

Cytological and Cytochemical Analysis of Plasma Clot Cultures and Peripheral Granulocytes Related to Long Term Survival in Childhood ALL and Cancer Patients Under Cytostatica Therapy

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Colony number and cytology, the cluster/colony ratio, and the peroxydase reaction were investigated in plasma clot cultures (Stephenson et al. 1971; Hellwege et al. 1978; Biermann et al. 1979) of 45 normal persons and 250 patients with childhood AL (Neth et al. 1980).

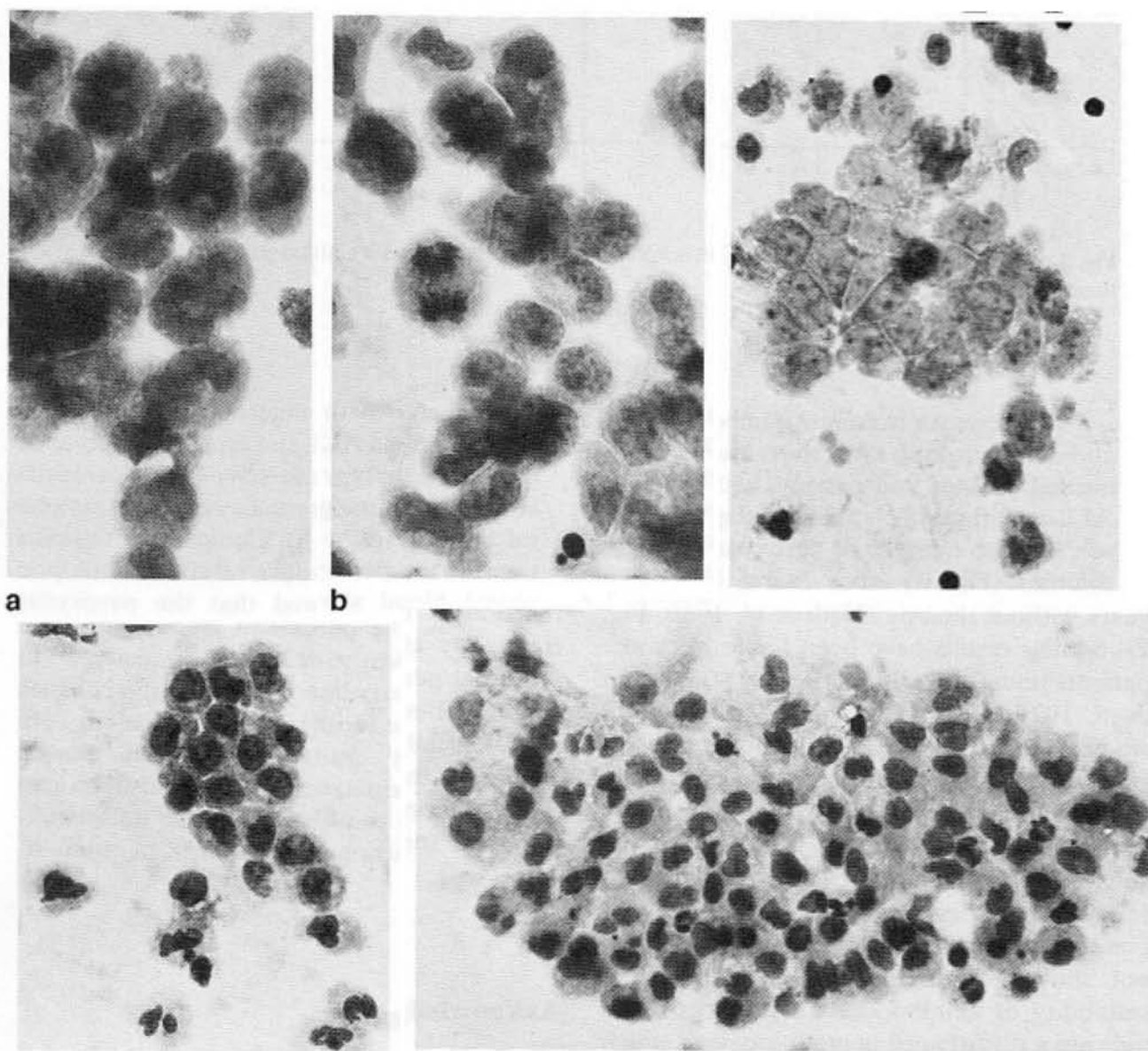


Fig. 1a-e. Plasma clot colonies. **a** peroxydase positive; **b** weak peroxydase positive; **c** peroxydase negative; **d** weak peroxydase positive small colony; **e** weak peroxydase positive large colony

<i>normal persons</i> <i>n = 11</i>	<i>normal persons</i> <i>n = 19</i>	<i>ALL</i> <i>2.5 years</i> <i>after therapy</i>	<i>ALL</i> <i>3.5 years</i> <i>after therapy</i>	<i>ALL</i> <i>2.5 years</i> <i>after therapy</i>
100	100	100	100	100
100	100	92	100	95
100	100	92	100	88
100	100	77	94	81
95	100	68	83	71
94	100	40	38	13
92	100	15	0	0
88	100	0		0
86	100			0
78	100			
55	98			
	95			
	95			
	88			
	86			
	82			
	70			
	59			
	48			
\bar{x} 90	90	60	74	50

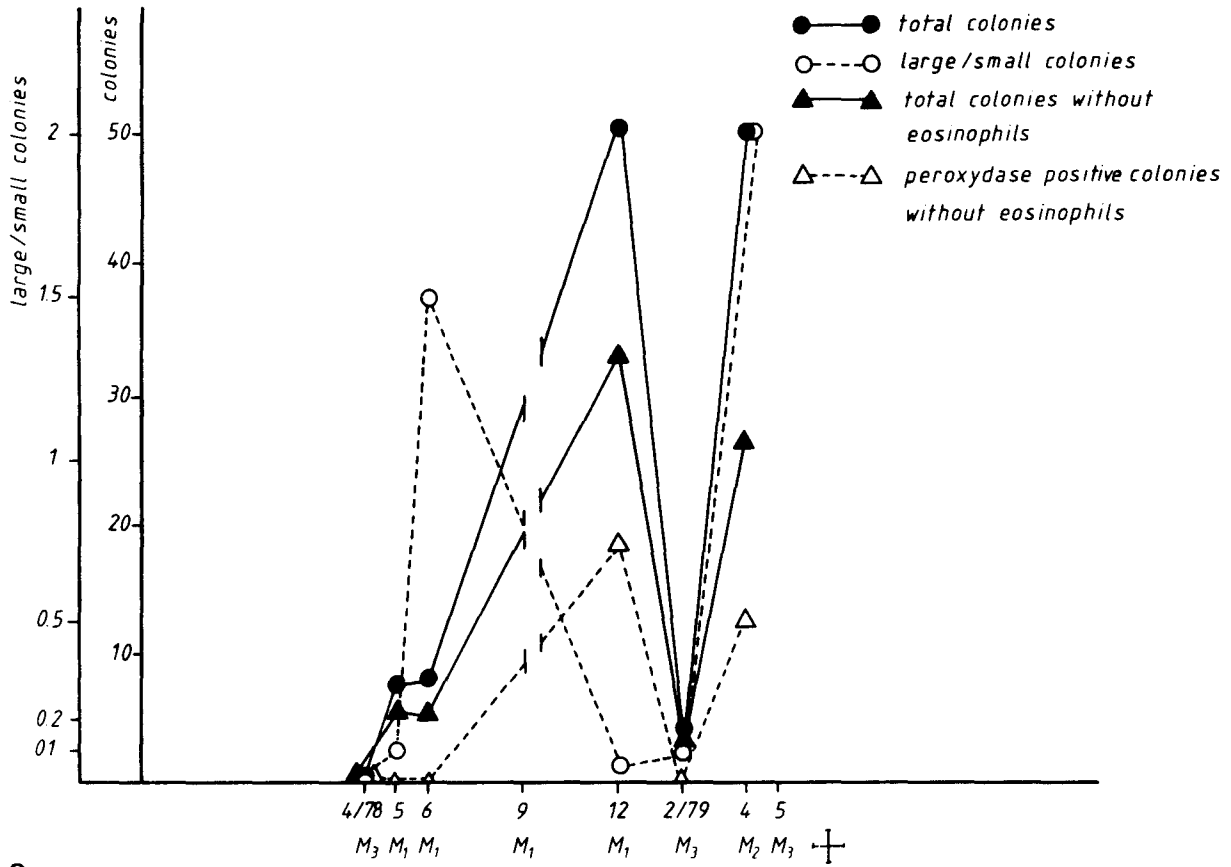
Fig. 2. % Peroxydase positive colonies in normal persons and patients with childhood leukemia (ALL) in long time remission

No differences in colony number, cytology, and cluster/colony ratio were found between normal persons and patients with childhood ALL except during leukemic relapses. However, a large number of peroxydase negative colonies (Fig. 1) were found in leukemic patients even in remission after as many as 2–6 years without therapy (Neth et al. 1980, Fig. 2). Similar results have been found in cancer patients under cytostatica therapy (Biermann et al. 1979; Neth et al. 1980). In follow up studies for up to 2 years in bone marrow cultures of patients with childhood ALL the colony number cluster/colony ratio, and the peroxydase reaction varied to a high degree (Fig. 3). For technical reasons there are no follow up studies of normal persons, but as bone marrow cultures of normal persons did not show a high degree of variation, the instability of childhood ALL cultures could indicate a disturbance in granulopoiesis which could result in a relaps if an additional noxa occurs.

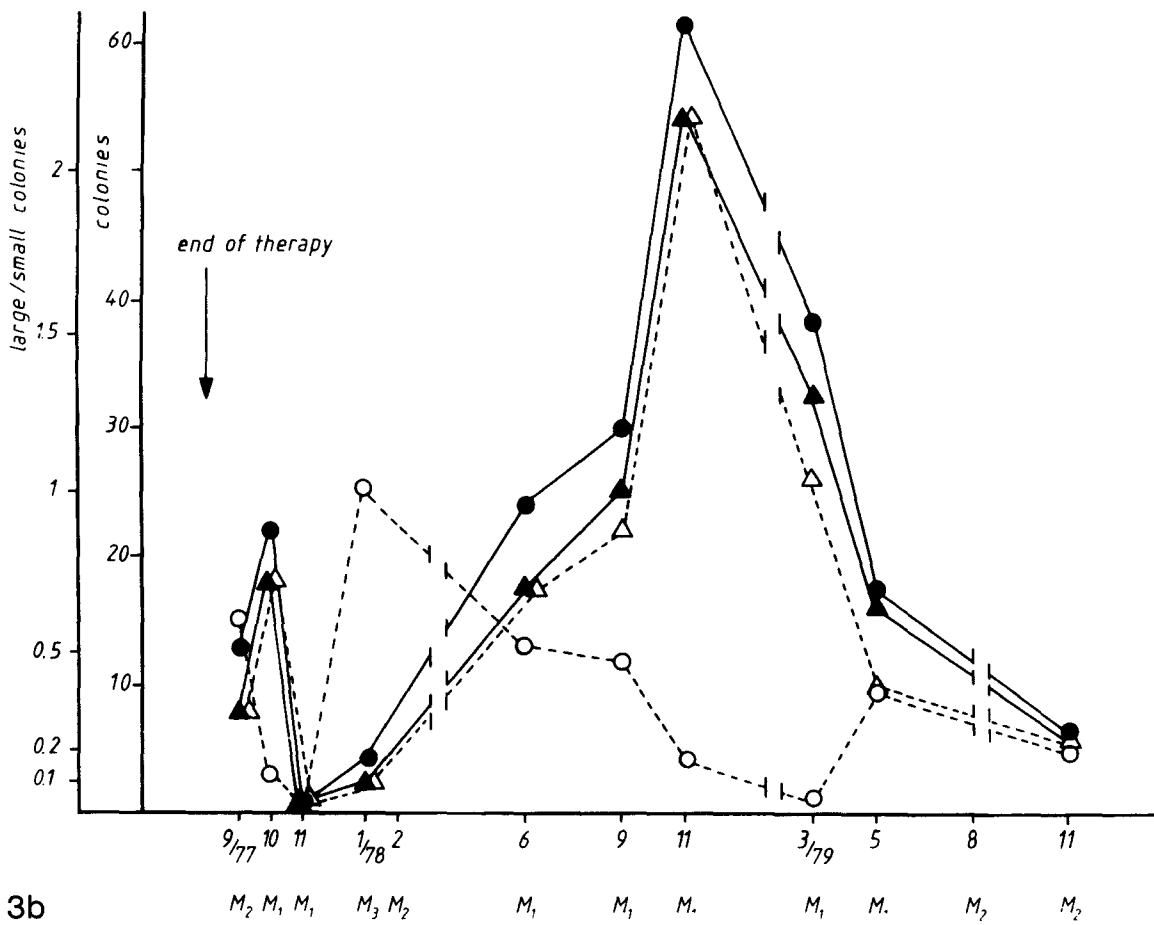
Compared with normal persons, patients with childhood ALL and cancer patients under cytostatica therapy also have a weak peroxydase reaction in the granulocytes of the peripheral blood (Figs. 4–6). Comparable examinations of the peroxydase reaction in the peripheral blood showed that the peroxydase reaction in the peripheral granulocytes was frequently clearly decreased in contrast to a normal peroxydase reaction in the colonies (Fig. 6) These results indicate that along with pathologically changed stem cells morbid changes of the microenvironment also can lead to regulation disturbances in the differentiation and functional maturation of granulocytes.

Acknowledgments

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3a



3b

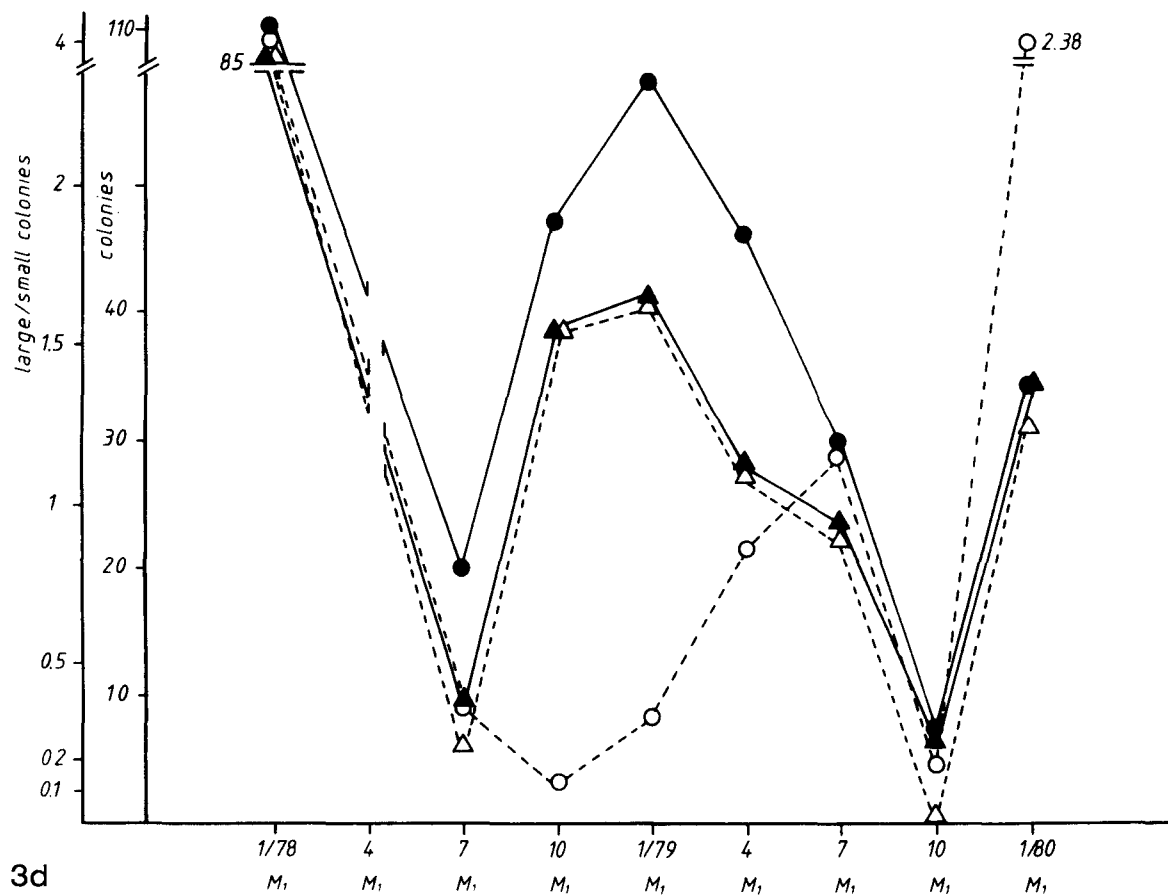
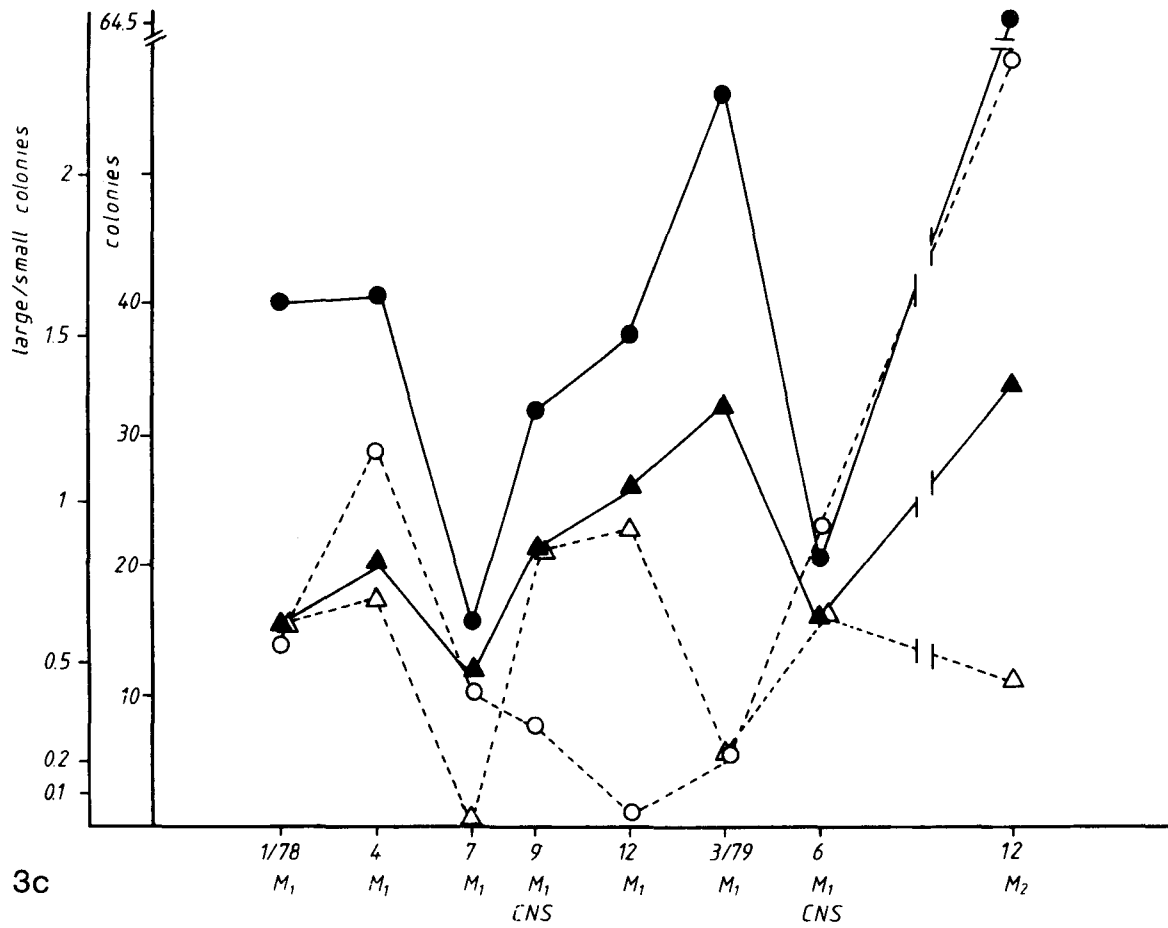


Fig. 3a-d. Follow up studies of patients with childhood ALL; **a,b,c** in therapy; **d** without therapy. M_1 , remission; M_2 , partial remission; M_3 , relapse.

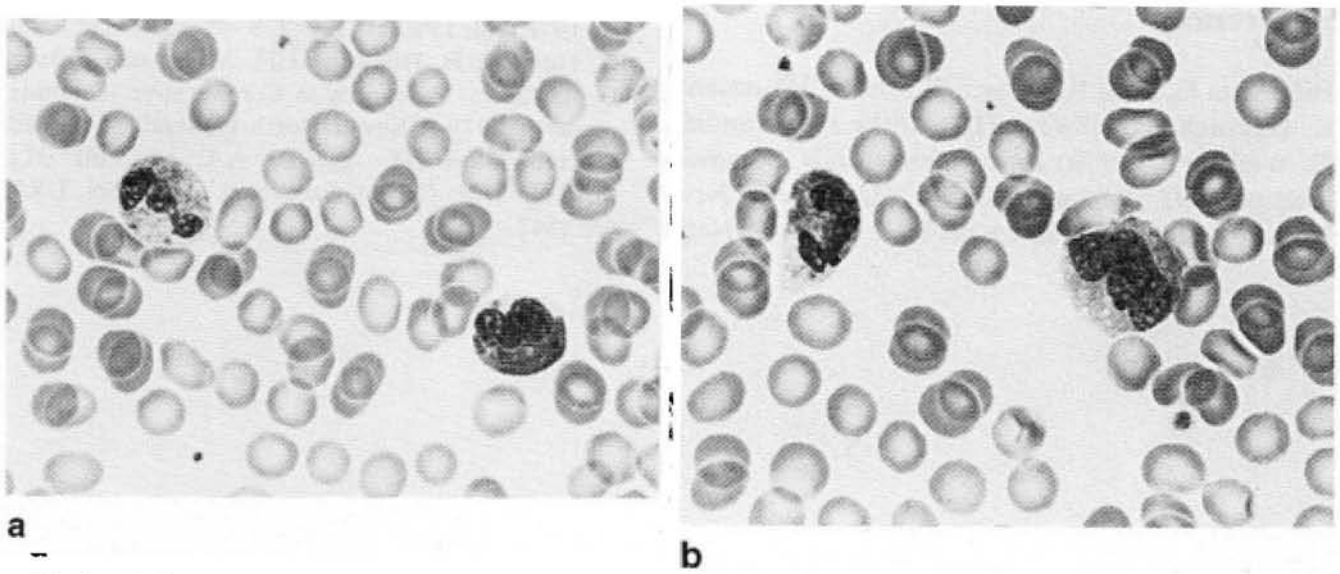


Fig. 4. *a* Left peroxydase negative granulocyte, *right* peroxydase positive granulocyte, *b* *Left* weak peroxydase positive granulocyte, *right* peroxydase negative monocyte

<i>normal persons</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
100	100	99	97	97	100	99
100	99	96	96	97	99	95
99	97	95	92	94	95	94
98	96	89	91	93	92	89
97	94	88	90	88	90	88
97	93	85	88	87	90	85
96	92	84	88	76	88	84
95	89	82	85	76	85	80
95	87	75	80	75	80	79
91	85	70	77	74	70	68
90	83	66	72	73		31
89	80	64	69	47		0
88	74	36	51	43		
59	70		49	26		
\bar{X} 92	82	79	80	75	89	74

Fig. 5. % Peroxydase positive peripheral granulocytes in patients with melanom in DTIC-therapy

<i>months after therapy</i>	<i>% peroxydase pos. colonies</i>	<i>% peroxydase pos. peripheral granulocytes</i>
14	100	58
28	97	16
31	97	70
12	96	31
5	94	62
4.6	90	92
4.5	88	76
27	86	83
20	79	93
30	6	1

Fig. 6. Peroxydase positive colonies in plasma clot cultures and peroxydase positive peripheral granulocytes in patients with childhood leukemia (ALL) in long time remission

References

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