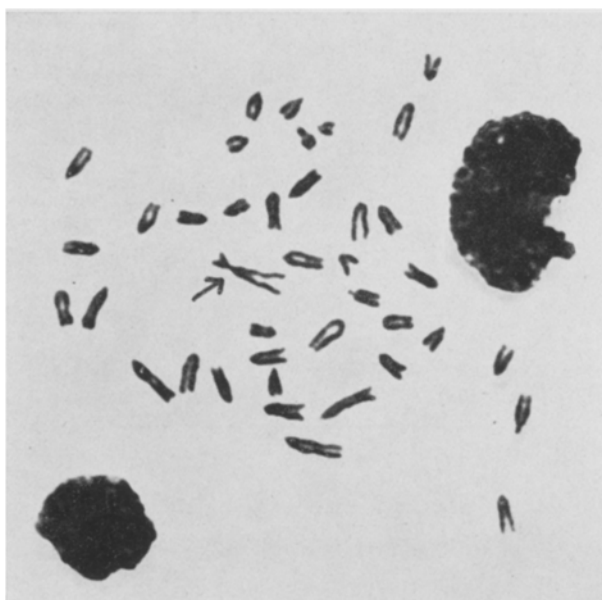

Fig. 1. Metaphase from asparaginase sensitive tumour; 39 chromosomes with a marker (marker chromosome is indicated by an arrow).

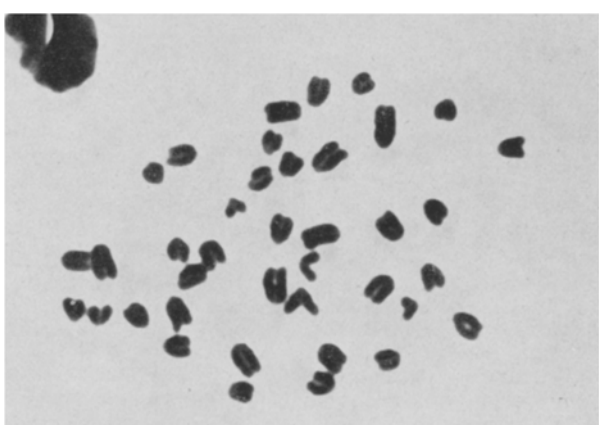

Fig. 2. Metaphase from asparaginase resistant tumour; 39 chromosomes without a marker.

always transfer the leukemic cells into the hosts from a 9-day-old tumour. We generally used 7-day-old tumours for our studies. The chromosome preparation was done according to the method described by MITRA and BANERJEE[7].

Results and discussion. So far we have studied 9 transplant generations of asparaginase sensitive leukemia and its resistant variant. Karyological analysis showed that both the tumour lines are hypodiploid having the modal number of 39 chromosomes. The difference between these 2 tumours is the frequency of marker chromosome (subtelocentric). The frequency of sensitive cells with this marker chromosome is generally higher in comparison to that of resistant cells and moreover, this varies from passage to passage (Figures 1 and 2). The details of the results are given in the Table. From the Table it is found that the percentage of sensitive cells with this marker chromosome is lower at passages 1–4, especially at No. 2 and 4; the reason for this is not clearly known. It has been found that on 5th day after transplantation of tumour in passages 3 and 4.53 and 40%, respectively, had the marker chromosome. The results may indicate that cells with the marker chromosome are more frequent ealier in 1st, 2nd, 3rd and 4th passages, while in other passages they appear later. This may be the reason why in the sensitive strain we observed very few cells with the marker chromosome from 7-day-old tumours of these transplant generations, and that perhaps during this period the sensitive cells with the marker chromosome infiltrate into other organs of the ascites tumour-bearing mice, for instance, the spleen. When out of curiosity, we studied the spleen cells from 7-day-old tumour-bearing mice of 4th transplant generation for any chromosomal change, it was revealed that a high percentage of spleen cells contained the marker chromosome, which is not present in normal spleen cells of the hybrid mouse strain used. There are several reports on the comparison of karyotypes of sensitive and resistant tumours. Some reported differences in chromosome number, others found marker chromosomes, whilst some of them could find no difference at all[8–12]. There is also a report on the persistance of the marker chromosome even after the loss of resistivity[13].

Zusammenfassung. Es wurde festgestellt, dass zwischen den Asparaginase-empfindlichen und resistenten Tumorzellen ein Unterschied bezüglich der Häufigkeit des Vorkommens von Marker-Chromosomen besteht.

A. T. BANERJEE and S. P. BANERJEE[14]

Innere Klinik und Poliklinik (Tumorforschung) der Ruhr-Universität, Hufelandstrasse 55, D-4300 Essen-Hosterhausen (Germany), 7 March 1972.

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