

## A Diagnostic Approach to Sources of Envenomation in Lucan

Lucan's *De Bello Civili*, colloquially known as the *Pharsalia*, is notorious for its tortured syntax and vivid descriptions of graphic violence. One of the most (in)famous episodes occurs in Book IX, in which the poet describes Cato leading his army across the deserts of Roman Libya. In the course of their march, the soldiers encounter a number of deadly serpents that populate this desolate landscape, and they succumb one by one to horrifying, bloody deaths. This interlude (*DBC* IX.587-937) has occupied scholars for decades, and a number of studies have sought to identify the snakes described with specific, real species (Morel 1928; Cazzaniga 1957; Morford 1967, 127; and so forth). While intriguing, a herpetological reading faces a significant obstacle: migration patterns and changes in venom production over time render any studies that reference existing snake species, their habitats, and the responses their venoms produce anachronistic.

In this paper, I propose an alternate approach to scientific analysis of Lucan's snake episode: a reading based on medical diagnoses of envenomation responses. While certainly exaggerated, Lucan's description of each soldier's death can be tied to a genuine bodily response to a specific type of toxin. With guidance from qualified medical doctors (Dr. Robert Negrin, Stanford Hematology; Drs. Patricia Schirmer and Zachary Dubit, practicing internists), I provide a diagnosis and associated pathophysiology for each victim. Using this evidence, I argue that Lucan's systematic treatment of different types of envenomations suggests that the sources on which Lucan bases his vivid descriptions of these deaths are primarily medical rather than herpetological.

While Nicander's *Theriaca* – often touted as one of Lucan's sources (Cazzaniga 1957, among others) – offers some envenomation descriptions, the level of detail on the medical side is less robust than what Lucan presents. Snake venoms can act on the body in a number of different ways: the bite itself can cause trauma, neurotoxins can inhibit the function of the nervous system, cyto- and myotoxins can cause physical damage to cells and muscle tissue, and hemotoxins can

interfere with blood clotting. Typically, the venoms of the deadlier snakes include multiple types of toxin — the better to incapacitate their victims (Ferraz et al., 2019).

The response that a bite can produce in a human being depends on the type and potency of the toxins involved, but Lucan's descriptions correspond to every major category of envenomation response documented subsequent to snakebite: Aulus, the first victim, exhibits an anticholinergic reaction indicating a neurotoxic venom (Migirov and Datta, 2021); Sabellus, when bitten by the *seps*, displays tissue degradation consistent with cyto- and myotoxins and excessive hemorrhage likely caused by a consumption coagulopathy (Maduwage and Ibister, 2014); Nasidius, next to fall, suffers the sort of exaggerated edema caused by the consumption of a certain blood protein; Tullus, struck by the aptly named *haemorrhois*, undergoes hemotoxicity that exhausts his clotting factors, leaving the remainder of his blood to flow out of him like water; Laevus falls prey to a fast-acting neurotoxin that desensitizes the initial wound site and paralyzes his body; Paulus suffers physical trauma from the bite itself; and Murrus is tricked by a venom-spitting mechanism, leading him to amputate his own arm.

Each of these deaths constitutes a poetic exaggeration of a very real bodily response to attack by a snake. As this paper will demonstrate through detailed reading of each case, the symptoms correspond with discrete toxins that are now recognized individually by medical and scientific communities. Further, all of the key categories of envenomation (venoms acting on blood, the nervous system, and muscle tissue) are represented. To provide such a realistic foundation for this section of his epic, Lucan must have had access to reference texts not only about the snakes mentioned but also about envenomation pathophysiologies and their medical treatments. As readers of *De Bello Civili*, recognizing the medical detail behind Lucan's writing should prompt us to reflect an elevated degree of technical accuracy in our translations and to give Lucan additional credit as a conscientious researcher and author.

## Works Cited

- Cazzaniga, I. 1957. "L'episodio dei serpi libici in Lucano e la tradizione dei 'Theriaka' Nicandrei." *Acme* 10, 27-42.
- Ferraz, C. R., A. Arrahman, C. Xie, N. R. Casewell, R. J. Lewis, J. Kool, and F. C. Cardoso. 2019. "Multifunctional Toxins in Snake Venoms and Therapeutic Implications: From Pain to Hemorrhage and Necrosis." *Front. Ecol. Evol* 7: 218.
- Maduwage, K. and G. K. Ibister. 2014. "Current Treatment for Venom-Induced Consumption Coagulopathy Resulting from Snakebite." *PLoS Neglected Tropical Diseases* VIII.10 e3220.
- Migirov, A. and A. R. Datta. 2021. "Physiology: Anticholinergic Reaction." StatPearls, via NCBI online. Treasure Island, FL: StatPearls Publishing.
- Morel. W. 1928. "Iologica." *Philologus* 83, 345-389.
- Morford, M. P. O. 1967. "The Purpose of Lucan's Ninth Book." *Latomus* 26 (1), 123-129.