1. Brain Mason, *Principles of Geochemistry*, Wiley International Edition, 1966.
2. Ermeev, A. N. *et al.*, *Geochem. Expl. Inst. Min. and Met. London*, 1972, p. 183.
3. Golubev, V. S. *et al.*, *Geokhimiya*, 1970 and 1974, pp. 1341 and 1067 (Russian).
4. Kaila, K. L. and Kharechko, G. E., *Seminar on Geodynamics of Himalayan Region*, NGRI, Hyderabad, 1973, p. 207.
5. Goloskokov, V. V. *et al.*, *Pribori i Tekhnika Experimenta*, 1973, **1**, 175 (Russian).
6. King, W., *Geol. Sur. of Ind. Mem.*, 1872, p. 8.
7. Murty, Y. G. K. *et al.*, Workshop on Cuddapah Basin, *Inst. of Ind. Peninsular Geol.*, Hyderabad, 1978, p. 41.
8. Qureshy, M. N. *et al.*, *Proc. Roy. Soc.*, 1968, **304**, 449.
9. Sen, S. N. and Narsimha Rao, C. H., *Symp. on Upper Mantle Project*, GRB and NGRI, Hyderabad, 1967 p. 261.
10. Balakrishna, S. *et al.*, *Geoph. Res. Bull.*, 1972, **10**, 91.

CHANGES IN CERTAIN SPLENIC HYDROLASES DURING TAIL REGENERATION IN THE GEKKONID LIZARD, *HEMIDACTYLUS FLAVIVIRIDIS*

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ABSTRACT

Changes in acid and alkaline phosphatases of spleen during tail regeneration in the gekkonid lizard, *Hemidactylus flaviviridis*, have been evaluated using histochemical techniques. Greater activities of these phosphatases during initial phases of regeneration have been correlated with lymphocytopoietic and cellular proliferative activities of the spleen.

INTRODUCTION

SPLEEN has been considered of prime importance as the seat of immune responses in animals. It represents the greatest concentration of reticuloendothelial cells per unit volume of tissue in the animal body[1]. Observations on certain histomorphological changes in the spleen during the initial phases of tail regeneration in the lizard, *Hemidactylus flaviviridis*, have highlighted splenomegaly[2]. Non-specific phosphatases like acid and alkaline phosphatases have long been implicated in divergent cellular activities such as functional differentiation[3] and phagocytosis[1, 4, 5]. As the process of tail regeneration manifests events like wound healing and cellular proliferation, involvement of these lysosomal hydrolases appears imperative. Current paper examines involvement of acid and alkaline phosphatases in changes occurring in spleen during the process of tail regeneration in the gekkonid lizard, *H. flaviviridis*, utilizing histochemical techniques of evaluation.

MATERIAL AND METHOD

For histochemical demonstration of acid and alkaline phosphatases, spleens were removed from normal lizards (with intact original tail) and from those at various stages of tail regeneration, and fixed on a cryostat microtome chuck maintained at – 20° C. Fresh frozen sections of 12 to 18 μ thickness were cut and fixed in cold acetone. The sections were washed thoroughly in several changes of distilled water. Azo-dye coupling methods were employed[6]. Suitable controls were run in media devoid of respective substrates.

OBSERVATIONS

In the spleen of normal lizards, alkaline phosphatase activity was more than that of acid phosphatase (Table I). Both these enzymes were detected

TABLE I

Acid and alkaline phosphatase activities in spleen during tail regeneration in the gekkonid lizard, Hemidactylus flaviviridis

	Phases of regeneration				
	Normal tail	Wound healing	Blastema	Differentiation	Full grown regenerate
Acid phosphatase	±	+	++	+	±
Alkaline phosphatase	+	++	±	+	+

Visually graded intensities of hydrolases designated as : ± low, + moderate; ++ high.

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in the white pulp cells only, whereas the red pulp cells were virtually devoid of the enzyme activities. During wound healing phase, there was an increase in the activities of both the phosphatases in the cells of white pulp. Alkaline phosphatase activity declined below the normal level when blastema was formed (Table I). However, at this stage the activity of acid phosphatase remained at a higher level. Nevertheless, during the next phase of tail regeneration, *i.e.*, differentiation, alkaline phosphatase reactivity in the spleen reached its preautotomy level, whereas that of acid phosphatase gradually decreased reaching its preautotomy level when the regenerate reached its full grown state.

Discussion

Activities of both the hydrolytic enzymes were discernible in the cells of white pulp only. An increase in the activity of both these phosphatases in the white pulp during wound healing implies an augmentation of lymphocytopoietic function of the spleen[7]. Alkaline phosphatase which is considered to be an inducible enzyme is known to accumulate in tissues or organs prior to the onset of their functions[3]. The process of wound healing would undoubtedly demand increased turnover of lymphocytes which would result in enhancement of cellular proliferation in the white pulp of the spleen that in turn would be reflected in the increased alkaline and acid phosphatase activities. Phosphatases have been implicated in cellular proliferation[3, 9] and also in phagocytosis[10]. Hence, an increase in reactivities of these two enzymes in the present context could be considered to be aiding the lytic activities occurring at the wound site during early period of regeneration and later the cellular proliferation.

The decline in reactivity of alkaline phosphatase to a subnormal level during blastema phase could be due to the completion of wound healing and reduced involvement of lymphocytes in the ensuing regenerative process. However, an increase in acid phosphatase activity during the same period indicates lytic activities being continued to clear up the cellular debris from the regenerate and the tail stump which are being brought to the spleen.

During the differentiation phase, alkaline phosphatase reached its preautotomy level and remained so thereafter; this points to the normalization of the spleen function. At this stage the histological features of the spleen are also comparable to those observed in the lizards with intact original tail[2].

1. Snodgrass, M. J. and Snook, Th., *Anat. Rec.*, 1971, **170**, 243.
2. Shah, R. V., Kothari, J. S. and Hiradhar, P. K., *J. Anim. Morphol. Physiol.*, 1977, **24** (2) (in press).
3. Moog, F., In *Biochemistry of Animal Development.*, ed. R. Weber, Academic Press, New York, 1965.
4. McWhinnie, J. W. and Sanders, J. W., *Develop. Biol.*, 1966, **14**, 169.
5. Sweeny, L. R. and Shapiro, B. L. *Anat. Rec.*, 1971, **170**, 235.
6. Burstone, M. S., *Enzyme Histochemistry and Its Application in Study of Neoplasms.* Academic Press, New York, 1962.
7. Asnani, M. V., Pilo, B. and Shah, R. V., *J. Anim. Morphol. Physiol.*, 1971, **18**, 188.
8. Olsen, R. L. and Nordquist, R. E., *J. Invest. Derm.*, 1966, **46**, 431.
9. Shah, R. V. and Menon, G. K., *J. Anim. Morphol. Physiol.*, 1974, **21**, 8.
10. Fry, A. E., Leius, V. K., Bacher, B. E. and Kalicnbach, J. C., *Gen. Comp. Endocrinol.*, 1973, **21**, 16.

PEYER'S PATCHES IN SOME INDIAN BATS

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Abstract

The Peyer's patches in twelve Indian species of bats having different feeding habits were studied. In general, the Peyer's patches are more in number in the frugivorous species than in the insectivorous ones. The Peyer's patches are absent in *Rhinopoma kinneari* and *Megaderma lyra lyra* which, however, have a well developed caecum. It is suggested that the degree of development of the Peyer's patches is dependant on the bacterial content of the diet since the Peyer's patches are aggregations of lymph nodules.

THE ileum of mammals is characterised by the presence of patches of lymphoid tissue—the Peyer's patches. It is well known that the lymphoid tissue plays an important role as a defence mechanism against bacterial infection, and its occurrence at several points along the alimentary canal is evidently meant to ensure the elimination of all unwanted bacteria from the gut. Hence, the Peyer's patches are a part