FRACTIONATION OF TARANTULA VENOM

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Only in recent years have papers been published on the composition and properties of tarantula venom, and in these it has been shown that it is not very toxic for warm-blooded animals (LD_{50} 60-65 mg/kg body weight), but acts considerably more strongly on insects [1]. Attention is being turned to the large amount of hyaluronidase in the venom [2]. By analogy with snake and scorpion venoms, the venoms from different species of tarantulas from different living areas apparently differ in composition. The present paper gives the results of an investigation of the composition and properties of the venom of tarantulas caught in Uzbekistan.

The venom was obtained by the stimulation of the oral apparatus of tarantulas, which contains the poison gland, and it was washed off with distilled water and was freeze-dried. The extinction of the venom (1 mg in 3 ml of distilled water) at 280 nm was 0.220, and at 260 nm it was 0.230; these results show the presence in the venom of an unknown cofactor – the nucleotide obtained in a study of the venom of the tarantula Dugesiella hentzi. Calculation from a published nomogram [3] and a formula [4] showed that the amount of protein in the venom was 40-50%, and the same figure was obtained in a determination of the protein content by Lowry's method. Its administration to white mice in doses of about 100 mg/kg body weight caused symptoms of poisoning in them. However, no lethal outcome ensued even after 24 h. This is possibly due to the fact that the venom that we used contained only a small amount of protein and, consequently, of toxins which, as is well known [1], are of protein nature. These results agree with information on the low toxicity of the venoms of other tarantulas for warm-blooded animals [1].

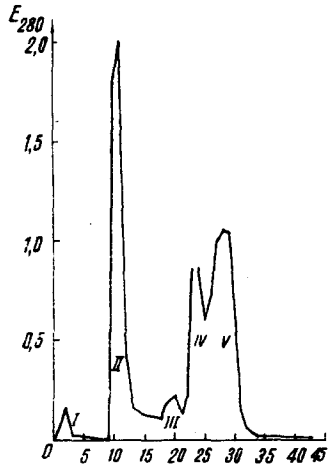

Fig. 1. Distribution curves of tarantula venom on Sephadex G-50: 1) amount of protein from the extinction at 280 nm; I, II, III, IV, V are fractions combined according to the protein "peaks."

By disk electrophoresis [5] in β-alanine buffer (pH 4.5), the tarantula venom was separated into seven components migrating to the cathode and one fraction remaining at the start. When the acid buffer medium was replaced by an alkaline one (tris-HCl, pH 8.3) better separation was achieved; the venom showed 10 fractions migrating to the anode and one at the start. Thus, from the results of electrophoresis the bulk of the venom consists of acid proteins. Similar results have been obtained previously in the electrophoresis of the venom of the tarantula Dugesiella hentzi, in which seven anodic fractions were found in a tris-HCl medium (pH 8.9) [1]. On passage through Sephadex G-50 gel (column 15 × 460 mm, eluent 0.1 M ammonium acetate buffer, pH 8.0), the venom was separated into five fractions (Fig. 1). The bulk of the protein issued in fractions II, IV, and V. On the basis of literature information on the compositions of the venoms of other tarantulas [1], it may be assumed that fraction II contains hyaluronidase and fractions IV and V the toxic agents of the venom.

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