

**Research Article** 

# Electro bio regulation of selective biochemical parameters during denervation muscle atrophy

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ABSTRACT : The activity levels of protein fractions, free amino acids and total body weight in gastrocnemius muscle, brain and liver of Toad bufo-melanostictus were studied which was sciatectomized and kept for 3, 5 days to access the induced protein damage due to disuse gastrocnemius muscle atrophy. The results indicated a steady decrease in protein content with a concomitant increase in free amino acids in denervated muscle. The denervated muscle was subjected to a programme of in vivo electrical stimulations, revealed an elevated protein content during Cathode polarity treatment than Anodal polarity treatment. The results suggest that the effect of in Vivo electrical stimulation could prevent the protein damage in gastrocnemius muscle during denervation.

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#### **INTRODUCTION**

Muscle fibers can exhibit denervation like phenomena in response to several factors such as diminished activity, specific and non specific external influences as well as absence of neurotrophic factors. The neural innervation of muscles appear to constitute an interrelated system between nerve and muscles in which neurotrophic factors act as communicating signals in both directions i.e., in the direction of muscles and Vice versa.<sup>1-3</sup> Direct stimulation of muscles after nerve transition is able to prevent or reverse the denervation effects<sup>4,5</sup>. The whole animal weight change has functional relevance in terms of biometric and physiological events. The variation in the weight of tissue will invariably upset the whole animal metabolism. The organ weight mostly comprises of water, proteins and amino acids. To know whether the changes resulting from denervation atrophy are localized to muscle alone or spread to other tissues, the effect of denervation atrophy and electropolarity treatment on contralateral muscle also studied using changes in Tissue Somatic Index, protein content and free amino acid levels as the parameters. The supplementation of electro polarity treatment has progressive effect in protein profiles<sup>6,7</sup>. and whether the characteristics induced by polarity treatment will continue or not. Such a study will help in developing an electrotherapy of induction of polarity which could have a significant effect in the muscle under denervation atrophy.

#### **RESEARCH METHODS**

Toads, Bufo-melanostictus weighing around  $30\pm 2$  g were acclimatized to the laboratory conditions. The study was carried out in four groups of animals viz., in denervated animals subjected to electrical stimulation kept for 5 days  $(DS_{5})$  and 3 days  $(DS_{2})$  after sciatectomy and denervated control (DC) batch without stimulations and a control batch (C) were maintained.

### **Experimental protocol:**

Toads were divided into following four groups of 10 animals each :

Group I :Control (C) (Fig. 1)

Group II: Denervated animals kept for 5 days (DC). (Fig.2)

Group III :Denervated animals given electrical stimulations (3 days) DS<sub>2</sub> both Cathode and Anode polarity.

Group IV :Denervated animals given electrical stimulations (5days) DS<sub>5</sub> both Cathode and Anodal polarity The study was carried out to asses the protein levels in the denervation disuse muscle atrophy under the influence of