Pharmacokinetics of Cryptelytrops purpureomaculatus (mangrove pit viper) venom following intravenous and intramuscular injections in rabbits

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http://dx.doi.org/10.1016/j.intimp.2013.10.007

1. Introduction

Snake envenomation is a serious public health problem in tropical and subtropical regions of the world [1,2]. Cryptelytrops purpureomaculatus (the mangrove pit viper) is a category 2 medically important pit viper in Southeast Asia [3]. The biochemical and toxicological properties of the venom have been investigated [4–7], but the pathophysiology of its envenomation is yet to be fully elucidated.

It is well established that antivenom is the definitive treatment in snake venom envenomation [3,8]. However, the dosage of antivenom required in the treatment of snake envenomation is still largely empirical. Pharmacokinetic studies of venom antigens in animal models can potentially contribute to a rational antivenom treatment [9–11]. To date, there have been relatively few studies on the pharmacokinetics of snake venoms [9,12–15], in particular for pit viper venoms. There are also few data available for the bioavailability of venoms following intramuscular administration. In this paper, we investigated the pharmacokinetics of C. purpureomaculatus venom following intravenous and intramuscular injections in rabbits, and estimated the bioavailability of the venom injected intramuscularly.

2. Materials and methods

2.1. Venom and reagents

Lyophilized C. purpureomaculatus crude venom was obtained from Latexan (France) with a certificate of origin (Southeast Asia). Goat anti-rabbit IgG-horse radish peroxidase (HRP) was purchased from Bio-Rad Laboratories (USA). All other chemicals and reagents utilized were of analytical grade and purchased from Sigma-Aldrich (St. Louis, USA).

2.2. Animals

Male New Zealand white rabbits (1.7–2.1 kg) were obtained from Chenur Supplier (Selangor, Malaysia) and housed in the Laboratory Animal Centre of the institution under standard conditions. The animals were handled according to CIOMS guidelines on animal experimentation [16] and were given food and water ad libitum throughout the study. All the experimental protocols involving the use of animal studies were approved by the Animal Care and Use Committee, Faculty of Medicine, University of Malaya PM/03/03/2010/012/FSY(I).

2.3. Production of antibodies against C. purpureomaculatus venom

Rabbits (n = 3, approximately 2 kg) were injected intramuscularly with the venom. Pre-immune serum was collected and used as the control in an enzyme-linked immunosorbent assay (ELISA).