

Hematological Effects of Lathyrism¹

In connection with other experiments on lathyrism we noticed a high hemoglobin level in the blood. Since the synthesis of collagen (especially of hydroxyproline) is decreased and the relative concentrations of serum proteins reversed², a hematological study on the cell maturation and hemoglobin synthesis seemed warranted with reference to the unknown way of action of the toxic agent (β -aminopropionitrile). In the literature we found only a passing note on the polycythemia in lathyrism³. The rats were kept for 2 months on a diet containing 56.0% of sweet pea⁴. Hemoglobin was determined with the photometer at 5500 Å after dilution 1:200 with 0.1% sodium carbonate. The white and red cells were counted by standard methods in Buerker's chamber. The bone marrow was studied from smears (stained with May-Gruenwald-Giemsa-solution) obtained from the thighbones. Usually one thousand (in few samples 500) cells were counted.

From the marrow following comparison was obtained.

Table II

	Lathyrus-group	Control-group
	%	%
No. of animals	4	7
Proerythroblasts	1.0	—
Erythroblasts	12.5	7.0
Normoblasts	45.0	42.7
Erythropoiesis: total . . .	58.5	49.7
Myeloblasts	—	0.3
Promyelocytes	0.4	1.8
Myelocytes	14.4	15.6
Matured neutrophils . . .	12.6	15.1
Eosinophils	4.1	7.3
Lymphocytes	6.9	7.1

To conclude, β -aminopropionitrile seems not to affect the division or maturation of the cells nor the synthesis of hemoglobin. This is in agreement with the histological findings on the connective tissue. These symptoms seem to be due to a chronic nitrile intoxication and not directly connected with the characteristic symptoms of lathyrism, which depend on an available amino group⁵.

¹ This work forms a part of a program which has been aided by Sigrid Juselius' Stiftelse. The help is gratefully acknowledged.
² Unpublished experiments.
³ B. J. GEIGER, H. STEENBOCK, and H. T. PARSAN, J. Nutr. 6, 427 (1933).
⁴ The animals and diet are described in L. KALLIOMÄKI, MAIJA YLI-POHJA, and E. KULONEN, Exper. 13, 495, footnote 2 (1957).
⁵ T. E. BACHHUBER, J. J. LALICH, D. M. ANGEVINE, E. D. SCHILLING, and F. M. STRONG, Proc. Soc. exp. Biol. Med. 89, 294 (1955).

If the β -aminopropionitrile would compete with β -alanine, symptoms of pantothenic acid deficiency, including anemia, were to be expected⁶.

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Zusammenfassung

Bei experimentellem Lathyrismus wurde eine deutliche Vermehrung von Erythrozytenproliferation und Hämoglobinsynthese beobachtet. Hämo-leukozyten und Myelopoese im Knochenmark wurden nicht beeinflusst.

⁶ Anemia is found in human lathyrism, which seems to be a different condition, C. GOPALAN, Trans. R. Soc. trop. Med. Hyg. 44, 333 (1950).

5-Hydroxytryptamine in Mammalian
Thyroid Gland¹

Thyroid glands of rats, sheep, rabbits, and dogs were examined for 5-hydroxytryptamine (5-HT). Considering the great quantities of 5-HT present in gastrointestinal mucosa², it is not surprising that high concentrations of 5-HT were found in mammalian thyroid glands, which phylogenetically are derived from the pharyngeal epithelium. Surprisingly, however, there are great differences between the 5-HT content of the thyroids of different species.

The tissues were extracted with 90% v/v acetone; otherwise the procedure suggested by AMIN *et al.*³ was followed. The glands were taken from rats and rabbits killed by a blow on the head and from dogs bled to death under ether anesthesia. The sheep thyroids were obtained from the slaughterhouse, where they were immediately put on dry ice. In most cases the cut tissues were left in acetone for a few days at -15°C, and the rest of the extraction was done just before the assay. 5-HT was assayed biologically by using the isolated heart of *Venus mercenaria* in natural sea water with 6 mg/l of benzoquinonium chloride (generously supplied by Sterling Winthrop Research Institute).

¹ This work was supported by a grant from the U.S. Public Health Service (H-2205).
² V. ERSFAMER, Pharmacol. Rev. 6, 425 (1954).
³ A. H. AMIN, T. B. B. CRAWFORD, and J. H. GADDUM, J. Physiol. 126, 596 (1954).

Table I

	Hemoglobin g%		Erythrocytes mill./mm ³		Mean hemoglobin	Leukocytes in mm ³
	Mean	Range	Mean	Range	Mean	Mean
Lathyrus-group (8) . . .	14.5	(13.1–16.4)	7.44	(6.60–8.01)	19.5	8690
Control-group (8) . . .	12.9	(12.4–14.1)	6.25	(5.73–6.77)	20.7	8860
P of chance occurrence of the difference . . .	< 0.01		< 0.001		> 0.10	—

The differentiation of the leukocytes was similar in both groups.