

# The Death of Germanicus: Disease or Murder?

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## Summary

Julius Caesar Germanicus died on Oct. 10th 19 C.E., in Epidaphne near Antioch of Syria, under mysterious circumstances, after days of unexplained suffering [1, 2, 3], at the age of 33 (uncertain 34), under the reign of Tiberius. He himself invoked poisoning while some historians lean towards a disease. The case, whose circumstances are controversial both from a political and a medical point of view, remains, even today, difficult to explain and represents a real historical enigma.

The author traces the historical circumstances that preceded the premature death of a man, regarded as possible candidate for the throne of Rome Emperor, analyzed the historical sources and carefully considered any disease that might have affected Germanicus, causing his death. Poisons, in use at the time, are also taken in account. All the etiological conditions compatible with the clinical course preceding to Germanicus' death were compared and processed using multivariate analysis test, in order to obtain a reliable estimate of a correlation measure associated with the premature death of the famous Roman aristocrat. According to the test, and to Josephus Flavius' historical record, the author concludes that poisoning was the cause of Germanicus death.

**Keywords:** virus, diseases, Romans, Germanicus, poison, microbiology, sudden death, history

“ferebatur Germanico per ambages, ut mos oraculis, maturum exitum cecinisse.” (Tac. Ann. II, 54.4) [1].

“Rumor had it that, in the cryptic fashion of oracles, it foretold Germanicus early death” [2].

## Introduction

According to historians, Germanicus died suddenly and mysteriously in Epidaphne, near Antioch, on Oct. 10<sup>th</sup> 19 C.E., at the age of 33, under the reign of Tiberius, confiding to his wife Agrippina the suspicion of having been poisoned by Gnaeus Calpurnius *Piso*, the governor of the Province of Syria.

He was appointed to be Emperor, as a natural heir in the line of descent. After his death, following complex dynastic

events, the title was inherited by his son Gaius Julius Caesar Augustus Germanicus, better known by the nickname of Caligula.

The cause of Germanicus' premature death is, still today, counted among the enigmas of history. This article aims to examine, through an unprecedented approach (philological, clinical, and statistical), the sources and the epidemiologically relevant aspects of the story, in order to propose an answer to the question "Was Germanicus' death due to an illness or consequence of a crime?"



### The Historical event

Most historians currently agree on the following reconstruction of the [4-7]. Julius Caesar Germanicus was born with the name of Nero Claudius Drusus, from Drusus major, son of the empress Livia Drusilla, and from Antonia minor, grandson of Augustus. He received the cognomen Germanicus following the successes of his father, commander in Germany between 12 and 9 B.C.E. The Senate decreed, in fact, in 9 B.C.E., after the death of his father, that the latter and his descendants were attributed this surname.

In 18 C.E. the Emperor Tiberius sent Germanicus as proconsul to the East, giving him the imperium proconsulare maius over all the eastern provinces, to solve the numerous stability problems that beset those territories.

During his work, Germanicus soon conflicted with Gnaeus Calpurnius Piso, appointed Governor of Syria by Tiberius at the same time, perhaps to control his work.

In the same period Germanicus undertook a cultural trip to Egypt, against the wishes of Tiberius and, on his way back to Antioch, he learned that while travelling, all his orders had been disregarded by Piso. A dispute ensued between Germanicus and Piso and the latter did not fail to complain to Tiberius. In an atmosphere of mutual suspicion and resentment, Germanicus suddenly fell ill, and the conviction was born in him and his wife that he had been poisoned by Piso.

According to the report of the historians cited in this study, Germanicus' last days were spent in an atmosphere of growing horror. In the house where he lived human remains were found, buried under the floor, and lead sheets engraved with the name of Germanicus along with various curses: they were tabellae defixionis with which it was believed to be able to consecrate the soul of the victim to the gods of afterlife. It was also said that Piso sent people every day to spy on the worsening conditions of Germanicus.

Germanicus was worried, prey to anger and fear for the fate that could befall his wife Agrippina and their six children, in the unfortunate event of his death. He then wrote a very harsh letter to Piso, with which he also ordered him to leave Syria, dismissing him from any office. Piso did not wait any longer with the statues of Drusus, his natural father, and his mother Antonia on either side.

and sailed slowly in the direction of Rome, ready to return if he had news of Germanicus' death.

Feeling his strength failing, Germanicus summoned his closest friends and expressed all his bitterness, expressly accusing Piso of having used the work of a poisoner named Martina, dear to his wife Munatia Plancina, to eliminate him. Finally, he asked them to avenge him. Friends, touching the hand of the dying man, vowed to lose their life rather than not fulfill the task of revenge. Finally, Germanicus turned to Agrippina and begged her, for her memory and for her six children, to accept the cruel fate that had struck them and to soften the harshness of her character, so that she returned to Rome, with her unbridled ambition, should not offend the sensitivity of the powerful, especially Tiberius. The medical attention was of no avail.

The historian Tacitus reconstructs the conclusion of the drama with the following words:

“Soon after he died, in the deep mourning of the province and of all the neighboring peoples. Foreign peoples and kings grieved, so great were his humanity towards his allies, his meekness towards his enemies, the reverence he inspired in seeing him and in the ‘hearing it, he who, while maintaining the dignified gravity of his high position, was able to escape envy and arrogance.” (Tacitus, *Annales*, II, 72, 2) [1] (transl. by the author. [8]).

The place chosen for the funeral pyre was the Forum of Antioch. Before being set on fire, Germanicus' body was examined. After the funeral, Agrippina left on a ship with her children and her husband's ashes, animated only by revenge intentions.

Many honors were decreed for Germanicus: arches were raised with inscriptions that narrated his deeds, it was established that his name was sung in *Carmen Saliare* and that his ivory portrait was carried at the head of the procession of *circus ludi*. Furthermore, it was decided to erect a cenotaph in Antioch, where he had been cremated, and a mound in Epidaphne, where he had died. Finally, his ashes were buried with full honors in the Mausoleum of Augustus. On the marble arch that was erected for him in the *Circus Flaminius*, the statue of Germanicus on the triumphal chariot was placed. In the trial that was celebrated in Rome in 20 C.E., it was not possible to actually prove the poisoning of Germanicus, but

among the serious charges disputed against Piso there were also the revolt he had raised to recover Syria, after his death of Germanicus, and insubordination. Aware that Tiberius could do nothing to save him, before a sentence was passed, Piso cut his throat with a sword. (Tacitus, *Annales*, III, 15, 3) [1].

## Methods

### Part one: authors and sources

In the first part of this study four classical records of the event are compared. The key paragraphs are examined, coming from the works of any of the four authors trusted as valuable historical source. The analytical philological comparison between the texts of Suetonius, Tacitus, Dio Cassius and Josephus Flavius is performed and any author is historicized in a diachronic and synchronic way.

The four compared versions are as follows:

- Caius Suetonius Tranquillus, *De vita duodecim Caesarium libri VIII*, IV 1, 23, 1. [3].
- Cassius Dio Cocceianus, *Historia romana* - Ἱστορία LVII, 18, 6-9. [9].
- Publius Cornelius Tacitus, *Annales*, II 69-73, 3-4. [1].
- Josephus Flavius, *Ἰουδαϊκὴ ἀρκασιολογία*, XVIII, 54. [10].

#### A. Suetonius

**The author.** Gaius Suetonius Tranquillus (69/70 - 122 C.E.), Suetonius below, is a scholar, biographer and historian, but also a rhetorician and grammarian. His authority derives from the possibility of easily accessing even confidential sources, as he was Prefect of the Praetorium of the emperor Hadrian, holding the office of secretary for him: procurator a studiis and ab epistulis, or superintendent of the archives and curator of imperial correspondence.

By virtue of his office, he had access to the most important documents of the imperial archives, an opportunity that he probably enjoyed also under Trajan. To the latter he had in fact been recommended by Pliny the Younger, a mutual friend. In his studies and books, he drew inspiration from the models of Antiquaria<sup>1</sup>, through the works of Varrone<sup>2</sup>, delighting in the biographical genre.

The *Lives of the Caesars* [11], the work from which the quoted passage comes, composed between the years 115 and

120, belongs to the period in which the author was employed and well regarded at the court of the emperor Hadrian.

The style, unscrupulous and detached, reviews the documents of the period, revealing even the scandalous and decadent aspects of the Empire in a ruthless way.

**The text.** "(Germanicus)... died in Antioch, at the age of thirty-four, after a long illness, not without suspicion of poisoning (Lat. "non sine **ueneni** suspicione"). In fact, in addition to the stains that covered his body and the drool that escaped from his mouth, the heart, when it was cremated, remained intact in the midst of the bones, and it is believed that it is inherent in the nature of that organ that it cannot be destroyed. from the fire when it is impregnated with poison. Moreover, it was common opinion that his death was due to a criminal scheme by Tiberius, carried out by the hand of Piso ..." [11].

(C. Suetonius Tranquillus, *De vita duodecim Caesarium libri VIII*, IV, 1, 2. Transl. by F Dessi) [3].

**Philological analysis.** tends to exclude the author's contributions that are unrelated to the reality reported in the sources examined. In the marginalized sentence, in brackets "non sine **ueneni** suspicione", the choice of the word in bold - u (v) enenum, i - is not incidental. In all sources (the term, of archaic etymology, comes from *venus*, us & i) it is always used with the meaning of juice or poisonous drink, spell for evil (Apul. Met. 10, 11., Dig., V., Sall. Cat. 11,3. but also in Hor., Cic., Prop.: see **Tab.1**), under deceptive forms and aspects and with the intention of doing harm. The athematic declension of the root from which the word originates, starting from the PIE<sup>3</sup> languages, leads to the Latin verb *volō* -volō, vis, vult, volui, velle- (wish) and to the term *vis*, in turn second person singular of the verb (you wish) but also the noun (strength). [8,12].

#### B. Dio Cassius

**The author.** Cassius Dio Cocceianus of Nicaea (Bithinia), (155 -235 C.E.), became consul under Commodus and, for the second time, under Alexander Severus. He wrote a Roman History from the beginning to 229 C.E., based on republican annalistic tradition, Livy or Livy's sources, imperial annalistic tradition and, for contemporary events, his own experience and authority. He handles his time material with full knowledge.



**The text.** Dio's books 57 and 58 draw at least on one source also known to Suetonius and Tacitus. It could be identified with Servilius Nonianus<sup>4</sup>. For this reason, Dio's narrative shows many points in common with the two authors. However, Dio also makes use of some imperial documentation, accessible only to him. These documents recognize consideration on the very particular nature of the Emperor, who "never had to prove what he really thought" (Roman History, LVII, I, 1-2) [11].

The two passages from Book 57 that interest the present research are quoted below.

"Germanicus, a man of exceptionally handsome physical appearance and excellent moral qualities, was distinguished both by his culture and by his prowess and, although he was violently impetuous against the enemy, he behaved very mildly with his fellow citizens. Although he had, as Caesar, a great deal of power, he kept his ambitions on the same level as the humble people; he never behaved hatefully towards his subordinates, he did not show envy for Drusus nor a blameworthy conduct towards Tiberius." (Cassius Dio, Roman History, LVII, 18, 6-7. Transl. by the author). [8,9].

(Germanicus) "...He died in Antioch, victim of a conspiracy hatched by Piso and Plancina; in fact, when Germanicus was still alive, human bones were found buried in the house where he lived and lead sheets with curses inscribed next to his name. That he had been killed by poisoning was revealed by the condition of his body (ὄτι δὲ καὶ φαρμάκω ἐφθάρη, τὸ σῶμα αὐτοῦ ἐξέφηγεν), which was led into the Forum and exhibited in front of those present." (Cassius Dio, Roman History, LVII, 18, 9. Transl. by the author). [9,13,14].

**Philological analysis.** Annalistic is arranged by Dio to meet requirements of subject matter and commitment. The narration is concentrated on political aspects, giving a rhetorical narrative in Atticist style. In accordance with this stylistic choice and with his ideal model, represented by Thucydides, Dio avoids expressing personal any judgment or comment. The criterion for choosing the truth relies upon identifying the exact trend of tradition. The Greek text of Dio reveals historical facts through the relationship between the author and his sources, composing every contrast or contradiction. The final impression can sometimes be of

suspension of judgment but leaves no doubt: see the bold Greek text quoted above.

### C. Tacitus

**The author.** Publius Cornelius Tacitus (56 -c.120 C.E.), Publius Cornelius Tacitus (56 -c.120 C.E.), is regarded as one of the greatest Roman historians. Tacitus's historical style owes some debt to Sallust. There has been some discussion about Tacitus's "neutrality". He is apparently worried with the balance of power between the Senate and the emperors, and the increasing corruption of the governing classes of Rome as they adjusted to the ever-growing wealth and power of the empire, but definitely cannot help from leaving his own opinion.

**The text.** The version of the historian Tacitus is long and complex. It is taken up here and summarized in the salient passages of his work [1]. We read through them verbatim (in box), reporting the most significant expressions in the original language, or resume and explain them. The incipit refers to the first episode of Germanicus's malaise and, subsequently, develops through the whole story.



LXIX. "...but (Piso) gave up for a moment, due to an illness of Germanicus. How did he know he had recovered ...". This is the mention of the first episode of Germanicus' sudden fall in health "mox adversa Germanici salute", on his way back from the trip to Egypt. However, he then re-establishes in an equally sudden way: "ubi recreatum".

Let us move on still in the words of Tacitus.

"Piso went to Seleucia, waiting to know the outcome of the disease that had struck Germanicus again. The conviction of having been poisoned by Piso increased the gravity of the disease in Germanicus; especially since they had found extracted from the ground and from the parts, remains of human bodies, formulas of invocation and the name of Germanicus carved on lead tablets, bones not yet incinerated and stained with blood, and other spells, with which it is believed to be being able to consecrate souls to the gods of the underworld. At the same time rumors of accusations were spreading against some who were said to have been sent by Piso to spy on the worsening of (Germanicus') health conditions."

LXX. Germanicus is afraid that with his death his wife and children would fall into the hands of his enemies.

"... The effect of the poison seemed slow to the enemies (lenta videri veneficia)." Piso, invited to leave Syria, lingers, as if to be able to return promptly in the event of Germanicus' death.

LXXI. In Tacitus' account, Germanicus appears firmly convinced that he is a victim of poisoning, and aware of the fate that awaits him, not by fate but "by fraudulent intrigues of a woman (muliebri fraude cecidisse)". "... The friends, touching the hand of the dying man, swore that they would rather lose their life than not fulfill the task of revenge."

LXXII. Germanicus recommends the memory and fate of his children and, in secret, confesses to his wife "Tum ad uxorem oravit ... alia secreto" the fear that the emperor himself could be the instigator of the poisoning. "Shortly after he expired (neque multo post extinguitur)." It is important to observe how, in Tacitus' narrative, Germanicus is conscious and able to speak to friends and to his wife: he is not in a coma and this will be taken in account when his cause of death shall be checked through.

LXXIII. "Before being cremated, the body was stripped naked in the forum of Antioch, which had been chosen as the place for the funeral: it does not appear whether (it) revealed signs of poison, the appearance established very little (praetuleritne venefici signa, parum constitit); in fact, according to whether each was more inclined to pity towards Germanicus, and to the presumption of suspicion, or was inclined to favor Piso, (the signs) were interpreted in a different way. " [1].

(P.C. Tacitus, Annales, II, 73, 4. Transl. by the author.) [1,8].

The **Philological analysis** of Tacitus' text is complex, since his work is long and circumstantial. The references to poisoning, to fraud, through female hands, are repeated and conform to Roman mores for this kind of crime. The mention of the spell, practiced through the tabulae defictiones found within the walls of Germanicus' house, fits in coherently with all the historical and narrative context. For the present discussion, the quoted, period still marginalized in parentheses is used: "praetuleritne venefici signa, parum constitit", isolating the term venefici (veneficium, ii). The meaning is poisoning by means of a drink, as in Livy and Pliny; more in Pliny, but also in Cicero, we find that it is a type of filter intended to create spells, to work spells, and is made by female hands, as befits witches, witches and

poisoners by profession [15,16].

#### D. Josephus Flavius

**The text.** In Jewish Archeology, the text of Josephus Flavius, the memory is short and straight, providing a concise record of the story. Due to its linguistic characteristics, it has been wholly reported first in its original polytonic Greek language version.

53. Ἐτελεύτησεν δὲ καὶ ὁ τῆς Κομμαγηνῆς βασιλεὺς Ἀντίοχος, διέστη δὲ τὸ πλῆθος πρὸς τοὺς γνωρίμους καὶ πρεσβέουσιν ἀφ' ἑκατέρου μέρους, οἱ μὲν δυνατοὶ μεταβάλλειν τὸ σχῆμα τῆς πολιτείας εἰς ἐπαρχίαν ἀξιοῦντες, τὸ πλῆθος δὲ βασιλευέσθαι κατὰ τὰ πάτρια. 54. καὶ ψηφίζεται ἡ σύγκλητος Γερμανικὸν πέμπειν διορθώσοντα τὰ κατὰ τὴν ἀνατολὴν πραγματευομένης αὐτῷ τῆς τύχης εὐκαιρίαν τοῦ

θανάτου: καὶ γὰρ γενόμενος κατὰ τὴν ἀνατολὴν καὶ πάντα διορθώσας ἀνῆρέθη φαρμάκῳ ὑπὸ Πείσωνος, καθὼς ἐν ἄλλοις δεδήλωται. [10].

The English translation that follows is taken from the historic work of Beardsley.

**53.** “At this time died Antiochus, the king of Commagene; whereupon the multitude contended with the nobility, and both sent ambassadors to [Rome]; for the men of power were desirous that their form of government might be changed into that of a [Roman] province; as were the multitude desirous to be under kings, as their fathers had been. **54.** So the senate made a decree that Germanicus should be sent to settle the affairs of the East, fortune hereby taking a proper opportunity for depriving him of his life; for when he had been in the East, and settled all affairs there, his life was taken away by the poison which Piso gave him, as hath been related elsewhere.”<sup>5</sup> (Transl. by William Whiston) [17].

**The author.** Flavius Josephus (37/38 - 100 C.E.), (FJ) hereinafter, is an antiquarian, scholar, historian, religious and Jewish philologist, author of works of great importance and fortune in the Flavian era, he wrote above all during the reigns of Vespasian and Titus but began a significant career by virtue of favor enjoyed by Poppaea<sup>6</sup> indifferent to its, during Nero's empire. He mentions the story of Germanicus, as cited above, in an icastic way, in Jewish Antiquities, XVIII, 54 [10].

The general intentions of FJ's work insist on personal and pro-Roman Jewish party accreditation, and in presenting Judaism positively to pagans. FJ is a Pharisee and, as such, adheres to the Jewish law of which, however, he is also an interpreter, in a Hellenistic key, in accordance with his cultural formation. He is syncretistic in reading the texts and their political interpretation. This attitude allows him to show Roman dominion perfectly compatible with the norms and rituals of the Law. The categories and teachings of the Christian message appear indifferent to its analysis<sup>7</sup>.

The Jewish Antiquities -AJ-, in twenty books, completed in the years 93/94 C.E., are conceived on the model of the Roman Antiquities of Dionysius of Halicarnassus [18]. For books I-XIII, the Bible, both in the Greek version of the Septuagint and in the Aramaic and Hebrew languages, represents the chosen source. In books XIV-XVII FJ draws

mainly on Nicolaus of Damascus [19,20], as well as rabbinic sources of the time. In books XVIII-XX the use of Roman sources is certain, including Cluvius Ruphus [22], while the debate remains open regarding numerous other sources, such as edicts and other documents accessible to him thanks to the positions held.

**Philological analysis.** The narration of historical facts in FJ scrupulously adheres to the words: “Do not refrain from speaking at the opportune moment, do not hide your wisdom. In fact, the word recognizes wisdom and education from the sayings of the language. Do not contradict the truth but be ashamed of your ignorance.”<sup>8</sup>. The news, as reported by FJ, therefore has historical authority credited by partially indirect sources, such as the afore mentioned Cluvius Ruphus, but most likely also direct, derived from the imperial archives now unfortunately lost [22]. From the point of view of linguistic analysis, the short text of the Jewish author leaves no doubt: “ἀνῆρέθη φαρμάκῳ” (killed by poison), writes FJ, who is certain to affirm a factual truth and is icastically assertive, admitting and validating previous authors who, however, do not appear explicitly mentioned.

## Methods

### Part two: the nosographic hypothesis

The compatibility was sought between the course and the symptoms reported in the sources and a series of infectious diseases which, for epidemiological reasons, could have been responsible for the morbid condition described by the historical sources: diseases that Germanicus should have contracted during the two months preceding his death, also in relation to the endemic areas visited during his trip to the East and Egypt.

Historical sources agree in reporting two episodes of illness, subsequent and spaced about one month from each other. Germanicus seems to recover after the first attack of illness, while he does not survive the second. To formulate hypotheses regarding the possible cause of the disease, based on the scarce news reported for the period under examination, we draw on infectious disease metagenomics, microbial genetics, paleo-epidemiology and next-generation sequencing [23].

According to the information on the pattern and symptoms



derived from the sources, and from modern nosography, the following diseases were found to be compatible with the case of Germanicus:

Brucellosis, leptospirosis, Q fever, rickettsioses, B19V (human parvovirus B19); HBV (hepatitis B virus), *H. pylori*, (*Helicobacter pylori*), SARS, severe acute respiratory syndrome; *Y. pestis* plague (*Yersinia pestis*), Malaria (*Plasmodium falciparum* malaria) [23-27].

Any conditions manifestly incompatible with the memory in the sources was not taken in account for the analysis.

The condition of poisoning, treated in the next paragraph, was also included in the analysis.

The multiple regressive analysis [28,29] has been performed assuming as Dependent variable the description of the pattern - course and symptoms - of Germanicus illness and death and as independent variables the mentioned set of diseases, settled according to their epidemiology, symptoms and course.

The statistical analysis was performed by SPSS Statistics for Windows package [30].

#### **Veneficium (poisoning) in ancient Rome**

Before examining the results of the analysis, we wish to focus some more on the phenomenon of poisoning in the historical circumstance that was the scene of Germanicus' drama.

The hypothesis that the death of Germanicus is attributable to poisoning, as seen, is raised by many authors. We find it in the narration and in the documents of the trial that was held in Rome and saw Piso as a defendant. Historians have always questioned, at least presumptively, the veracity and validity

of this hypothesis and this still happens today.

Rome represented a culture steeped in superstition, fear and mythology with virtually no scientific means of retrospectively proving or disproving alleged poisoning [15].

The practice of poisoning was widespread in antiquity. It is also not possible to draw a precise boundary between medicine and magic and the substances used in both arts were the same. The administration of poisons for the purpose of crime in ancient Rome had already been regulated in 451 with the Laws of the 12 tables<sup>9</sup> [30]. The rules of this archaic code governed the poisoning of livestock, spells with the aim of injuring, causing disease or death in athletes, spouses and family members, cases of poisoning of offspring by mothers,

and the procurate.

The Roman legislation required an explicit distinction between "good or bad poison, because even medicines can be poisonous." The word "drug", of Greek etymology, in Latin could in fact be expressed in various ways, and juridically the term *venenum bonum* was used in contrast with the expression *venenum malum* [31].

The use of poisoning was carefully considered by Roman jurisprudence. The "Quaestio de sicariis et veneficis" was a permanent court (Quaestio) operating in republican Rome, established with the Lex Cornelia Sullae de sicariis et veneficis, approved by Silla in 81 a.C.E., which dealt with the knowledge and consequent punishment of the crimes of voluntary murder (non-negligent), poisoning.

Annotations relating to the evidence of accusation were also provided for through the post mortem examination of the victim. In the Rethorica ad Herennium [32], by an anonymous author and attributed by some to Cicero [33], we find "It is established that the corpse was disfigured, swollen, and discoloured; therefore, the man was killed by poison."

Cicero [33,34] and Quintilian [35] and again the anonymous one cited above [36] provide methodological rules to be followed during the trials that contemplated the accusation of poisoning through the so-called "ἀντιπαραβολή", or the exclusion by default of another cause of death. "For some things are heinous in themselves, such as parricide, murder, poisoning, but other things have to be made to seem heinous." [36].

In Pliny, (Plinius Secundus, 23 -79 C.E.) we also find a detailed description of various types of plants from which many poisons were extracted, for medicinal, magical or criminal purposes [37]. The Deadly nightshade (*Atropa belladonna*) occupies a prominent place. The symptoms it induces are many, diversified according to the preparations, the dosage, the method of intake, the association with other substances but no one of them is out from the mentioned historical sources [38]. The belladonna occupied a primary place in the ancient recipes of poisoning.

A list of further sources [39], classical and late, Latin or in Greek, which describe customs and events connected to the phenomenon of poisoning in the Roman world is summarized in **Tab.1**.



## Results

The ability to match the information coming from historical sources of the mentioned ten selected diseases, described in Goldman-Cecil Medicine [40], according to their categories of symptoms, was verified by statistical methodology.

Only *Y. pestis* plague and malaria showed a possible association with the clinical manifestations reported in the description of Germanicus' case. However, this association is not significant and is not supported by many clinical and epidemiological factors: the clinical characteristics and the course of the two diseases can hardly be superimposed on the Germanicus illness.

The possibility, however, of a poisoning, perpetrated by administering a toxic substance containing belladonna, strophanthus or ouabain [41], could instead have produced a symptomatology that would be compatible with historical information. The association between poisoning and

disease/death of Germanicus is supported by a high statistical significance ( $P > .001$ ).

The complete results of the statistical analysis are summarized in **Tab. 2**.

In historical sources, the death of Germanicus was preceded by two episodes of malaise. The first apparently passed and the second, about thirty days after the first, was finally fatal. The symptoms that characterized the two episodes were reported by the authors cited above. Toxic substances, available and customary at the time, were considered. The substances that show high compatibility with the narrative are belladonna, strophanthus and ouabain. Cardiac arrest in systole and heart resistance to cremation appear in the toxicology of ouabain [16,42].

The multivariate analysis test result strongly supports the authors and sources claiming the murder as the cause of Germanicus death.

**Tab. 1.** The phenomenon of poisoning in Roman society. Relevant bibliographic references, by author and source, and historical periodicization (abbr: -c, circa; Era Vulgaris, E.V. or CE, Common Era. AEC, Ante Era Vulgaris, Ante Common Era, BCE, Before Common Era).

	Year	Author and source(s)
1	189-c aCE	Plautus, Truculentus 762.
2	130-c aCE	Polybius, The Histories, p 269, Fragments of Book VI121 VI.13.4.
3	66 aCE	Cicero, Pro Cluentio 148.
4	41-c aCE	Horace, Epodes III.8.
5	36-c CE	Seneca, Controversia II.13.13; Porphyrio Horati epistulae I.5.9.
6	118-c CE	Tacitus, Annales II.74; III.7.
7	118-c CE	Tacitus, Annales XII.66.
8	120-c CE	Juvenal, Saturae I.71.
9	120-c CE	Juvenal, Saturae VI.661.
10	121-c CE	Suetonius, Nero 33.
11	160-c CE	Apuleius, Metamorphosis X.11 and 25-26.
12	200-c CE	Plutarch, Demetrius XX.2.
13	220-c CE	Cassius Dio, Roman History Vol. VIII p3 Epitome of Book LXI.
14	533 CE	Digestum, XLVIII.8.3; XLVIII.8.3.2.



**Tab. 2.** Diseases (independent variables) occurrence probability, according to reported symptoms (dependent variable) in Germanicus death: Multiple regression analysis results.

Independent variable (disease)	Coefficient	Std Err	t-ratio	P	R <sup>2</sup>	F-ratio	F p <
brucellosis	1.60	2.03	0.79	.456	.69	7.840	.016
leptospirosis	2.22	1.85	1.19	.270	.72	9.048	.011
Q fever	0.10	3.05	0.11	.990	.66	6.914	.022
rickettsioses	2.00	1.78	1.12	.298	.71	8.796	.012
B19V	1.05	7.39	0.44	.674	.67	7.202	.020
HBV	1.00	1.96	0.51	.626	.68	7.300	.019
H. pylori	2.00	3.26	0.61	.559	.68	7.474	.018
SARS	2.22	1.85	1.19	.270	.64	9.048	.011
Y. pestis plague	4.63	1.68	2.75	.028	.84	18.191	.002
Malaria	2.72	1.85	1.47	.185	.74	10.129	.008
Poisoning	6.95	1.37	5.06	<b>.001</b>	.86	18.199	.002

## Discussion

Unfortunately, there are no longer direct sources, contemporary to the death of Germanicus. This has always been a limitation. The authors considered in this review certainly made use of sources that are now lost [22]. For them, and only for some of them, it is possible to formulate hypotheses.

There is a broad consensus that at least one or two main sources were used by the authors considered. It has also been admitted that each of the authors has chosen or omitted details which he considered more or less important for narrative purposes and for understanding the story. The historical foreground of the authors plays an important interpretative role, considering the peculiar and different political context in which they wrote. The cultural attitude and imperial power towards the memory of a very important episode in the succession of the Giulio Claudia family and the senatorial power certainly conditioned each author in a specific way. However, it is difficult to suppose that the similarities between the different narratives are all attributable to hostile attitudes towards power and the Julius Claudia dynasty.

The examination of the diseases potentially able to cause the death of Germanicus, based on current paleogenetic and epidemiological information, as well as the comparison between the ten morbid conditions and the poisoning, carried out in this study, significantly supports that the latter was the

reason for Germanicus's death. In fact, the only pathologies to show a possible cause-and-effect association were *Y. pestis* plague and malaria. However, it appears extremely difficult to credit them as the possible etiological cause: *Y. pestis* plague is a very contagious condition which would very likely have been transmitted to someone else of the *famuli* and relatives; malaria (*falciparum*) presents a course quite different from the narrative.

In the narrative, the death of Germanicus appears isolated and unexpected.

The news reported by the historians enjoy philological and linguistic credibility and raise legitimate suspicions on the conduct of characters connected to the death of Germanicus: consider, i.e. Piso's attitude and behavior, whatever the historical judgment to be drawn on this controversial figure. Why did he pretend to have walked away, waiting for what event?

Josephus' narrative, in its linear conciseness, is trusted by this paper and believed to provide a version grounded in historical truth, when he relates that "... his (of Germanicus) life was taken away by the poison which Piso gave him, as hath been related elsewhere." [10].

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<sup>1</sup>Antiquaria: A Latin term referring to the art to collect and arrange information, in a systematic way, and applying them to things and ideas. Varro M T is regarded as its main Roman character.

<sup>2</sup> Varro, Marcus Terentius (116-27 a.C.E.) stands as the greatest scholar among the Romans. Varro's writings cover nearly every domain of Roman culture, and his works were (and are) a mine of information for authors and compilers.

<sup>3</sup> PIE: Pre Indo European.

<sup>4</sup> Servilius Nonianus Marcus (uncertain-35 C.E.): for his style see in Quint. Inst. 10.1.102. Tac. Dial. 23.

<sup>5</sup> Flavius Josephus. *The Works of Flavius Josephus*. Translated by William Whiston, A.M. Auburn and Buffalo. John E. Beardsley. 1895. [17].

<sup>6</sup> Poppaea Sabina, by 58 mistress of Nero (Tac. Ann. 13.45; Hist. 1.13). It was allegedly at her instigation Nero murdered Agrippina (year 59) and divorced and executed Octavia (year 62). Nero married Poppaea, who bore a daughter, Claudia in 63. She died pregnant in 65, from a kick which Nero gave her.

<sup>7</sup> Flavius Josephus is "foreign to any experience of the divine. He does not know what prayer, love and fear of God, messianism, sin, faith in the resurrection are. He cannot understand the messianic ferments that fueled the rebellion against Rome: his constant loyalty to Rome is very honest." (A. Momigliano) [22].

<sup>8</sup> Roman Catholic Bible, CEI 2001, Ecclesiastes (Sir) 4, 23-25. [21].

<sup>9</sup> The laws of the XII tables (duodecim tabulae; duodecim tabularum leges) are an old body of laws, compiled in 451-450 BCE by decemviri legibus scribundis, containing rules of private and public law. They represent one of the first written codifications of Roman law, if we consider the most ancient mores and lex regia. The full text is lost.