GENERAL CONSIDERATIONS

Extensive hormonal regulatory interplays are operative in day to day activities of an adult organism and metabolic interactions are considerably influenced by endocrine secretions. With these facts in view the current study was designed and experimental protocols were executed.

A regenerating system, such as the lizard's tail, offers an unparallel opportunity to evaluate the extent of influence exerted by systemic factors on the morphogenetic and metabolic interactions in an adult organism.

Comprehension of the morphogenetic alterations accompanied by metabolic interactions during lizard tail regeneration has largely stemmed from earlier investigations spanning over a decade and a half (Shah and Hiradhar, 1978). Several factors, both intrinsic as well as extrinsic, would obviously be expected to exercise their influence in triggering, maintaining and culminating the developmental events that are so characteristic of a regenerating system.

One cannot help but bring out comparison with the amphibian regeneration as it has been a more experimented upon system than the lizard tail. The inherent advantage in this respect is two fold in that similarities and/or dissimilarities between these two regenerating systems could be envisaged and the specific characteristics of either of the system be revealed.

An attempt has been made not to lose sight of the functional restoration that is attendent to the morphologic one while discussing the biochemical parameters that have been studied following hypophysectomy.

The hypophysial hormones through their wellknown influence on the organs and tissues either directly or indirectly (through other endocrines and/or organs) have been a subject of much investigation and discussion.

A disturbance observed in the morphogenetic events of the lizard tail regeneration following hypophysectomy amounting to extension of the initial phases of the process, and defective differentiation of several regenerate tissues leading to retarded growth called forth an examination of causative factors in terms of metabolic profile of the regenerate.

With induction and progress of tail regeneration in lizards, fluctuations in carbohydrate metabolism in local and distant tissues have been reported (Shah and Hiradhar, 1978; Shah et al., 1977a,b). With a view to evaluate the involvement of hypophysial hormones in carbohydrate metabolism during lizard tail regeneration relevant parameters have been currently examined in the hypophysectomized animals. Normal progress of tail regeneration depends heavily on these metabolites. In hypophysectomized lizards inadequate supplies of carbohydrates, the principal energy yielders of adult organisms, were obvious from the values of the regenerate, hepatic and muscle glycogen, and circulating levels of blood glucose. This could be perhaps due to either an effect on the carbohydrate synthesis machinery and/or an effect on the capacity of the reacting system (the regenerate) to utilize the available metabolites to its advantage. The quantitative levels of lactate dehydrogenase (LDH) activity have also manifested similar fluctuations which underscore the deranged metabolic mechanisms concerning carbohydrates and consequent morphogenetic disturbance in the regenerate.

Non-specific phosphatases, functional in acid and alkaline environments and significant for their multifarious functions, have also been examined. Major disturbance caused during the crucial wound healing and blastemal phases in the hypophysectomized lizards could be attributed to altered environmental conditions with consequent greater prevalence of alkaline phosphatases. It may be recalled that cellular events following tail autotomy heavily depend upon optium concentrations of acid phosphatase (Shah and Chakko, 1966). Nevertheless, possibility of existence of several isoenzymes of the phosphatase in question cannot be overruled. Continuance of regeneration in spite of lack of hypophysial hormone/s could be attributed to persistent activities of certain isoenzymes while others are affected in the circumstances. This would obviously demand further evidence in termsof examination of isoenzyme species during early phases of regeneration in the hypophysectomized lizards.

Stricking exception to lowered quantitative levels of various metabolites following hypophysectomy were those of ascorbic acid (AA). This vitamin is well-known for its broad spectral involvement in normal development, general repair and regeneration in organisms with respect to

structural and metabolic activities. Maintenance of consistently high levels of AA, though apparently enigmatic, could be explained at this juncture as either due to stress induced reactions triggered off in the body and/or due to poor power for utilization of the vitamin by cells in question following hypophysis ablation.

A slight deviation from the main stream of current investigations is the quantitative evaluation of free amino acids during normal course of lacertilian tail regeneration. This was done with a view to get a preliminary report on these important building blocks of proteins which would predictably be reorganized and/or resynthesized during tail regeneration. Presence of seventeen free amino acids in the normal tail and fluctuations in their levels during different phases of tail regeneration have been detected. Preponderance of some of these amino acids and lower values of others during different phases of tail regeneration, have been correlated in terms of their utilization for synthesis of proteins, mucopolysaccharides and other macromolecules characteristic of the metabolic and morphogenetic activities of the specific phase.