

intravenous route at an advanced stage of tetanus led to the survival of the animals.

From the above results, it definitely appears that vitamin C can be effectively used as a simple prophylactic and therapeutic tool to combat the neurotoxic effects of tetanus toxin. Thanks are due to Prof. S. R. MOITRA for his interest in this work.

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[1] DEY, P. K.: (a) *Naturwissenschaften* 52, 164 (1964); — (b) *Ind. J. Exptl. Biol.* (communicated, 1966). — [2] SHERRINGTON, C. S.: *The Integrative Action of Nervous System*, p. 303, 112. New York: Yale University Press 1906. — [3] BROOKS, B. V., D. R. CURTIS, and J. C. ECCLES: *Nature* 175, 120 (1955). — [4] JUNGBLUT, C. W.: *J. Immunol.* 33, 203 (1937).

Efficacy of Vitamin C in Counteracting Tetanus Toxin Toxicity

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The author has shown [1] that ascorbic acid is most effective as prophylactic and therapeutic agent in nullifying the lethal and convulsive properties of strychnine. He now examined the efficacy of ascorbic acid in counteracting the toxic action of tetanus toxin since SHERRINGTON [2] observed that the effects of strychnine poisoning are similar to those appearing in tetanus toxin toxicity and BROOKS et al. [3] confirmed the findings of SHERRINGTON that the action of tetanus toxin in the spinal cord closely resembles that of strychnine. Also, JUNGBLUT [4] has shown that the toxin is destroyed *in vitro* by vitamin C.

Adult rats were used in all the experiments. Diet, temp. and space allowed for movement were kept uniform. The gastrocnemius muscle was the site used for the intramuscular administration of toxin.

Group 1: 5 rats were given 2MLD (minimum lethal dose) of tetanus toxin. The symptoms of toxicity were then noted. —

Group 2: 5 rats were given simultaneously 2MLD of toxin and 1 gm/kg of vitamin C intraperitoneally. Then for subsequent three days, vitamin C (1 gm/kg) was only administered twice daily i. p. — *Group 3:* 5 rats were administered ascorbic acid 1 gm/kg twice daily for three days. Then 2MLD of toxin was given, followed again by administration of vitamin C for subsequent three days at the previous dose. — *Group 4:* 5 rats were given 2MLD of toxin. Usually after 16 to 26 hours, local tetanus appeared in the affected leg. When such beginning of symptoms were noted, vitamin C (1 gm/kg) was given i. p. twice daily for 3 days. — *Group 5:* 10 rats were given 2MLD of toxin. After 40 to 47 hours, general tetanic symptoms markedly developed, vitamin C (300 mg) was administered intravenously after anaesthetizing the animal with Na-thiopental.

Results: Group 1: Following tetanus toxin, local tetanus appeared in 16 to 26 hours. The affected leg was in fixed position and toes were extended. Within 27 to 39 hours, the tail, extremity and hip deviated to the injection side. Both extremities assumed a parallel extended position. In 40 to 47 hours, spasticity of the abdominal and thoracic musculature and flexor muscles of the spine and neck was seen. Tachycardia, dyspnoea, and convulsions were observed. Death followed in 47 to 65 hours. — *Group 2:* All the animals survived. Only very mild local tetanus were seen at the affected leg after 18 hours. — *Group 3:* All the animals survived. No symptoms of toxicity appeared. — *Group 4:* When the initial symptoms of local tetanus appeared, administration of vitamin C prevented the further spread of the symptoms and they finally survived. — *Group 5:* Administration of vitamin C through

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