

## REVIEW

# DIAGORAS OF CYPRUS (3<sup>RD</sup> CENTURY BC) – AN EMINENT OCULIST AND OPPOSER TO THE USE OF OPIUM

Gregory TSOUCALAS<sup>1\*</sup>✉, Konstantinos MARKATOS<sup>2\*</sup>, Maria-Triantafyllia REVELOU<sup>1</sup>, George ANDROUTSOS<sup>3</sup>, Demetrios KORRES<sup>4</sup>, Marianna KARAMANOU<sup>2</sup>

<sup>1</sup> History of Medicine, Department of Anatomy, Medical School, Democritus University of Thrace, Alexandroupolis, Greece

<sup>2</sup> History of Medicine, Medical School, University of Crete, Heraklion, Greece

<sup>3</sup> History of Medicine, Biomedical Research Foundation of the Academy of Athens, Greece

<sup>4</sup> Orthopaedics Department, Medical School, National and Kapodistrian University of Athens, Greece

\* Authors with equal contribution

Received 01 July 2018, Accepted 07 Aug 2018

<https://doi.org/10.31688/ABMU.2018.53.3.22>

## ABSTRACT

The objective of this article is to showcase the use of opium in ancient times, as well as the beliefs surrounding it, focusing on the opinion of Diagoras of Cyprus, a physician with great knowledge of pharmacology who probably practiced ophthalmology, composing a rose-based collyrium. Opium, a drug produced from poppy, used to have several uses such as in anesthesia, pain relief and ritualistic purposes. There is evidence of its creation since before 5000BC. In Greece, the first documentation dates back to around 2600-1100 BC in Crete. Many ancient medico-philosophers used to utilize it in their practice, mentioning it in the majority of the medical texts of that time. However, there were others that disapproved of its use due to the possible side effects. Diagoras was one of them, as he categorized opium as a lethal substance that could cause severe problems to the vision. He may even have thought of the possible addiction that it can cause because of the euphoric state it puts a person in. Some practitioners mentioned Diagoras's opinion on opium, such as Erasistratus and Pliny the Elder. Despite his

## RÉSUMÉ

Diagoras de Chypre (le 3-ème siècle AD) un éminent oculiste et opposant de l'usage de l'opium

L'objectif de cet article est de présenter l'utilisation de l'opium dans l'Antiquité, ainsi que les croyances qui l'entourent, en mettant l'accent sur l'opinion de Diagoras de Chypre, un grand spécialiste de la pharmacologie qui pratiquait probablement l'ophtalmologie composant un collyrium à base de rose. L'opium, un médicament produit à partir de pavot, avait plusieurs usages, notamment en matière d'anesthésie, de soulagement de la douleur et de rituel. Il existe des preuves de sa création avant 5000 avant JC. En Grèce, la première documentation remonte à environ 2600-1100 avant JC en Crète. Beaucoup d'anciens médico-philosophes l'utilisaient dans leur pratique, le mentionnant dans la plupart des textes médicaux de l'époque. Cependant, d'autres ont désapprouvé son utilisation en raison des effets secondaires possibles. Diagoras était l'un d'entre eux, car il classait l'opium parmi les substances mortelles pouvant causer de graves problèmes à la vision. Il

✉ Address for correspondence:

Gregory TSOUCALAS

Address: Ierolochiton str 155, P.C. 38334, Agioi Anargyroi, Volos, Greece

Email: [gregorytsoucalas@yahoo.gr](mailto:gregorytsoucalas@yahoo.gr)

contributions in opium usage and ophthalmology, Diagoras is still unappreciated as a medical figure.

**Keywords:** Diagoras, Cyprus, opium, ophthalmology, pharmacology, history of medicine.

## INTRODUCTION

The use of opium as a drug was a quite common practice in Antiquity. Evidence from ancient Greece indicates that opium was consumed in several ways, like inhalers, poultices and with hemlock for suicide purposes and poppy plants (Fig. 1) were widely cultivated in antiquity. It was known and widely-spread through Sumeria, Assyria, Egypt, India, Greece, Rome, Persia and Arabia where it was used as a useful and effective pain killer to induce anaesthesia before various surgical procedures<sup>1</sup>, sometimes used in combination with Thessaly's endemic plant mandragoras (mandrake)<sup>2</sup>. Opium is mentioned in the most important medical texts of the ancient world, including the Ebers Papyrus and the writings of Dioscorides, Galen, and Avicenna. Practitioners, priests, medico-philosophers, botanologists and rhizotomoi (Greek:

peut même avoir pensé à la dépendance possible qu'il peut causer en raison de l'état euphorique dans lequel il se trouve. Certains pratiquants ont mentionné l'opinion de Diagoras sur l'opium, comme Erasistratus et Pline l'Ancien. Malgré ses contributions à l'utilisation de l'opium et à l'ophtalmologie, Diagoras n'a été pas toujours apprécié comme personnage médical.

**Mots-clés:** Diagoras, Chypre, opium, ophtalmologie, pharmacologie, histoire de la médecine.

ρίζοτόμοι, root collectors) all searched and used the extracts of the opium poppy (Fig. 2)<sup>3</sup>. However, several physicians in antiquity condemned its wide and uncontrollable use due to its side effects and complications<sup>1</sup>. Among them the eminent pharmacologist Diagoras of Cyprus (3<sup>rd</sup> century BC), who understood the pain relieving and euphorigenic properties of the plant. The purpose of this historic review is to summarize the contribution of Diagoras of Cyprus in medicine and pharmacology with a special interest in his views on opium. Moreover, we aim to present opium's side effects known by him and how his views passed to his successors<sup>4</sup>.

## LIFE AND WORK OF DIAGORAS OF CYPRUS

Diagoras of Cyprus lived and flourished in the late 4th to 3<sup>rd</sup> century BC. Nothing is known about



Figure 1. *Papaver somniferum* L, Blackwell plate 482, 1739.



Figure 2. A method of extracting the juice from the opium poppy, *Opiologia*, Sala (Angelus) 1618, Wellcome History of Medicine Library.



**Figure 3.** The island of Cyprus, Map of the Levant, engraved by Jacomo Franco in „The Viaggio“, 1598.

his life except that he lived and practiced medicine in Cyprus (Fig. 3). The ancient Cypriot School of Medicine and Philosophy flourished in the island since the 6<sup>th</sup> century BC. Anatomy was among the main clinical objects of the School, implying a connection with the Alexandrian doctrine, which also had a notorious fame in dissections. Thus, Diagoras, was possibly exposed to the teachings of the Hellenistic school of Medicine of Alexandria in Egypt, where he possibly studied. What is known about Diagoras is derived from fragments of his work, referenced in the work of his successors<sup>3,5-7</sup>. He is considered as a main representative of the School<sup>8</sup> an oculist and commentator of the Hippocratic Collection<sup>9-10</sup>, an anatomist<sup>11</sup> and an expert in the ear diseases<sup>11-12</sup>.

Erotianus (1<sup>st</sup> century AD), in his treatise „Collection of Hippocratic words“, notes that Diagoras wrote for Hippocrates that he called the non-dedicated nerves «περόνια» (=fibullas). He seemed to have acquired a good reputation for his knowledge on medicine and his respectable practice according to the protocols of the era<sup>3,9,13</sup>. Diagoras had a significant contribution in pharmacology, as we may assume from fragments in medical texts of later medico-philosophers. Pliny the Elder (23-79 AD) informs us that according to Diagoras there were three kinds of poppy; the white poppy used to treat elephantiasis, the black poppy used to treat earache and the wild poppy for the treatment of swelling and inflammation. Pliny makes constant references to his work especially concerning his views on the use of black poppy and opium, „Diagoras and Erasistratus

have completely condemned the use of opium as lethal, also forbidding its instillation because it damages vision. Andreas the physician has added that this is why it does not immediately cause blindness because it is adulterated in Alexandria. Later, however, its use has not been condemned in the famous drug called codeine (Greek: διὰ κωδυῶν)<sup>46</sup>.

Erasistratus (304-250 BC), in his writings once more apprises us that Diagoras condemned the use of opium considering it as a lethal substance, claiming also that it was really harmful for the vision<sup>11</sup>. According to Dioscorides Pedanius (40-90 AD) and his masterpiece „Materia Medica“, Diagoras claimed that Erasistratus also condemned the instillation of opium for the treatment of earache and ophthalmic pain, for diminishing of the vision and narcosis, „Excellent is the milky liquid of poppy which is opium, a dense and heavy and odorous drug (...). However, the word says that Erasistratus condemns its use for the treatment of earache and eye pain because it causes vision impairment and narcosis (coma). Andreas also says that, if it were not distorted, it would blind people who use it<sup>412</sup>.

Among the accomplishments of Diagoras of Cyprus stands his manufacture and use in his practice of a very successful collyrium based on extracts of roses. This was finally named after him as „The great rose collyrium of Diagoras“ (Greek: τὸ κολλύριον διάρροδον τὸ Διαγόρου τὸ μέγα). References to its use and production may be found in the work of Oribasius (320-403 AD) and Aetius of Amida (5th-6th century AD), „... rose collyrium (collyrium with basic



**Figure 4.** The sublime Minoan poppy goddess/priestess, cca 1400-1100 BC, discovered near the site of Knossos, Archaeological Museum of Heraklion, Greece, photographed with the licence of the Museum.

component roses) the so-called great one. To cure severe pains, pustules, burns, illnesses, cornea, strokes (fly outward, of the eyes mainly), fiery eyes, old loses, exophthalmos, grimy diseases (Greek: *ρυπαρές*, infection, cataract, inflammation?). Ingredients: Roses without the lobes drachmas (weight) 72; cadmes drachma 24; egg lobe drachmas 3; stima (antimony with sulfur) drachmas 2; copper drachmas 2; Indian weed drachma 1; smyrna drachmas 3; gum drachmas 24; rain water<sup>414-15</sup>.

## DISCUSSION

The use of opium was known since the Neolithic age. Its extraction from poppy dates back before 5000 BC. It was used mainly for recreation, ritual purposes and anaesthesia. The oldest known cultivation of the poppy is estimated in around 3500 BC in Mesopotamia. It was used in ancient Egypt as the Ebers papyrus indicates, with its invention attributed to one of the deities of the Egyptian pantheon, Thoth and its use restricted to religious rituals, or entertainment by priests, magicians and warriors<sup>16-17</sup>.

Its use in Greece dates back in the era of Minoan Crete, its attributes are described in the Hippocratic corpus of medicine<sup>16-17</sup>. Prehistoric archaeological findings unearthed in the island of Crete, testify the widespread use of opium poppy in the Minoan civilization in cult rituals and for therapeutic purposes in the east Mediterranean area, when no written references existed. Poppy capsules ornamenting figurines, bas-reliefs, vases, pins and jewellery seem to imply various symbolic meanings of the plant. Poppy considered as a healing drug, important for fertility, wealth and immortality. The Minoan „Goddess of poppies“ (Figure 4), seem to have been the patronage of healing in the 13th century BC. The Cretan goddess is depicted wearing in her head three hairpins of poppy capsules, indicating that ancient Cretans understood the methods of extracting opium from the poppy capsule<sup>18</sup>. Once again, archaeological findings since the early antiquity in Cyprus island have been interpreted as tools for the harvesting of the poppy and the extraction of opium. Its use passed on to the Roman Empire and to the Islamic world, and its medicinal properties were reintroduced in Western Europe medicine through those sources. The work of Avicenna (980-1037 AD) „Canon of Medicine“, comprises an exemplary detailed account of the pharmaceutical use of opium as well as of its side effects<sup>19</sup>. Later on, opium is mentioned among the herbal drogues in Corpus Hippocraticum on several occasions suggesting that Hippocrates and his followers used it widely<sup>3</sup>.

Diagoras of Cyprus was an eminent physician who surely flourished and practiced in the island of Cyprus. His practice coincides in time and place with a well-known part of the world where the poppy was cultivated and widely used. Cypriot Base-ring juglets were exported all over the eastern Mediterranean in the Late Bronze Age, used for the transportation of the poppy extract (Figure 5). Chronologically, Diagoras is considered as contemporary with Erasistratus and Andreas, circa 4th-3rd century BC, considered as one of the 100 physicians who influenced Pliny the Elder in his work<sup>20</sup>. He was cited by many authors in antiquity, thus considered as an important physician of the Cypriot School of Medicine<sup>3</sup>.

Available fragments of Diagoras' work indicate a deep knowledge of the pharmaceutical use of opium as well as of its side effects. Clinical and pharmaceutical uses of opium had been available and known since much earlier ages, as well as addiction, toxicity and other side effects which had been also thoroughly described by previous authors. Although his complete work did not survive until nowadays, it seems that he was an eminent oculist, as a great collyrium may



**Figure 5.** Cypriot Base-ring juglets for the transportation of opium, Late Bronze Age, BAS Library.

have been only composed by a great ophthalmologist. Blurred vision, dizziness and euphoria after a heavy use of opium may have been the main reason for his strong opposition against opium, considering it as a contributor to ophthalmic diseases. On the other hand, as a conservative philosopher he may have understood the vanity of the provoked euphoria and the dangers of a possible addiction towards a narcotic plant.

## CONCLUSION

Diagoras of Cyprus was an eminent physician, most probably an oculist, of his era and well-respected among his contemporary and future colleagues, who referred to his work and knowledge especially on opium, its application and its side-effects. He flourished and practiced medicine in Cyprus island, coinciding with a rich tradition on the cultivation of the poppy and opium production. He seems to have been an expert on its pharmaceutical use as well as its side effects and was a vigorous opponent to its administration.

## Compliance with Ethics Requirements:

„The authors declare no conflict of interest regarding this article“

„No funding for this study“

## REFERENCES

1. Crocq MA. Historical and cultural aspects of man's relationship with addictive drugs. *Dialogues Clin Neurosci.* 2007;9(4):355-361.
2. Tsoucalas G, Sgantzos M, Androutsos G. Hippocrates, principles on abdominal surgery in ancient Greece during the fifth century bc. *Surg Innov.* 2016;23(2):212-213.
3. Tsoukalas I. History of paediatrics from Homer until today. Skopelos-Thessaloniki, Science Press, 2004.
4. Digital Ancient Cypriot Literature. [www.akg.cyi.ac.cy/en/content/diagoras-cyprus](http://www.akg.cyi.ac.cy/en/content/diagoras-cyprus) [Accessed 20 February 2018].
5. Phokaides PhN. Hellenism of Cyprus. Salisbury, Notios Rodesia, 1962.
6. Plinius S. Medizin und Pharmakologie: Heilmittel aus wild wachsenden Pflanzen: Naturkunde, Naturalis Historia in 37 Bänden. Zurich & Dusseldorf, Walter de Gruyter, 1996.
7. Plinius. The Natural History. London, HG Bohn, 1857.
8. Oribasii. Collectionum Medicarum Reliquiae, vol. 1, libri I-VIII, Corpus Medicorum Graecorum VI. 1,1. Leipzig, Teubner, 1928.
9. Erotianus. Vocum Hippocraticarum Collectio. Lipsiae, Klein, 1865: 108.
10. Anastasiou A, Irmer D. Testimonien zum Corpus Hippocraticum. Gottingen, Vandenhoeck & Ruprecht, 1997.
11. Erasistratus. Testimonia et Fragmenta, Fragment 270 in Herophilus und Erasistratus. Eine historische Parallele. Berlin, Friedrich Heinrich Christian Schwarz, 1826.
12. Pedanius Dioscurides. De Maeria Medica [Περὶ Ὑλῆς Ἰατρικῆς]. Lipsiae, Knobloch, 1829: Book 4, Chapter 46, Section 6.
13. Meursius J. Ioannis Mevrsi Opervm: Volvmen tertivm. Florentiae, Apvd Tartinivm, et Franchivm, 1744.
14. Oribasius. Ouevres d'Oribase. Paris, Imprimerie impériale, 1876.
15. Aetius. Aetii Amideni libri medicinali. Venice, Aldus, 1534.
16. Brownstein MJ. A brief history of opiates, opioid peptides, and opioid receptors. *Proc Natl Acad Sci USA.* 1993;90(12):5391-5393.
17. Rida PC, LiVecche D, Ogden A, Zhou J, Aneja R. The Noscapine chronicle: a pharmaco-historic biography of the opiate alkaloid family and its clinical applications. *Med Res Rev.* 2015;35(5):1072-1096.
18. Askitopoulou H, Ramoutsaki IA, Konsolaki E. Archaeological evidence on the use of opium in the Minoan world. *International Congress Series.* 2002;1242:23-29.
19. Mahdizadeh S, Khaleghi Ghadiri M, Gorji A. Avicenna's Canon of Medicine: a review of analgesics and anti-inflammatory substances. *Avicenna J Phytomed.* 2015;5(3):182-202.
20. von Staden H. Herophilus: The Art of Medicine in Early Alexandria. Cambridge & New York, Cambridge University Press, 1989.