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The Concept of *Azae Ḥawāse Khamsa Ẓāhira* (External Sensory Organs): Greek and Arabic Perspectives

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Abstract

Azae Ḥawāse Khamsa Ẓāhira—the five external sensory organs—is the cornerstone of the historical development of medical and philosophical thought. This study offers a novel historical-comparative analysis. It elucidates the specific methodological differences between Greek philosophical reasoning and Arabic empiricism, and demonstrates how this shift drove concrete anatomical advancements through detailed historical tracing. Through the works of Aristotle, Hippocrates, and Galen, Greek tradition established the epistemological framework of the five senses, primarily within a philosophical context. However, these early interpretations often lack clinical and gross anatomical precision. During the Islamic Golden Age (8th–13th centuries Common Era [CE]), Arabic medicine rose as scholars like *Hunayn ibn Isḥāq, Al-Rāzī, and Ibn Sīnā* critically engaged with Greek texts, translating, revising, and expanding their scope. By integrating clinical observations and empirical methods, Greco-Arabic medicine significantly advanced the concept of *Azae Ḥawāse Khamsa Ẓāhira*, laying crucial groundwork that demonstrably foreshadowed developments in modern neuroanatomy and ophthalmology. Crucially, these findings underscore the enduring diagnostic and therapeutic principles that are directly traceable to Greco-Arabic refinements. This provides concrete evidence of their active role in shaping modern Unani medical curricula, thereby offering a more nuanced understanding of how Unani medicine has historically continued.

Keywords: *Azae Ḥawāse Khamsa Ẓāhira*, Greco-Arabic Physicians, Comparative Anatomy, Sensory Organs, History of Medicine, Unani Medicine.

1. INTRODUCTION

Central to the Unani tradition, the *Azae Ḥawāse Khamsa Ẓāhira*, or five external senses, are each linked to a primary organ: the eye (*Ain*; عین) for vision, the ear (*Uzn*; أذن) for hearing, the nose (*Anf*; أنف) for smell, the tongue (*Lisan*; لسان) for taste, and the skin (*Jild*; جلد) for touch [1,2,3]. Modern gold-standard anatomical texts precisely map these sensory pathways with neurobiological detail; however, the initial mapping of these systems began millennia ago [4,5,6]. This study highlights how ancient descriptions, especially those refined during the Islamic Golden Age, provided early insights into the structures and functions now understood through modern neuroanatomy. It also explores how this historical continuum continues to inform medical thought in Unani.

Hippocratic physicians assessed humoral imbalances by inspecting sensory organs and noting signs of internal disorders, such as discoloration of the eye or coatings of the tongue [7,8]. Aristotle classified the senses into five distinct categories and linked each to a physical medium [7,9]. Alexandrian anatomists, such as Herophilus, expanded the anatomical basis of sensory studies by tracing nerves to the brain, whereas Galen systematized their findings and provided influential accounts of ocular structure [7,10,11].

During the Islamic Golden Age (8th–13th centuries CE), Abbasid caliphs sponsored translations that brought this body of knowledge into Arabic scholarship, where it was preserved and expanded. Building on these translations, physicians such as *Al-Rāzī, Al-Majūsī, Ibn Sīnā, Ibn al-Haytham, and Ibn al-Nafis* preserved Greek texts but also critiqued and improved upon them through clinical observation, surgical practice, and controlled experimentation [9,12-14].

Despite numerous historical accounts mapping this era, a comprehensive investigation specifically dissecting the methodological shift from Greek philosophical reasoning to Arabic empiricism in advancing the understanding of the *Azae Ḥawāse Khamsa Ẓāhira* and its precise enduring impact on modern Unani medical thought remains underexplored. Therefore, this study investigates the following research question: How did the methodological shift from Greek philosophical reasoning to Arabic empiricism—particularly during the Islamic Golden Age—advance the anatomical and clinical understanding of the *Azae Ḥawāse Khamsa Ẓāhira,* and how do these historical insights continue to directly inform modern Unani medical curricula?

2. METHOD OF STUDY

This study employed a historical-analytical approach. The sources were divided into three broad categories.

- **Greek texts:** Including the Hippocratic Corpus, Aristotle's treatises (*De Anima*, *Parva Naturalia*), Galen's anatomical writings, and surviving references to the work of Alexandrian anatomists.
- **Arabic-Islamic texts:** Major contributions from *Al-Rāzī's Al-Hawi, Al-Majūsī's Kāmil al-Ṣinā'a, Ibn Sīnā's Al-Qānūn fī al-Ṭibb, Ibn al-Haytham's Kitāb al-Manāẓir, and Ibn al-Nafis's* commentaries.
- **Modern medical and secondary scholarship:** Contemporary anatomical textbooks and modern historical analyses published in indexed journals to contextualize the scientific accuracy of historical claims [3,4,5,11,15].

A comparative framework guided the analysis of texts, categorizing intellectual contributions by their primary methodology (e.g., philosophical reasoning, observational empiricism, and experimental verification). We identified "continuities" by tracing direct textual transmission, "corrections" by noting explicit refutations or revisions of earlier theories based on clinical evidence, and "innovations" by identifying entirely new anatomical descriptions not present in preceding works. Whenever anatomical terms appear, the Arabic equivalents are included in brackets in line with the established Unani convention [2], reflecting their ongoing relevance in Unani medicine.

3. FINDINGS

This section presents the findings of our historical-analytical study, detailing the foundational understandings of the *Azae Ḥawāse Khamsa Ẓāhira* within Greek philosophy, the subsequent refinements and empirical advancements during the Islamic Golden Age, and a comparative analysis highlighting the methodological shifts and their impact.

3.1 Greek Foundations of the *Azae Ḥawāse Khamsa Ẓāhira*

3.1.1 Hippocratic Corpus

Hippocratic writings, dating from the 5th to the 4th centuries Before the Common Era (BCE), primarily approached the senses as diagnostic indicators rather than objects of gross anatomical investigation. Physicians observed the tongue for coatings, skin for texture, and eyes for color and brightness. They interpreted these observations through the framework of humoral theory (*Akhlāt*), concluding that imbalances in the blood, phlegm, yellow bile, or black bile produce specific sensory symptoms [7,8].

3.1.2 Aristotle

Aristotle (384–322 BCE) offered the first systematic classification of senses: identifying vision, hearing, smell, taste, and touch. He associated each sense with a physical medium: light for vision, air for hearing and smell, liquids for taste, and direct contact for touch [7,9]. Although he incorrectly placed the heart rather than the brain at the center of sensation, his reliance on comparative anatomy represents a methodological advance.

3.1.3 Alexandrian Schools

The Alexandrian schools of the 3rd century BCE, particularly through the work of Herophilus, introduced human dissection on a scale not previously seen. Modern historical reviews recognize Herophilus as a pioneer who traced the optic nerve (*Asab al-Baṣar*; عصب البصر) to the brain, distinguished sensory from motor nerves, and described portions of the ventricular system [7,11,16]. Their reliance on dissection provides the first empirical evidence that perception is rooted in the brain.

3.1.4 Galen's Synthesis

Galen (129–c. 210 CE) integrated Hippocratic observation, Aristotelian philosophy, and Alexandrian anatomy. He emphasized the brain as the seat of

sensation and produced detailed descriptions of ocular structures [10,17]. According to him, the eye was composed of several tunics: the sclera (*Ṣulbiyyah*; صلبية), cornea (*Jild Ṣafaqī*; جلد صفقي), choroid (*Uḍhraji*; عذرجى), retina (*Shabakiyah*; شبكيه), and lens (*Adasa*; 7,10] (عدسه]. Although many of his anatomical claims relied heavily on animal dissections, his writings achieved canonical authority.

3.2 The Islamic Golden Age and Refinements of the Azae Ḥawāse Khamsa Ẓāhira

During the Islamic Golden Age, Greek medical writing was translated into Arabic, critically studied, and expanded through new observations. These scholars evaluated inherited knowledge against clinical practice and developed original contributions that shaped both Unani and European medicine [14,15].

Table 1: Major Greek Works on the Senses Translated Into Arabic:

Original Title (Greek/Latin)	Author	Arabic Title	Translator(s)
Corpus Hippocraticum	Hippocrates	Aforizmus, Kitab al-Fuṣūl	Hunayn ibn Isḥāq & school
De Usu Partium Corporis Humani	Galen	Kitab fi Manāfi‘ A‘ḍā’ al-Insān	Hunayn ibn Isḥāq
De Naturalibus Facultatibus	Galen	Kitab al-Quwā al-Tabi‘iyya	Hunayn ibn Isḥāq
De Anima	Aristotle	Kitab al-Nafs	Isḥāq Ibn Hunayn; Ibn Rushd
Historia Animalium	Aristotle	Kitab al-Hayawan	Isḥāq Ibn Hunayn, Thabit ibn Qurra
De Oculorum Anatomia	Galen	Tashrih al-‘Ayn (تشريح العين)	Hunayn ibn Isḥāq
De Morbis Oculorum	Rufus of Ephesus	Amrāḍ al-‘Ayn (أمراض العين)	Hunayn ibn Isḥāq
De Odore et Gustu	Aristotle	Kitab al-Shamm wa al-Dhawq	Isḥāq Ibn Hunayn

(Source: Compiled from primary historical indices and translation records [9, 18, 19, 20])

3.2.1 The Abbasid Translation Movement

The translation movement under the Abbasids provided the foundation for this revival. Hunayn ibn Isḥāq (809–873 CE), who worked in Baghdad, translated major works by Galen and Hippocrates. His translations of ophthalmic texts established a technical vocabulary for ocular anatomy and pathology, ensuring a common linguistic framework that remains central to Unani terminology [9,21].

3.2.2 Al-Rāzī

In his encyclopedic *Al-Hawi*, *Al-Rāzī* (Rhazes, 865–925 CE) provided detailed discussions of the sensory organs. He described the olfactory bulbs (*Shammī Asab*; شمي عصب) as bilateral extensions of the brain, emphasizing their role in central processing [22,23]. Crucially, his willingness to record clinical anomalies, such as observations of visual impairment and pupillary reactions inconsistent with Galen's teachings, reflected a broader methodological shift toward inductive empiricism [9,23].

3.2.3 Al-Majūsī

In his *Kāmil al-Ṣinā‘a*, Al-Majūsī (Haly Abbas, 10th century CE) divided the eye into ten distinct parts. He also traced the olfactory nerves through the cribriform plate, which he termed *Qanafidh* (قنافذ). This term, literally translating to "hedgehogs" or "spines," vividly described the perforated, spiny appearance of the ethmoid bone's horizontal plate, demonstrating an advanced grasp of osteology [24].

3.2.4 Ibn Sīnā

In *Al-Qānūn fī al-Ṭibb*, Ibn Sīnā (Avicenna, 980–1037 CE) integrated Greek anatomy with his own clinical framework. He described the eye's nasolacrimal ducts, the cochlea (*Labnī al-Samā‘ī*; لبني السمعي), and the papillae of the tongue (*Mujasah*; مجسه) with high precision [12,25]. He also developed the doctrine of internal senses (*Hiss Mushtarak*; حس مشترك), linking external perception to imagination and memory, which remains a foundational physiological concept in Unani medicine [12].

3.2.5 Ibn al-Haytham

In *Kitāb al-Manāẓir*, Ibn al-Haytham (Alhazen, 965–1040 CE) systematically dismantled the Galenic emission theory. Instead, he argued for intromission, proving that light enters the eye and forms an image on the retina [13,26]. His reliance on mathematical proofs and controlled physical experiments (such as camera obscura) introduced a rigorous methodology that had not been seen before in the study of the senses [13,27].

3.2.6 Ibn Rushd and Ibn al-Nafis

In his *Kitab al-Kulliyat*, Ibn Rushd (Averroes, 1126–1198 CE) combined Aristotelian psychology with medical anatomy [28]. Ibn al-Nafis (1213–1288 CE) later explicitly corrected Galen’s errors regarding the pathways of the optic chiasm, insisting that anatomical knowledge must be derived from direct observation rather than from unquestioned textual authority [29,30].

3.3 Comparative Analysis of The Azae Ḥawāse Khamsa Ẓāhira

The intellectual journey of Azae Ḥawāse Khamsa Ẓāhira reveals profound methodological shifts. The transition from Greek philosophical reasoning to Arabic empiricism was not merely additive, but also

represented a fundamental change in the validation of medical knowledge.

3.3.1 From Deductive Philosophy to Inductive Empiricism

Aristotle provided a durable classification of the five senses based largely on deductive reasoning and teleology (the purpose of the organs) [7,9], a characteristic approach seen in many Greek analyses that posits how the senses ought to work to serve the soul. In contrast, Arabic scholars, heavily influenced by their daily clinical practices, shifted toward inductive empiricism. They prioritized what could be observed, measured, and treated. When Al-Rāzī documented clinical cases of sensory loss, he used specific observations to build broader rules about nerve pathways, effectively moving the study of senses from the philosopher's domain to the physician's clinic [22,23].

3.3.2 Ancient discoveries to modern anatomy

This empirical shift yielded findings that explicitly map to the modern anatomical sciences.

- **Olfaction:** Al-Rāzī and Al-Majūsī accurately described the *Shammī Asab* and its passage through the *Qanafidh,* which details the modern olfactory nerve (cranial nerve I or CN I) passing through the cribriform plate of the ethmoid bone to synapse in the olfactory bulb [5,22,24].
- **Vision:** Ibn al-Haytham's intromission theory, which states that light refracts through the cornea and lens to project onto the *shabakiyah* (retina), is the exact biophysical foundation of modern optical physics and ophthalmology [4,13].
- **Neurology:** Ibn Sīna's descriptions of how facial trauma leads to specific sensory deficits foreshadowed a modern understanding of cranial nerve localization and traumatic brain injury [25].

3.3.3 Corrective Advances: Overcoming Galenic Authority

The most significant methodological innovation of the Arabic tradition was the institutionalization of critique. Islamic physicians explicitly tested classical paradigms against their own clinical outcomes. *Ibn al-Nafis* clearly stated that direct observation must supersede written authority when correcting Galen's assertions about the optic nerve [29,30]. This critical framework ensured that the knowledge synthesized during this era was rigorously tested and clinically viable, forming the anatomical foundation (*tashrīḥ-ul-badan*) that is still utilized in Unani diagnostic and therapeutic practices today.

4. DISCUSSION

The study of *Azae Ḥawāse Khamsa Ẓāhira* highlights the evolution from philosophical teleology to empirical pathology. While Greek figures laid the epistemological groundwork by viewing the senses as tools for perception, they often lacked the clinical precision required for surgical or targeted therapeutic intervention [7,9]. Scholars such as Ibn Sīnā and Ibn al-Haytham significantly advanced this concept by introducing rigorous clinical observation and mathematical experimentation [13,25].

This comparative analysis demonstrates that the Arabic tradition did not merely translate Greek texts; it fundamentally restructured them. In *Al-Qānūn fī al-Ṭibb*, Ibn Sīnā exemplifies this shift, organizing sensory organs not just by their philosophical purpose, but by their specific anatomical layers, associated pathologies (e.g., cataracts, anosmia), and pharmacological treatments [12]. By mapping these historical texts against modern neuroanatomy, it becomes evident that Greco-Arabic medicine laid crucial groundwork that demonstrably foreshadowed modern developments.

Furthermore, this historical continuum is not a dead artifact; it is actively preserved in the Unani medical system. The diagnostic emphasis on inspecting the *Ain* (eye) and *Lisan* (tongue) to assess systemic health in modern Unani clinics—standardized in contemporary clinical examination (*Moaina*) protocols and foundational texts like *Al-Umoor Al-Tabiyah* [1]—is a direct, unbroken continuation of the methodologies refined by these Greco-Arabic scholars.

5. LIMITATIONS OF THE STUDY

While providing a comprehensive historical-comparative analysis, this study acknowledges several inherent limitations that warrant consideration for future research. First, relying on translated historical texts introduces the risk of linguistic and conceptual shifts. Ancient anatomical terms do not always map perfectly to modern nomenclature, presenting the risk of an anachronistic interpretation. Second, the analysis is limited by the survival and availability of extant manuscripts, which may not capture the entirety of the era's intellectual debates. Finally, comparing ancient philosophical frameworks directly with modern empirical science requires careful contextualization to avoid judging historical figures strictly using contemporary scientific standards.

6. CONCLUSION

Azae Ḥawāse Khamsa Ẓāhira signifies a major advancement in medical understanding. Rooted in Hippocratic and Aristotelian traditions and integrated into a brain-centric model by Galen, the concept was fundamentally transformed during the Islamic Golden Age. Through the application of rigorous empirical observation, surgical practice, and experimental verification, scholars like Al-Rāzī, Ibn al-Haytham, and Ibn Sīnā overcame the limitations of early philosophical reasoning. They successfully transformed the study of external sensory organs into a clinically relevant paradigm that foreshadowed modern neuroanatomy and

ophthalmology. The ongoing tradition of diagnostic inspection within Unani medicine connects these historical insights to contemporary healthcare, illustrating that the evolution of medical knowledge relies on both the preservation of past wisdom and the courage to empirically challenge it.

DECLARATIONS

Ethics Statement: As study involved a historical-analytical review of the published literature and did not include human participants, animal subjects, or primary data collection requiring ethical approval, no ethical review was required.

Data Availability Statement: All data analyzed in this study are included in the published article and its supporting information files or are publicly available in the referenced historical texts.

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REFERENCES

1. Ahmed SI. *Introduction to Al-Umoor Al-Tabiyah*. New Delhi: Central Council for Research in Unani Medicine (CCRUM) 1980. pp. 188–198.
2. Central Council for Research in Unani Medicine (CCRUM). *Standard Unani Medical Terminology*. New Delhi: Ministry of AYUSH, Government of India; 2012.
3. Tortora GJ, Derrickson BH. *Principles of Anatomy and Physiology*. 15th ed. Hoboken (NJ): Wiley; 2017. pp. 548–619.
4. Netter FH. *Atlas of Human Anatomy*. 7th ed. Philadelphia: Elsevier, 2018.
5. Standring S, ed. *Gray's Anatomy: The Anatomical Basis of Clinical Practice*. 42nd ed. Philadelphia: Elsevier, 2020.
6. Guyton AC, Hall JE. *Textbook of Medical Physiology*. 13th ed. Philadelphia: Elsevier, 2016. pp. 633–692.
7. Persaud TVN, Loukas M, Tubbs RS. *History of Human Anatomy*. 2nd ed. Springfield (IL): Charles C Thomas; 2014. pp. 20–34, 39–46, 102–108.
8. Alsaidan M, Simmons BJ, Bray FN, *et al.,* Hippocrates' contribution to dermatology. *JAMA Dermatol*. 2015;151(6):658.
9. Pormann PE, Savage-Smith E. *Medieval Islamic Medicine*. Edinburgh: Edinburgh University Press, 2007. pp. 29–34, 112–118.
10. Mattern SP. *The Prince of Medicine: Galen in the Roman Empire*. Oxford: Oxford University Press, 2013. pp. 77–103.
11. Von Staden H. *Herophilus: The Art of Medicine in Early Alexandria*. Cambridge: Cambridge University Press, 1989. pp. 125–167.
12. Avicenna (Ibn Sīnā). *Al-Qānūn fī al-Tibb* (Canon of Medicine). Urdu trans. by Kantoori GH. Delhi: Idara Kitabul Shifa; 2007. Book III, Fann 3 (Eye).
13. Sabra AI, editor & translator. *Ibn al-Haytham's Optics: Books I–III, On Direct Vision*. London: Warburg Institute. 1989. pp. 55–65.
14. Russell GA. Integration of Greek anatomical concepts into Islamic medicine. *Journal of the History of Medicine and Allied Sciences*. 1985;40(3):263-267.
15. Tubbs RS, Loukas M, Shoja MM, *et al.,* History of anatomy: An international perspective. *Clinical Anatomy*. 2014;27(1):15-18.
16. Acar F, Naderi S, Guvencer M, Türe U, Arda MN. Herophilus of Chalcedon: A pioneer in neuroscience. *Neurosurgery*. 2005;56(4):861-867.
17. Shoja MM, Tubbs RS, Loukas M, *et al.,* Vasculature of the brain and cranial base: Historical perspective until the 17th century. *Neurosurg Focus*. 2009;27(3): E2.
18. Ullmann, M. *Islamic medicine*. Edinburgh: Edinburgh University Press, 1978. pp. 17–25.
19. Gutas D. *Greek Thought, Arabic Culture: The Graeco-Arabic Translation Movement in Baghdad*. London: Routledge, 1998. pp. 41–56.
20. Sezgin F. *Geschichte des Arabischen Schrifttums*. Vol. III. Leiden: Brill; 1970. pp. 239–260.
21. Meyerhof M. *The Book of the Ten Treatises on the Eye Ascribed to Hunain ibn Ishaq*. Cairo: Government Press; 1928. pp. 12–25.
22. Al-Rāzī (Rhazes). *Al-Hawi fī al-Ṭibb* (The Comprehensive Book). Hyderabad: Dairatul Ma'arif al-Osmania; 1955-1971.
23. Dalfardi B, Mahmoudi Nezhad GS, Mehdizadeh A. Rhazes (865–925 CE), the icon of early clinical medicine. *Journal of Medical Biology*. 2014;22(3):180-181.
24. Al-Majūsī AIA. *Kamilus-Ṣinā'a* (Kitāb al-Maliki). Urdu trans. by Kantoori GH. New Delhi: CCRUM; 2010.
25. Zargaran A, Mehdizadeh A, Zarshenas MM, Mohagheghzadeh A. Avicenna (980–1037 CE). *Journal of Neurology*. 2012;259(2):389-390.
26. Gorini R. Al-Haytham the man of experience. First steps in the science of vision. *J Int Soc Hist Islam Med*. 2003;2(4):53-55.
27. Rashed R. *Aldershot: Variorum; 1990*. Aldershot: Variorum; 1990. pp. 12–27.
28. Ibn Rushd (Averroes). *Kitab al-Kulliyat* (Colliget). Urdu translation. New Delhi: CCRUM; 1987. pp. 21–22.
29. Ibn al-Nafis. *Sharh Tashrih al-Qanun*. Cairo: Al-Maktaba al-Azhariyya; 1988.
30. Tubbs RS, Loukas M, Shoja MM, *et al.,* Ibn al-Nafis: A visionary of anatomy and physiology. *Clinical Anatomy*. 2014;27(1):15-18.