Study on the Influence of Splenectomy on the Blood Picture in Mice

(Preliminary Report)

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In the present investigation an attempt has been made to observe the influence of splenectomy on leukocytes in the peripheral blood in healthy adult mice. The blood pictures of the mice before and after splenectomy were compared. Twenty-four hours, a week, two weeks, one month, and two months after splenectomy, blood was taken from the tail and smear preparations were made respectively. Of these, the blood films which were made twenty-four hours and two months after splenectomy were observed, and a differential count of leukocytes was carried out. The results of the blood films made in the other stages after splenectomy will be reported later. These experiments were conducted during July 15 to September 15.

As shown in Tables 1 and 2, it was found by the present experiment that, in all the cases examined, relative decrease of neutrophil leukocytes and relative increase of eosinophil leukocytes occurred two months after splenectomy. It is of interest that neutrophil leukocytes indicated a different reactivity to splenectomy from eosinophil leukocytes in the present experiment. However, it should be noted that the predominant leukocyte in the peripheral blood did not change before and after splenectomy. In other words, the small lymphocytes appeared in the blood in the highest incidence (42.5—62.9% before splenectomy, and 45.7—71.2% two months after splenectomy) in all the cases examined.

As regards the changes in blood picture found twenty-four hours after splenectomy, a definite conclusion could not be drawn here although relative decrease of both the neutrophil leukocyte and eosinophil leukocyte was proved in many cases. Sexual difference could not be recognized in the present experimental results. Basophil leukocytes comparable with the basophil leukocytes of human blood,

Table 1. Splenectomized mice.

	Case No. 1 ♂			Case No. 5 ♂		
	Before splenectomy	24 hrs after splenectomy	2 months after splenectomy	Before splenectomy	24 hrs after splenectomy	2 months after splenectomy
Neutrophils	21.3%	25.7%	15.5%	39.1%	32.7%	15.9%
Small lymphocytes	58.7%	55.0%	45.7%	42.5%	51.8%	71.2%
Large lymphocytes	13.3%	14.1%	12.3%	11.7%	12.2%	8.1%
Monocytes	4.0%	4.3%	12.6%	5.6%	2.9%	3.3%
Eosinophils	2.7%	0.9%	5.3%	1.1%	0.4%	1.5%
Basophils	0 %	0 %	0 %	0 %	0 %	0 %

Table 2. Splenectomized mice.

	Case No. 6 ♀			Case No. 10 ♀		
	Before splenectomy	24 hrs after splenectomy	2 months after splenectomy	Before splenectomy	24 hrs after splenectomy	2 months after splenectomy
Neutrophils	30.0%	18.8%	20.1%	27.1%	21.0%	18.6%
Small lymphocytes	47.0%	66.0%	61.2%	62.9%	73.2%	69.5%
Large lymphocytes	15.9%	11.7%	10.9%	7.1%	4.8%	10.4%
Monocytes	5.3%	2.2%	4.6%	2.4%	0.5%	0.4%
Eosinophils	1.8%	1.3%	3.2%	0.5%	0.5%	1.1%
Basophils	0 %	0 %	0 %	0 %	0 %	0 %

were never found in the peripheral blood examined before and after splenectomy.

As a control, blood films of the healthy adult mice whose spleens were not removed, were examined in parallel with the splenectomized group. In this control no significant seasonable changes in blood picture could be detected as demonstrated in Table 3.

It is reported that, in urodele blood, both plasma cells and Russell body cells newly appeared, and that pigmented leukocytes increased from 1 to 30 per cent after splenectomy (2). It is also reported that, in anuran and urodele blood, basophil leukocytes decreased in number after splenectomy (1). Further, it has been clinically well known that, in man, following splenectomy for any cause,

Table 3. Non-splenectomized mice.

	Control No. 1 ♂		Control No. 6 ♀		Control No. 7 ♂	
	mid July 1964	2 months after	mid July 1964	2 months after	mid July 1964	2 months after
Neutrophils	43.6%	38.6%	16.5%	17.6%	26.4%	36.9%
Small lymphocytes	39.0%	42.3%	61.9%	70.1%	54.3%	45.2%
Large lymphocytes	12.2%	11.4%	17.1%	9.1%	9.5%	12.5%
Monocytes	3.2%	5.7%	3.2%	2.7%	4.4%	2.7%
Eosinophils	2.0%	2.0%	1.3%	0.5%	5.4%	2.7%
Basophils	0 %	0 %	0 %	0 %	0 %	0 %

eosinophilia together with lymphocytosis often replaces the earlier neutrophilia, suggesting that normal spleen inhibits the liberation of cells from the bone marrow, in other words, it exercises some control over the bone marrow (3).

Evidence was thus presented that, the spleen exerts an essential influence upon the component of leukocytes in the peripheral blood although the detailed results are varied according to animal species.

References

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