

exists in the germfree animal. Another possibility is that the axenic animal provides an environment conducive to augmented activity of the ESF. This could occur if the level of circulating erythropoiesis-inhibiting factor^{7, 8} was lower in the germfree animal. Finally, it is conceivable that a decreased rate of hormone destruction occurs in the axenic mouse. In this regard, the liver has been implicated as a site of inactivation of the ESF^{9, 10}. The finding that the liver is less developed, both morphologically and functionally, in germfree than in conventional animals^{11, 12} supports the possibility that a diminished rate of destruction of ESF occurs in the axenic animal. This could be tested by determining the sojourn time of exogenous and endogenously-produced ESF in the circulation of germfree animals¹³.

Zusammenfassung. Unsere gegenwärtigen Ergebnisse zeigen, dass keimfreie Mäuse dem Erythropoietin (ESF) gegenüber einen verstärkten erythrocytengerzeugenden Faktor aufweisen als normale Mäuse.

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The Activity of Erythrocyte Glucose-6-phosphate Dehydrogenase as an Indicator of the Rate of Erythropoiesis

The differences of glucose-6-phosphate dehydrogenase activity (G-6-PD) in red cells of different age have been used for the estimation of red cell mean age¹⁻⁴ and for the evaluation of the rate of erythropoiesis³⁻⁵. Nevertheless, direct comparison between erythrocyte G-6-PD activity and the rate of erythropoiesis, investigated by one of the more accurate methods has not been reported, except a preliminary observation on a small number of patients³. In this paper, the correlation between erythrocyte G-6-PD activity and between the rate of erythropoiesis, estimated by the radioiron method is described and compared to that of G-6-PD and reticulocytes.

In a group of 29 subjects with various blood disorders, determination of erythrocyte G-6-PD activity (performed by the method of KORNBERG and HORECKER⁶, with some modifications, described in³), ferrokinetic studies (carried out as given in⁷) and current blood examinations were made at the same time. Results and main clinical data on investigated individuals are summarized in the Table. When erythrocyte G-6-PD activity was plotted against red blood cell iron turnover rate (RBCITR), good, statistically significant correlation in both parameters was found. On the other hand, no correlation was stated between RBCITR and reticulocytes both in absolute or in relative values (Figure). Thus, these results suggest that the determination of red cell G-6-PD activity could provide more accurate information of the rate of erythropoiesis than reticulocyte counts, though approximate information can be obtained by the latter⁸.

One of the most likely explanations of this difference in G-6-PD and reticulocyte sensitivity for an evaluation of erythropoiesis is probably a short period during which young erythrocytes of peripheral blood are present as reticulocytes, being on the average 39 h⁹, while G-6-PD activity decreases gradually during the ageing of red cell¹⁰

and thus better reflects the presence of increased number of young red cells in the peripheral blood. This explanation is also supported by the fact that, in decompensated pernicious anaemia, reticulocytosis after B₁₂ treatment disappears essentially sooner than the elevation of erythrocyte G-6-PD activity, the latter change being more sensitive and demonstrable even at that time, when other current hematological features of erythropoietic stimulation disappear^{3, 11}.

Nevertheless, the above given conclusions on the rate of erythropoiesis, based on erythrocyte G-6-PD determination, can be made only in subjects having normal pituitary and thyroid function, or not being treated by larger doses of corticoids, since all these conditions have

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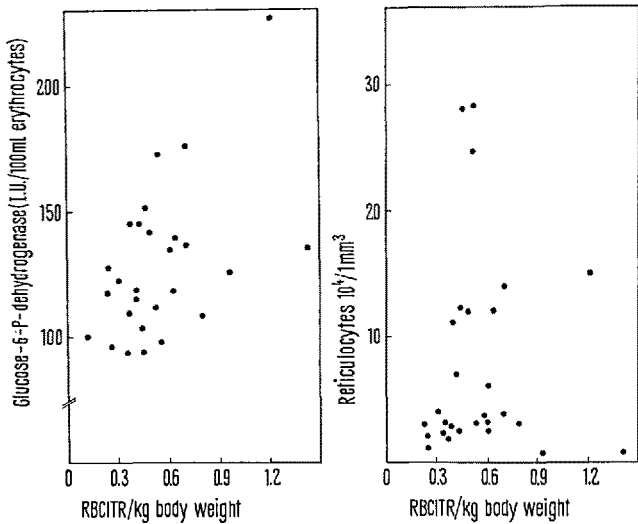
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Clinical and laboratory data on subjects, in which correlation between red blood cell iron turnover rate (RBCITR), erythrocyte glucose-6-phosphate dehydrogenase (G-6-PD) activity and reticulocyte values was investigated

Diagnosis	Hematocrit	Reticulocytes % of red cells	Reticulocytes absolute values/mm ³ in 10 ³	G-6-PD I.U./100 ml red cells	RBCITR/24 h/kg body weight
Primary refractory anaemia	35	1.6	63	117	0.60
	23	4.8	121	138	0.62
	19			99	0.09
	19	1.5	32	110	0.52
	30	1.1	40.3	135	0.70
	25	0.9	21	144	0.36
	34			97	0.54
	31.5	0.7	22.2	126	0.23
	33	1.2	34		0.59
Chronic lymphadenosis	28	0.9	29.4	116	0.22
Chronic myelosis	26	0.3	9.2	123	0.95
	27	1.0	30.5	117	0.38
Acute leukemia	24	3.0	71.5	144	0.42
Malignant reticulosis	37	3.1	122	92	0.44
Erythromyelosis	25.5	5.6	152	226	1.20
Myelofibrosis	24	5.0	120	140	0.48
Autoimmune hemolytic anaemia	34.5	6.8	248	172	0.52
Hereditary spherocytosis	29.5	8.4	282	150	0.45
	33	7.6	285		0.51
Sideroblastic anaemia	28.5	0.4	11.4	133	1.40
	21.5	1.7	39		0.50
	32	3.5	112	113	0.40
	24.5	1.0	27	133	0.60
	33	0.9	32	107	0.80
	13	1.0	13	95	0.25
	33.5	2.8	140	175	0.67
Healthy subject	40.5	0.6	26	102	0.43
	41.5	0.5	24	93	0.35
	39	0.7	31	109	0.37
Normal values				96 ± 10	0.3 ± 0.04



Left: correlation between red blood cell iron turnover rate (RBCITR) and erythrocyte glucose-6-phosphate dehydrogenase activity. The correlation was statistically significant ($r = 0.495_8 > r_{0.01} = 0.486_9$; $p < 0.01$). Right: correlation between RBCITR and reticulocytes, expressed in absolute values. No correlation could be proved ($r = 0.024_7 \ll r_{0.05} = 0.380_9$; $p \gg 0.05$). No correlation was present also between RBCITR and reticulocytes, expressed in % of erythro-

recently been shown to influence erythrocyte G-6-PD activity¹²⁻¹⁴.

Zusammenfassung. Bei 29 Patienten mit verschiedenen hämatologischen Affektionen wurde eine positive Korrelation zwischen Glucose-6-phosphatdehydrogenase-Aktivität der Erythrozyten und dem Erythrozyten-Eisenumsatz gefunden.

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cytes ($r = 0.033_8 \ll r_{0.05} = 0.380_9$; $p \gg 0.05$). Abbreviations: r , correlation coefficient; $r_{0.01}$, critical value of r for $p = 0.01$; p , statistical significance. Calculations were carried out as described in ¹⁵.