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Original Research Paper

Postsocial genealogies: Persian medical cultures as early epistemic formations

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Abstract

Karin Knorr Cetina developed the concept of "postsocial relations" to explain the increasing importance of epistemic objects in the organization of knowledge, expertise, and social interaction within late modern scientific and technological contexts. While this theoretical approach has primarily been applied to contemporary developments, its historical scope remains largely unexplored. The present article investigates whether medieval Persian medicine can be understood as a historically specific form of object-centered epistemic relations that is analytically comparable to the relational dynamics described by postsocial theory. The focus is on Persian medicine between the ninth and fifteenth centuries, examining manuscripts, hospitals, pharmaceutical substances, medical instruments, and pedagogical practices as material components of an epistemic culture. Methodologically, the study is based on a historical-conceptual analysis within the framework of Science and Technology Studies (STS), drawing on research concerning Islamic medicine and material knowledge cultures. The findings indicate that these material entities functioned as dynamic and open-ended centers of epistemic engagement, structuring learning, clinical practice, and scholarly communities in ways that exhibit important structural similarities to the characteristics Knorr Cetina associates with epistemic objects. Rather than arguing that medieval Persian medicine constituted a postsocial society in the strict historical sense, the article proposes that it developed historically specific configurations of object-centered epistemic relations. By doing so, the study extends the temporal and geographical horizon of postsocial theory, contributes to the globalization of STS, and demonstrates how non-Western knowledge cultures can serve as sources of theoretical refinement.

Keywords: Postsocial relations, epistemic objects, Persian medicine, epistemic cultures, science and technology studies, history of science

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مقاله پژوهشی

تبارشناسی‌های پسااجتماعی: فرهنگ‌های پزشکی ایرانی به‌مثابه صورت‌بندی‌های معرفتیِ اولیه

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چکیده:

کارین کنور ستینا مفهوم «روابط پسااجتماعی» را برای تبیین نقش روزافزون اشیای معرفتی در سازمان‌دهی دانش، تخصص و تعاملات اجتماعی در محیط‌های علمی و فناورانه متأخر مطرح کرد. با وجود تأثیر گسترده این چارچوب نظری، کاربرد آن عمدتاً به زمینه‌های معاصر محدود مانده و ظرفیت تاریخی آن کمتر مورد بررسی قرار گرفته است. مقاله حاضر بررسی می‌کند که آیا پزشکی ایرانی در دوره اسلامی میانه را می‌توان نمونه‌ای تاریخی از روابط معرفتی شیءمحور دانست که از نظر تحلیلی با پویایی‌های رابطه‌ای توصیف‌شده در نظریه روابط پسااجتماعی قابل مقایسه باشد یا خیر. این پژوهش با تمرکز بر پزشکی ایرانی از سده‌های سوم تا نهم هجری قمری (نهم تا پانزدهم میلادی)، از رویکردی تاریخی ـ مفهومی در چارچوب مطالعات علم و فناوری (STS) بهره می‌گیرد. تحلیل بر پایه پژوهش‌های معتبر تاریخی انجام شده و نسخه‌های خطی، بیمارستان‌ها، مواد دارویی، ابزارهای پزشکی و شیوه‌های آموزش پزشکی را به‌عنوان مؤلفه‌های مادی یک فرهنگ معرفتی بررسی می‌کند. این شواهد تاریخی بر اساس نقش مستند آن‌ها در سازمان‌دهی دانش پزشکی، شکل‌گیری اقتدار حرفه‌ای و سامان‌دهی کنش‌های نهادی انتخاب و با استفاده از مفاهیم «اشیای معرفتی» و «روابط شیءمحور» تحلیل شده‌اند. یافته‌ها نشان می‌دهد که این عناصر مادی به‌عنوان کانون‌های پویا و گشوده تعامل معرفتی عمل می‌کردند و یادگیری، عمل بالینی و اجتماعات علمی را به شیوه‌هایی سازمان می‌دادند که از نظر ساختاری با ویژگی‌هایی که کنور ستینا برای اشیای معرفتی برمی‌شمارد، شباهت دارند. با این حال، مقاله مدعی نیست که پزشکی ایرانی در دوره اسلامی میانه به معنای دقیق تاریخی، جامعه‌ای پسااجتماعی بوده است؛ بلکه استدلال می‌کند که این سنت پزشکی، صورت‌بندی‌های تاریخی خاصی از روابط معرفتی شیءمحور را پدید آورده است که افق زمانی و جغرافیایی نظریه روابط پسااجتماعی را گسترش می‌دهد. این پژوهش با ایجاد گفت‌وگو میان پزشکی ایرانی و مطالعات علم و فناوری، هم به جهانی‌تر شدن مباحث STS و هم به تاریخ‌نگاری پزشکی یاری می‌رساند و نشان می‌دهد که فرهنگ‌های معرفتی غیرغربی نه‌تنها می‌توانند نمونه‌های تاریخی برای آزمون نظریه‌های جامعه‌شناختی باشند، بلکه ظرفیت پالایش و توسعه مفهومی این نظریه‌ها را نیز دارند.

واژه‌های کلیدی: روابط پسااجتماعی، اشیای معرفتی، پزشکی ایرانی، اسلام میانه، مطالعات علم و فناوری، تاریخ پزشکی

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Original-Forschungsarbeit

Postsociale genealogien: Persische medizinische Kulturen als frühe epistemische Formationen

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Zusammenfassung:

Karin Knorr Cetina entwickelte das Konzept der „postsozialen Beziehungen", um die zunehmende Bedeutung epistemischer Objekte für die Organisation von Wissen, Expertise und sozialer Interaktion in spätmodernen wissenschaftlichen und technologischen Kontexten zu erklären. Während dieser theoretische Ansatz bislang vor allem auf gegenwärtige Entwicklungen angewandt wurde, bleibt seine historische Reichweite weitgehend unerforscht. Der vorliegende Beitrag untersucht, ob die persische Medizin des mittelalterlichen Islam als historisch spezifische Form objektzentrierter epistemischer Beziehungen verstanden werden kann, die analytisch mit den von der Postsocial-Theorie beschriebenen relationalen Dynamiken vergleichbar ist. Im Fokus stehen die persische Medizin zwischen dem 9. und 15. Jahrhundert sowie Handschriften, Krankenhäuser, pharmazeutische Substanzen, medizinische Instrumente und pädagogische Praktiken als materielle Bestandteile einer epistemischen Kultur. Methodisch basiert die Studie auf einer historisch-konzeptionellen Analyse im Rahmen der Science and Technology Studies (STS) und nutzt Forschungsergebnisse zur islamischen Medizin und materiellen Wissenskultur. Die Untersuchung zeigt, dass diese materiellen Entitäten als dynamische und offene Zentren epistemischer Auseinandersetzung fungierten und Lernprozesse, klinische Praxis sowie wissenschaftliche Gemeinschaften strukturierten. Dabei weisen sie wesentliche strukturelle Gemeinsamkeiten mit den von Knorr Cetina beschriebenen Eigenschaften epistemischer Objekte auf. Der Beitrag argumentiert jedoch nicht, dass die mittelalterliche persische Medizin eine postssoziale Gesellschaft im strengen historischen Sinne darstellte, sondern dass sie eigenständige Formen objektzentrierter epistemischer Relationen hervorbrachte. Dadurch erweitert die Studie den zeitlichen und geografischen Horizont der Postsocial-Theorie und leistet einen Beitrag zur Globalisierung der STS sowie zur Neubewertung außereuropäischer Wissenskulturen als Quellen theoretischer Weiterentwicklung.

Schlüsselwörter: Postsociale Genealogien, epistemische Objekte, iranische Medizin, mittelalterlicher Islam, Science and Technology Studies (STS), Geschichte der Medizin

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1. Introduction

Karin Knorr Cetina's idea of postsocial relations attempts to clarify the transformation that takes place in knowledge organization, as well as the design of sociality, in contemporary culture. According to her, objects, particularly epistemic objects, occupy relations that were once considered the province of human beings. They assume the position of active, dynamic participants in interaction, engaging attention, affecting and guiding conduct, and defining the terms within which meaning and cooperation emerge. According to Knorr Cetina, this is the nature of knowledge in the late modern world, in places such as molecular biological laboratories or trading floors in the global marketplace, where objects embody "incomplete" entities with indeterminate ontologies that always call for interaction, employing complex webs of social persons (Knorr Cetina, 1997, 2001). Postsocial relations overturn traditional sociological views, including those of Goffman (1967), Mead (1934), and Schutz (1967), which regard sociality as essentially interpersonal. They instead give prominence to objects as active participants in the construction of sociality (Knorr Cetina, 1997; Humphries & Smith, 2014).

Although this framework remains enormously influential, it raises a pressing question regarding the temporal immanence and spatial extent of postsociality. Do postsocial relations, as Knorr Cetina asserts, remain largely a product of the last decades of modernity? Or might corresponding relational assemblages be identified in other historical and cultural milieus, particularly outside the Euro-American sociocultural habitats that gave rise to STS as a theoretical project? Indeed, the most widely shared assumption within the literature is that postsociality emerges together with "advanced technologies, laboratory sciences, or informational capitalism." However, a growing body of literature within global history and the history of science shows that so-called "premodern epistemic cultures" were predicated, in tandem, upon dynamic, open-ended "objects" that correspond structurally with modern theoretical models (Daston, 2004; Hamling & Richardson, 2010; Mukherjee & Dasgupta, 2023; Salmani Bidgoli, 2026). The present study does not argue that medieval Persian medicine was postsocial in the historical sense proposed by Knorr Cetina. Rather, it suggests that certain relational configurations within medieval Persian medicine exhibit structural and,

in selected domains, functional characteristics analogous to those identified in postsocial knowledge societies. Accordingly, the concept of postsocial relations is employed as a heuristic analytical framework rather than as a historically literal category. This distinction is intended to avoid conceptual anachronism while allowing the analytical vocabulary of Science and Technology Studies to illuminate earlier forms of object-centered knowledge practices.

This article argues that Persian medicine during the medieval Islamic period developed an object-centered epistemic culture whose relational configuration is structurally comparable to what Knorr Cetina later conceptualized as postsocial relations. Rather than claiming historical equivalence, the article proposes that medieval Persian medicine represents a configuration that broadens the historical genealogy of object-centered epistemic relations. Although it is not the same as modern postsociality, Persian medical culture shared important structural features with it (Gutas, 2012; Pormann & Savage-Smith, 2007; Ullmann, 2019). These included reliance on incomplete and changing knowledge objects; relational approaches mediated through texts and tools; institutional settings that treated objects as central players; and regional manuscript networks that linked scholars through shared materials. By examining these historical dynamics through the lens of postsocial theory, the article aims to expand the understanding of object-mediated social connections, challenge the idea that the modern West is the only place where this developed, and show the deeper historical roots of object-oriented knowledge practices (Conrad, 1995; Rosenthal, 2007).

The argument unfolds in six steps. First, I present Knorr Cetina's theoretical framework and explain its importance for historical analysis. Second, I examine key aspects of Persian medicine during medieval Islam, focusing on written practices, hospitals, tools, and the movement of manuscripts. Third, I demonstrate how these objects created early forms of social relations by influencing authority, identity, and social life. Fourth, I outline the limitations of using the postsocial framework in premodern settings. I explain how medieval object relations differ from modern technological interactions. Finally, I consider the implications for Science and Technology Studies, advocating for a broader and more historically informed view of object-centered sociality.

This article engages with three important debates in contemporary scholarship. First, it contributes to ongoing efforts within Science and Technology Studies (STS) to globalize theoretical frameworks beyond their original Euro-American contexts (Anderson, 2019; Harding, 2011; Seth, 2009). In doing so, it situates Knorr Cetina's concept of postsocial relations in dialogue with broader STS discussions concerning material agency, epistemic objects, historical ontology, and medical practice, while maintaining postsociality as its primary analytical framework. Second, it builds upon historical scholarship emphasizing the material dimensions of medieval Persian scientific and medical traditions. Third, it contributes to sociological debates on object-centered sociality by arguing that the relational logic underlying epistemic objects possesses a deeper historical genealogy than has generally been recognized. Medieval Persian medicine thus provides a historically rich setting for reconsidering the temporal and geographical boundaries of postsocial relations.

2. Methodology

This study adopts a qualitative conceptual-historical approach situated at the intersection of Science and Technology Studies (STS) and the history of medicine. Rather than reconstructing the institutional history of medieval Persian medicine or conducting archival research on specific medical texts, the article seeks to extend the theoretical scope of Knorr Cetina's concept of postsocial relations by examining its analytical applicability to a premodern epistemic culture. Accordingly, the study is conceived as a theory-oriented historical interpretation in which historical materials are employed not merely as descriptive evidence but as conceptual resources for reassessing the temporal and geographical boundaries of postsociality.

The analysis is based on a critical synthesis of the established historiography of medieval Persian medicine together with foundational STS scholarship on epistemic objects and epistemic cultures. Historical literature concerning medical manuscripts, bīmāristāns, diagnostic and surgical instruments, pharmaceutical substances, and pedagogical practices was selected because these domains constitute the principal material infrastructures through which medical knowledge was produced, transmitted, institutionalized, and practiced in the medieval

Persian world. Rather than attempting an exhaustive reconstruction of medieval medicine, these domains were purposefully chosen as analytically representative sites in which relationships between humans and knowledge-bearing objects become most visible.

The analytical strategy proceeds in four stages. First, the defining characteristics of epistemic objects are identified through a close reading of Knorr Cetina's theoretical work, particularly her discussions of epistemic cultures, object-centered sociality, and postsocial relations. Second, these conceptual characteristics are translated into historically observable analytical criteria suitable for examining premodern medical practices. Third, the selected historical domains are comparatively interpreted to determine whether they exhibit relational configurations analogous to those associated with modern epistemic objects. Finally, the historical findings are brought into dialogue with contemporary STS theory to evaluate both the continuities and discontinuities between medieval Persian medicine and modern knowledge societies.

Within this analytical framework, an object is treated as an epistemic object not because of its technological sophistication or chronological location but because of the relational role it performs within knowledge production. Accordingly, historical objects are identified as epistemic objects when they display one or more of the following characteristics: epistemic openness, continual reinterpretation through commentary or practice, ontological incompleteness that generates further inquiry, mediation of professional authority and expertise, and the capacity to organize collective forms of knowledge production. These criteria are derived deductively from Knorr Cetina's theoretical formulation and are subsequently employed as interpretive tools rather than empirical variables.

The objective of this methodological approach is therefore neither to demonstrate that medieval Persian medicine was identical to contemporary scientific practice nor to claim a direct historical continuity between the two. Instead, it seeks to investigate whether the relational logic that underlies postsociality can be historically identified beyond the temporal limits assumed by contemporary STS literature. In doing so, the study proposes a historically grounded theoretical extension of the concept of postsocial relations while remaining attentive to the cultural and institutional particularities of the medieval Persian medical tradition.

Table 1. Operationalizing Knorr Cetina's Concept of Epistemic Objects: Analytical Criteria and Historical Indicators

Characteristic of Epistemic Objects (Knorr Cetina)	**Historical Indicator in Medieval Persian Medicine**	**Empirical Domain**
Ontological incompleteness	Continuous commentary, annotations, revisions	Medical manuscripts
Epistemic openness	Ongoing interpretation and transmission	Canonical medical texts
Mediation of expertise	Clinical diagnosis and therapeutic practice	Medical instruments
Organization of collective practice	Teaching, patient care, and institutional routines	Bīmāristāns
Generation of further inquiry	Experimentation with compounds and remedies	Materia medica

3. Theoretical Scope and Conceptual Translation

Knorr Cetina developed the concept of postsocial relations to explain transformations in late modern knowledge societies, particularly within environments such as molecular biology laboratories and global financial markets. In these settings, epistemic objects are not passive tools but dynamic entities that continuously organize attention, structure professional practice, and mediate social relations. Their defining characteristics include ontological openness, epistemic incompleteness, and the capacity to generate ongoing inquiry. The concept was therefore formulated to account for forms of sociality emerging within technologically advanced systems of knowledge production rather than as a general historical theory applicable to all periods and cultures.

The present study acknowledges these theoretical boundaries and does not seek to extend the concept through historical equivalence. It does not argue that medieval Persian medicine constituted a postsocial society in the historical sense intended by Knorr Cetina, nor does it suggest that medieval medical institutions functioned as precursors of modern laboratories. Such claims would risk conceptual anachronism by projecting categories developed for late modern scientific environments

onto fundamentally different historical contexts. Instead, the article employs postsocial relations as a heuristic analytical framework that enables the examination of how object-centered forms of knowledge organization operated within a distinct premodern epistemic culture.

The central argument is therefore based on structural comparison rather than historical identification. Structural comparison does not assume that two historical settings are identical; rather, it investigates whether they are organized through comparable relational logics despite profound differences in chronology, technology, and institutional context. The analysis asks whether certain material entities in medieval Persian medicine—medical manuscripts, hospitals, surgical instruments, pharmaceutical substances, and scholarly textual traditions—performed relational functions analogous to those attributed to epistemic objects in Knorr Cetina's account. Specifically, the study examines whether these objects mediated professional authority, organized collective medical practice, generated continuous interpretation and revision, and sustained durable relationships between physicians and material artifacts.

In several domains, these similarities are also functional. Canonical medical texts were continually expanded through commentary and annotation, hospitals organized clinical practice through material infrastructures, instruments structured diagnostic and therapeutic procedures, and pharmaceutical substances remained open to refinement through observation and experimentation. Although these practices unfolded within religious, educational, and institutional settings fundamentally different from those of contemporary science, they nevertheless reveal comparable mechanisms through which objects actively participated in the production, circulation, and stabilization of medical knowledge. The comparison therefore concerns the epistemic functions performed by objects rather than the historical conditions under which those functions emerged.

Accordingly, the argument advanced in this article is neither metaphorical nor essentialist. It does not use postsociality merely as a rhetorical analogy, nor does it claim that medieval Persian medicine and late modern scientific cultures are historically equivalent. Rather, the study proposes that the relational logic later conceptualized by Knorr Cetina has a broader historical genealogy than has generally been

recognized within Science and Technology Studies. Medieval Persian medicine is therefore interpreted as exhibiting relational configurations that are historically specific forms of object-centered epistemic relations, which anticipate certain structural dimensions of postsociality without collapsing the distinctions between premodern and modern knowledge cultures.

This theoretical translation serves two purposes. First, it enables the concept of postsocial relations to be evaluated beyond the Euro-American settings in which it was originally formulated, thereby contributing to ongoing efforts to globalize STS theory. Second, it demonstrates that the history of medicine can function not merely as an empirical illustration of existing sociological concepts but also as a source of theoretical refinement. By placing medieval Persian medicine in dialogue with contemporary STS, the article seeks to expand the historical imagination of postsocial theory while preserving the historical specificity of both analytical contexts.

Table 2. Levels of Conceptual Comparison

Dimension	**Modern Postsocial Relations**	**Medieval Persian Medicine**	**Nature of Similarity**
Historical context	Late modernity	Medieval Islam	Different
Institutional setting	Laboratory, finance	Bīmāristān, manuscript culture	Different
Object-centered relations	Yes	Yes	Structural
Knowledge production	Yes	Yes	Functional
Epistemic incompleteness	Yes	Yes	Structural
Technological environment	Modern	Premodern	Different

3.1. Postsocial Relations in Dialogue with Related STS Traditions

Although postsocial relations constitute the principal theoretical framework of this article, the concept has emerged within a broader intellectual landscape concerned with materiality, knowledge production, and the agency of objects. Positioning the present study within this wider tradition is important not only for clarifying its theoretical contribution but also for distinguishing its analytical orientation from adjacent approaches in Science and Technology Studies (STS) and the history of science.

The most immediate point of comparison is Bruno Latour's Actor–Network Theory (ANT). Latour challenged conventional sociology by arguing that social action is generated through heterogeneous networks composed of both human and non-human actors rather than exclusively through interpersonal relations (Latour, 1996, 2005, 2011). Medical texts, instruments, hospitals, and pharmaceutical substances therefore participate in networks of action alongside physicians, patients, and institutions. The present study shares ANT's commitment to recognizing the material agency of objects. However, it departs from ANT in an important respect. Rather than treating all entities as symmetrical actors within networks, the analysis focuses specifically on epistemic objects—objects whose significance derives from their capacity to organize knowledge production, sustain inquiry, and structure professional practice. In this respect, Knorr Cetina provides a more precise analytical vocabulary for understanding the knowledge-generating role of material artifacts in medieval Persian medicine.

Hans-Jörg Rheinberger's concept of epistemic things provides an even closer theoretical affinity. Rheinberger argues that scientific research is organized around material entities that remain inherently incomplete and whose indeterminacy drives further experimentation and discovery (Rheinberger, 1997, 2020). This conception closely parallels Knorr Cetina's emphasis on epistemic incompleteness. The present study builds upon this shared insight by arguing that canonical medical manuscripts, pharmaceutical substances, and diagnostic instruments in medieval Persian medicine similarly functioned as evolving objects of inquiry rather than fixed repositories of knowledge. Their importance lay not simply in preserving information but in continually generating new interpretations, commentaries, and practical innovations.

Michel Foucault's archaeology of knowledge offers a complementary perspective by demonstrating that systems of knowledge emerge through historically specific discursive formations rather than through the accumulation of objective facts (Foucault, 2013). Whereas Foucault primarily investigates the historical conditions under which statements become possible, the present article shifts attention toward the material objects through which those statements were produced, circulated, and stabilized. Rather than replacing Foucauldian analysis, the concept of postsocial relations extends it by highlighting the constitutive role of material artifacts within epistemic practices.

Ian Hacking's notion of historical ontology further supports the methodological orientation adopted here. Hacking argues that the categories through which reality is understood are themselves historically contingent and should not be projected uncritically across different periods (Hacking, 2002). This insight directly informs the present analysis. The article does not claim that medieval Persian medicine was "postsocial" in the historical sense intended by Knorr Cetina. Instead, it employs postsociality as a heuristic analytical framework for identifying structurally comparable forms of object-centered epistemic relations while preserving the historical specificity of the medieval Persian context.

Finally, Annemarie Mol's concept of the body multiple demonstrates that scientific and medical objects acquire different identities through distinct practices rather than existing as singular, fixed entities (Mol, 2002). Her practice-oriented ontology reinforces the present study's emphasis on the dynamic character of medical objects. Medieval manuscripts, hospitals, and therapeutic substances were not static artifacts but continually enacted through teaching, copying, diagnosis, treatment, and commentary. Their epistemic significance therefore emerged through practice rather than through intrinsic properties alone.

Taken together, these theoretical traditions provide an important intellectual context for the present study while also clarifying its distinctive contribution. Unlike Actor–Network Theory, the article does not seek a general sociology of heterogeneous networks. Unlike Rheinberger, it extends the analysis beyond experimental systems into premodern medical cultures. Unlike Foucault, it foregrounds the epistemic functions of material objects rather than discursive formations

alone. Unlike Hacking, it uses historical ontology not as an endpoint but as a caution against conceptual anachronism. Unlike Mol, it focuses less on ontological multiplicity than on object-centered relations of knowledge. Through this dialogue, the article positions Knorr Cetina's theory as the primary analytical framework while demonstrating that its historical extension is strengthened—not weakened—by engagement with the broader STS tradition.

4. Results

4.1. Applying Postsocial Relations to Medieval Persian Medicine

Knorr Cetina's idea of postsocial relations stems from a broader sociological concern about the shifting foundations of social life in late modernity. Traditional sociology viewed society as a network of interactions among people. Social bonds were seen as personal, communicative, and regulated by norms. In contrast, Knorr Cetina argues that modern life increasingly revolves around relationships between people and objects that act as active partners. These objects are not just static materials; they are entities with evolving, uncertain qualities that require ongoing involvement. They encourage exploration, create emotional investments, and shape social practices (Knorr Cetina, 1999, 2007; Salmani Bidgoli & Namazi, 2026). Situated within the broader tradition of Science and Technology Studies (STS), Knorr Cetina's theory extends earlier concerns with materiality by emphasizing the epistemic capacities of objects rather than treating them merely as passive instruments.

Central to this idea is the concept of the epistemic object. Unlike everyday objects, epistemic objects are incomplete and possess an internal complexity that cannot be fully comprehended at any given moment. Their key quality is that they always offer more to discover. This openness makes epistemic objects the center of inquiry, the guiding principle of communities, and the foundation of professional identities. In laboratory settings, for example, the molecule or cellular process being studied becomes the partner with which scientists engage. The object's resistance, unpredictability, and changing characteristics shape the work and commitments of the scientific community (Nerland & Jensen, 2016; Rescher, 2012).

Postsocial relations involve shifting social agency from humans to objects. Objects may lack intentionality, but they still exert force, structure interactions, and influence ways of living. These relationships are asymmetrical; objects do not respond in human ways, but they are still relational, emotionally charged, and contribute to social meaning (Knorr Cetina, 1997; Humphries & Smith, 2014). In financial markets, the electronic trading screen acts as an epistemic object that traders observe, engage with, and center themselves around. Its constant movement captures attention and triggers emotional responses. In molecular biology, the genetic sequence serves as an object that directs experimental practice (Chang, 2011; Miettinen & Virkkunen, 2005). The analytical significance of these examples lies not in their historical specificity but in the relational logic they reveal—namely, that material objects may organize sustained forms of knowledge production and social coordination. This relational logic provides the basis for the historical comparison developed in the present study.

The present study employs this theoretical framework as a heuristic lens through which selected features of medieval Persian medicine may be examined. Rather than claiming that Persian medicine constituted a postsocial society in the historical sense proposed by Knorr Cetina, the analysis investigates whether certain object-centered epistemic configurations exhibit structural—and, in selected domains, functional—similarities to those identified in contemporary knowledge societies. The following sections therefore examine medical texts, hospitals, instruments, and pharmacological practices to assess the extent to which they functioned as epistemic objects within their own historical context.

4.2. Persian Medicine as an Epistemic Culture

The medieval Persian world, from the ninth to the fifteenth centuries, witnessed the emergence of a sophisticated medical tradition that integrated clinical practice, theoretical inquiry, and practical innovation. Drawing upon Greek, Indian, Egyptian, Islamic, and local intellectual traditions, Persian medicine developed a distinctive epistemic culture in which medical knowledge was produced, transmitted, and continually refined (Emami et al., 2013; Gorji & Ghadiri, 2002; Hamedi et al., 2013; Zargaran & Zarshenas, 2017). Knowledge circulated through manuscripts, educational institutions, hospitals (bīmāristāns), itinerant scholars, and

apprenticeship networks, creating interconnected communities of learning (Angeletti, 1990; Nutton, 2004). This tradition produced influential encyclopedic works, most notably Ibn Sīnā's *Canon of Medicine (al-Qānūn fī al-Ṭibb)*, al-Rāzī's *Comprehensive Book (al-Ḥāwī)*, and later works such as Jurjānī's *Zakhīreh-ye Khwārazmshāhī*, alongside specialized treatises devoted to anatomy, pharmacology, diagnosis, and medical instruments. These works were not static repositories of inherited knowledge but remained central reference points for teaching, commentary, revision, and clinical practice across successive generations of physicians.

The epistemic culture of Persian medicine was fundamentally organized around material objects that mediated both knowledge production and professional practice. Medical manuscripts functioned not merely as containers of information but as evolving scholarly artifacts whose marginal annotations, commentaries, diagrams, and successive recensions continually reshaped interpretation and medical reasoning (Bulus & Abiola, 2025; Orayj, 2022). The *Canon of Medicine*, for example, generated an extensive tradition of commentary and abridgment that extended over several centuries, illustrating how authoritative texts remained open to continual interpretation rather than becoming intellectually closed. Likewise, hospitals (bīmāristāns) served not simply as places of treatment but as institutional environments in which architectural organization, clinical observation, instruments, teaching, and record-keeping collectively structured medical learning. Pharmaceutical substances—including herbs, minerals, distilled preparations, and compound remedies—required continual observation, classification, and therapeutic refinement, while diagnostic and astronomical instruments facilitated systematic interaction between physicians, patients, and the natural world (Garrison, 1933; Irannejad, 2023; Pourahmad, 2008).

Viewed through the analytical framework developed in the previous section, these material entities functioned not only as practical tools but also as object-centered focal points around which medical authority, professional identity, and scholarly communities were organized. Their significance derived not from passive materiality but from their capacity to sustain inquiry, coordinate practice, and invite continual engagement. The *Canon of Medicine*, for instance, exemplifies this relational dynamic: rather than operating as a closed repository of authoritative knowledge, it

remained an evolving object of inquiry through continuous commentary, pedagogical use, translation, and clinical interpretation. Similarly, hospitals, pharmaceutical substances, and diagnostic instruments acquired meaning through repeated interaction and practical engagement rather than through fixed or completed forms. These observations do not suggest that medieval Persian medicine constituted a postsocial society in the modern sense. Rather, they indicate that its epistemic culture exhibited object-centered relational configurations that are structurally comparable to the epistemic dynamics identified by Knorr Cetina in contemporary knowledge environments. The following sections examine each of these domains in greater historical detail (Moorey, 1985; Shoja & Tubbs, 2007; Ziai, 1975).

4.3. Manuscripts as Epistemic Objects

Manuscripts in Persian medicine played a central role as active, developing sources of knowledge. Their creation involved scribes, calligraphers, paper-makers, illuminators, and scholars, all contributing to the manuscript's changing identity (Melville, 2018). A manuscript was never finished; it allowed for marginal notes, commentaries, glosses, and super-commentaries that altered its content and meaning over time. The physical aspects of the manuscript, including its script, layout, diagrams, and even the quality of its paper, influenced how readers interacted with it and affected the spread of knowledge (Tadjbakhsh, 2007). The manuscript tradition surrounding Ibn Sīnā's *Canon of Medicine* illustrates this dynamic particularly well. Surviving copies frequently contain marginal annotations, corrections, glosses, and later commentaries added by successive generations of physicians, demonstrating that the text remained open to continual reinterpretation rather than functioning as a fixed repository of knowledge.

The manuscript's incompleteness relates closely to Knorr Cetina's idea of the epistemic object. It appeared as a problem to explore, a space for potential connections, and a place for further investigation. Physicians viewed manuscripts not just as sources of authoritative knowledge but as partners in a continuing relationship of understanding. They revisited the text over and over, drawing new insights, discussing interpretations, and providing corrections. The manuscript functioned relationally: it attracted attention, required care, and guided scholarly work (Buts et al., 2021;

Knorr Cetina, 2001; Vihla, 2000; Whitt, 2023). The *Canon of Medicine*, for instance, was repeatedly consulted not merely to preserve established doctrine but to resolve clinical problems, compare therapeutic approaches, and integrate newly accumulated experience into existing medical knowledge.

The manuscript's evolving nature is clear in the commentary tradition that thrived in Persian intellectual culture. Commentaries were not just reflections; they actively expanded on the subject. They changed the original text, forming a complex object that included different voices and interpretations. Each commentary raised new questions and opened up new possibilities, adding to the object's ongoing incompleteness. The manuscript turned into a living entity that supported communities of scholars over generations (Khan, 2016; Zaman, 1999). The extensive commentary tradition on the *Canon of Medicine* demonstrates this process particularly clearly. Scholars such as Fakhr al-Dīn al-Rāzī, Quṭb al-Dīn al-Shīrāzī, and numerous later commentators did not merely explain Ibn Sīnā's arguments; they questioned diagnoses, refined classifications, reconciled contradictions, and introduced new clinical observations. The manuscript therefore evolved through cumulative scholarly intervention, continuously expanding the epistemic possibilities embedded within the original work.

Manuscripts played a key role in establishing authority and professional identity. Owning a high-quality manuscript showed one's status in academic circles. Students engaged with texts through memorization, recitation, and annotation. These activities fostered strong connections with the manuscript, which were both educational and emotionally engaging. Medical education in many Persian scholarly circles required students to copy authoritative manuscripts, annotate them during instruction, and preserve them as professional resources throughout their careers.

Viewed through the analytical framework developed in this article, the Persian medical manuscript exhibits several structural characteristics associated with Knorr Cetina's epistemic objects. Its openness to continual revision, its capacity to organize scholarly communities, and its role in sustaining long-term engagement suggest an object-centered relational configuration that is structurally comparable to, although historically

distinct from, the postsocial dynamics described in contemporary knowledge environments (El Shamsy, 2020; Sardar, 1993). Rather than demonstrating the existence of postsociality in medieval Persia, the manuscript illustrates how similar epistemic relations could emerge within a fundamentally different historical and institutional setting (Becker, 2012; Nerland & Jensen, 2016).

4.4. Hospitals as Relational Environments

The hospital provides insight into the object-centered relationships in Persian medicine throughout the medieval Islamic period. Unlike modern hospitals, which are often seen as places controlled by bureaucracy and technology, medieval hospitals were knowledge-focused, epistemic environments. Their layout, architectural features, instruments, and record-keeping methods acted as essential parts of medical practice. The hospital itself shaped the actions of everyone inside it. Its design influenced social interactions: the arrangement of wards, the location of pharmacy rooms, the setup of patient beds, and the movement of students and doctors all relied on how the hospital was designed (Dols, 1987; Ragab, 2020).

The hospital's structure showed the traits of an epistemic object because it was always adapted, expanded, and reinterpreted. New wards were added, instruments were replaced, and protocols were modified. The institution was never complete, as it constantly offered new possibilities for intervention and change. Physicians engaged with the hospital as a dynamic partner, and its organization affected their diagnostic and therapeutic choices (Ragab, 2015; Sayılı, 1980).

Within the hospital, objects like clinical observations served as relational nodes. These records were not just data storage but also interpretive objects that facilitated communication among physicians. They preserved clinical narratives, allowed for comparisons between cases, and encouraged joint reasoning. The record's evolving nature, which was continually updated, corrected, and annotated, established a relational dependency between the physician and the object. It required attention, invited interpretation, and shaped clinical practice.

The hospital's pharmacy acted as an important epistemic environment. Shelves filled with various substances, jars of compounds, and

preparation tools created a system focused on objects that influenced interactions. Apprentices engaged with these substances using their senses—smelling, tasting, touching, and observing reactions. These materials functioned as relational objects in processes of exploration, eliciting fascination, caution, and curiosity. Their properties were never fully understood; each new preparation uncovered potential differences, leading to further experiments (Ragab, 2015, 2020). Thus, the pharmacy exemplified the open-endedness of the epistemic object: it was a space of ongoing inquiry, where understanding was continuously reassessed and renegotiated.

Viewed through the analytical framework adopted in this article, the medieval bīmāristān exhibits several structural characteristics associated with object-centered epistemic relations. Its architectural organization, material infrastructure, pharmaceutical spaces, and clinical practices collectively mediated professional interaction and knowledge production. This comparison does not imply that medieval hospitals constituted postsocial institutions in the late modern sense proposed by Knorr Cetina. Rather, it suggests that they embodied historically specific relational configurations in which material environments actively organized medical knowledge and professional practice.

4.5. Pharmaceutical Substances and Material Knowledge

Persian medicine's object-centered relationality is most clearly seen in pharmacology. Pharmaceutical agents, such as herbs, minerals, animal products, distilled substances, and complex formulations, remained dynamic objects that did not have their properties wholly revealed. Works such as Ibn Sīnā's *Canon of Medicine* and Ismāʿīl Jurjānī's *Zakhīreh-ye Khwārazmshāhī* devoted extensive sections to the classification, preparation, and therapeutic properties of medicinal substances, illustrating the centrality of material objects within Persian medical knowledge. They were knowledge-producing (epistemic) entities that demanded regular communication and involved observation, experimentation, and sensory engagement (Hamedi et al., 2013; Zargaran & Zarshenas, 2017).

The incompleteness of the ontology of pharmaceutical substances corresponds very well to the qualities of the epistemic object. Physicians and pharmacists knew that the actions of substances differed according to

the way they were made, the amount given, the time of year, the place of origin, and the combination with other substances. The effects were uncertain; therefore, patient trials and meticulous documentation were essential. Every single material allowed for the acquisition of new knowledge and the formulation of new questions. Both the *Canon* and the *Zakhīreh* repeatedly emphasize that the efficacy of a remedy depends upon factors such as the quality of raw materials, geographical origin, season, dosage, preparation techniques, and the patient's individual temperament (*mizāj*). Consequently, medicinal substances could never be treated as fixed entities; rather, they demanded continual observation and clinical judgment. The object's developing character demanded a relational connection: physicians and pharmacists did not gain their knowledge just through reading but by actually experiencing the substances through their senses (Golshani et al., 2015; Irannejad, 2023).

Physicians' engagement with pharmaceutical substances involved sustained practical attention, careful judgment, and professional commitment. Such engagement frequently required patience, caution, and confidence developed through repeated clinical experience. Although historically distinct from contemporary laboratory settings, these forms of attachment resemble what Knorr Cetina describes as the affective dimension of epistemic objects (Salmani Bidgoli, 2025).

In addition, the use of substances mediated social relations by serving as markers of professional expertise and marked social stratification and professionalism in society. The skill of distinguishing original materials, making compounds, and foreseeing effects was the means to attain an authoritative position. Knowledge of substances was transmitted through apprenticeship, with direct engagement with objects constituting a central component of the learning process. Medical education commonly required apprentices to identify raw materials, prepare compound remedies, and observe therapeutic outcomes under the supervision of experienced physicians and pharmacists. Practical engagement with medicinal substances therefore constituted an essential component of professional formation rather than merely an application of textual knowledge. The substance was the focal point of the teacher-student relationship: the teacher controlled the student's interaction with the object, showing how to read signs and effects. Consequently, the

pharmaceutical object formed a relational triad interconnecting student, teacher, and substance.

Viewed through the analytical framework developed in this article, pharmaceutical substances exhibit several structural characteristics associated with epistemic objects. Their therapeutic properties remained open to continual investigation, their efficacy depended upon ongoing interaction, and their practical use organized relationships among physicians, apprentices, pharmacists, and patients. These observations do not imply that medieval Persian pharmacology constituted a postsocial domain in the late modern sense. Rather, they suggest that pharmaceutical practice embodied historically specific object-centered relational configurations that are analytically comparable to the epistemic dynamics identified by Knorr Cetina.

4.6. The Social Life of Instruments

Scientific and medical instruments in the Islamic and Persian world, such as astrolabes, mortars, balances, and diagnostic tools, played central relational roles. Medical instruments are described extensively in works such as al-Zahrāwī's *al-Taṣrīf* and appear throughout Persian medical literature, including Ibn Sīnā's *Canon of Medicine*. Surgical instruments, urine flasks used in uroscopy, balances employed in pharmaceutical preparation, and astrolabes for determining astronomical conditions related to medical practice illustrate the diversity of material devices that mediated diagnosis, treatment, and teaching. These instruments facilitated interactions between physicians and patients, offering structured ways to perceive and interpret bodily signs. They were not just extensions of the body but active participants in diagnostic reasoning. Using them required training, interpretation, and trust (Ganchy, 2009; Shamsaei & Mahmoudi, 2017).

The role of the instrument lay in its ability to shape how phenomena were perceived. It filtered sensory information, showed new types of evidence, and focused attention on specific features of the body (Käs, 2023). Like other knowledge-seeking epistemic objects, the instrument had an open-ended ontology. It needed calibration, produced surprising results, and uncovered phenomena that required further investigation. Physicians worked with instruments as partners, and their behavior affected clinical decisions.

Instruments also served as a means of expressing authority. Owning advanced tools indicated one's expertise and scholarly standing. These instruments were exchanged among physicians as gifts or objects of prestige, strengthening social connections. Their depiction in manuscripts—through illustrations—highlights their conceptual significance (Brown et al., 2019; Ganchy, 2009). Illustrated surgical instruments in al-Zahrāwī's *al-Taṣrīf* demonstrate that instruments themselves became objects of scholarly transmission. Their depiction in manuscripts allowed techniques to circulate together with the material forms through which medical practice was organized. Thus, instruments played a role in a relational system and framework where objects influenced authority, trust, and identity.

Viewed through the analytical framework employed in this study, medical instruments exhibit several structural characteristics associated with epistemic objects. Their effective use depended upon sustained practical engagement, interpretive judgment, and continual refinement rather than passive application. By organizing interactions among physicians, apprentices, patients, and material devices, instruments participated in historically specific object-centered relational configurations. This comparison does not imply that medieval Persian medicine constituted a postsocial society in Knorr Cetina's historical sense; rather, it demonstrates that analogous forms of object-mediated epistemic relations emerged within a distinct premodern context.

4.7. Pedagogy and the Formation of Professional Identity

The formation of the medical profession in the traditional Persian world was equally dependent on relationships with people and with objects. Manual reading of manuscripts, observing substances, and participation in hospital routines were all part of the pedagogy process essential to professional formation (Asad et al., 2024; Dajani, 1989). Medical education in the Persian tradition was structured around authoritative texts such as Ibn Sīnā's *Canon of Medicine*, which students copied, memorized, annotated, and discussed under the supervision of experienced physicians. Mastery of medicine therefore depended not only upon interpersonal instruction but also upon sustained engagement with material objects, including manuscripts, medicinal substances, diagnostic instruments, and clinical practice within the bīmāristān. The objects

helped in the learning process by providing focal points around which interactions unfolded. Through the process of annotation, memorization, and recitation, students interacted with the texts and formed relationships with them. The manuscript functioned not merely as a medium of transmission but as an enduring focus of intellectual engagement through which professional competence was progressively developed. Directly, through their senses, students acquired knowledge of substances, and at the same time, they developed relational dependencies with pharmacological objects. Instruments served as the means of training in the skills of perceiving and interpreting (Hamarneh, 2021; Pocock & Rezaeian, 2016). The hospital was an environment that facilitated relationships among objects, spaces, and bodies.

Viewed through the analytical framework adopted in this study, professional identity in medieval Persian medicine emerged through sustained interaction with manuscripts, hospitals, pharmaceutical substances, and medical instruments as well as through interpersonal instruction. These material engagements organized learning, stabilized professional authority, and structured medical expertise (Kasule, 2013; Wahid et al., 2021). Rather than demonstrating the existence of postsocial professions in the medieval world, this analysis suggests that the formation of medical identity relied upon historically specific object-centered relational configurations that are analytically comparable to those described by Knorr Cetina for contemporary knowledge societies.

5. Discussion

The historical analysis presented in this study suggests that medieval Persian medicine was characterized by sustained forms of object-centered engagement that played a constitutive role in the production of medical knowledge, the organization of professional authority, and the formation of scholarly communities. Manuscripts, hospitals, pharmaceutical substances, and medical instruments functioned not merely as passive tools or repositories of information but as material entities around which intellectual activity, clinical practice, and pedagogical relationships were organized. Examined through the analytical framework developed in this article, these objects display several structural characteristics associated with Knorr Cetina's epistemic objects, including openness,

incompleteness, relational productivity, and the capacity to organize sustained epistemic engagement. This comparison should be understood as an analytical interpretation rather than a claim of historical identity. The findings do not suggest that medieval Persian medicine constituted a postsocial society in the strict historical sense proposed by Knorr Cetina for late modern knowledge environments. Rather, they demonstrate that historically distinct object-centered epistemic configurations may exhibit relational dynamics that are structurally comparable to those described within contemporary postsocial theory.

These findings also contribute to broader theoretical conversations within Science and Technology Studies. By emphasizing the active role of material entities in organizing knowledge, the analysis resonates with Bruno Latour's Actor–Network Theory, which rejects rigid distinctions between human and non-human actors and instead conceptualizes knowledge as emerging through heterogeneous networks of relations. Likewise, the interpretation presented here parallels Hans-Jörg Rheinberger's concept of *epistemic things*, according to which scientific objects remain productive precisely because they are incomplete and continuously generate new questions. At the same time, the historical perspective adopted in this study complements Michel Foucault's archaeology of knowledge by illustrating how material arrangements participate in the constitution of epistemic orders rather than merely reflecting them. Similarly, Ian Hacking's notion of historical ontology provides a useful framework for understanding how forms of knowledge emerge through historically contingent practices instead of timeless conceptual categories. Finally, Annemarie Mol's emphasis on the multiplicity of objects reminds us that medical objects acquire different identities through diverse practices of observation, diagnosis, teaching, and therapeutic intervention. Rather than replacing these theoretical perspectives, the present study demonstrates their combined usefulness for interpreting premodern epistemic cultures while simultaneously extending their geographical and historical scope.

From the perspective of the history of medicine, the findings encourage a reconsideration of Persian medicine as a material epistemic culture rather than solely as a collection of canonical texts or intellectual doctrines. Previous scholarship has understandably concentrated on the

transmission of Greek medicine, the achievements of major physicians, or the development of medical theories. While these dimensions remain fundamental, the present analysis shifts attention toward the material infrastructures through which medical knowledge was historically produced and maintained. Manuscripts were continually transformed through copying, annotation, and commentary; hospitals organized relationships among physicians, students, patients, and therapeutic spaces; pharmaceutical substances required ongoing experimentation and sensory engagement; and medical instruments mediated diagnostic perception and professional expertise. These material practices reveal that knowledge emerged through continuous interaction between people and objects rather than through abstract intellectual activity alone.

The implications of these observations for postsocial theory should, however, be stated with appropriate caution. The evidence presented here does not establish that postsocial relations originated in medieval Persia, nor does it invalidate Knorr Cetina's argument that postsociality characterizes late modern knowledge societies. Instead, the historical evidence suggests that several structural features associated with postsocial relations—including sustained engagement with open-ended knowledge objects, the organization of expertise through material entities, and the centrality of object-mediated epistemic practices—can also be identified within a historically distinct medical culture. The comparison advanced in this article is therefore based upon structural similarity rather than historical equivalence. Medieval Persian medicine should be understood as an analytically productive historical case that enables a reconsideration of the temporal and geographical boundaries within which postsocial theory has traditionally been applied. In this sense, the article seeks not to replace Knorr Cetina's conceptualization but to broaden its analytical horizon through historical investigation.

More broadly, this study contributes to current efforts to globalize Science and Technology Studies by demonstrating that historical knowledge traditions outside Europe can serve not merely as empirical illustrations of existing theories but as productive sites for theoretical refinement. Medieval Persian medicine offers an example of how concepts developed within contemporary sociology may be critically re-examined through historical analysis. Rather than treating non-Western scientific traditions as peripheral cases, this approach recognizes them as important

sources for testing, extending, and qualifying sociological concepts. Such a perspective encourages a more pluralistic understanding of the history of science in which theoretical innovation emerges through dialogue between contemporary social theory and historically diverse epistemic cultures.

Several limitations should nevertheless be acknowledged. The present study is based primarily on conceptual historical analysis and published historical scholarship rather than direct examination of manuscripts, archival materials, or institutional records. Although this approach is appropriate for the theoretical objectives of the article, future research could strengthen and refine these arguments through detailed manuscript studies, analyses of individual hospitals, investigations of specific pharmacological traditions, or examinations of particular medical instruments. Comparative research involving other premodern medical traditions may further clarify which dimensions of object-centered epistemic relations are historically widespread and which remain specific to particular cultural settings. Such investigations would contribute not only to the historiography of medicine but also to the continuing development of Science and Technology Studies by providing a richer historical basis for evaluating the scope and applicability of concepts such as epistemic objects and postsocial relations.

6. Conclusion

This study has examined medieval Persian medicine through the analytical lens of postsocial theory to explore the historical significance of object-centered epistemic relations. Rather than treating manuscripts, hospitals, pharmaceutical substances, and medical instruments as passive supports for medical practice, the analysis has shown that these material entities actively organized the production, transmission, and stabilization of medical knowledge. Viewed through the conceptual framework developed in this article, these objects display several structural characteristics associated with Knorr Cetina's epistemic objects, including openness, incompleteness, relational productivity, and sustained engagement. The comparison advanced here is analytical rather than historical; it does not suggest that medieval Persian medicine constituted a postsocial society in the strict sense proposed for late modern scientific environments.

The findings instead indicate that historically distinct epistemic cultures may develop object-centered relational configurations that share important structural similarities with those described in contemporary postsocial theory. Medieval Persian medicine therefore provides a historically productive case for reconsidering the temporal and geographical boundaries within which postsocial concepts have generally been applied. Rather than challenging Knorr Cetina's account of late modern knowledge societies, this study extends the analytical conversation by demonstrating how historical investigation can contribute to refining sociological concepts.

More broadly, the article contributes to ongoing efforts to globalize Science and Technology Studies by demonstrating that non-Western histories of science can serve not merely as empirical illustrations of existing theories but also as sources of theoretical development. Persian medicine is presented here not simply as a historical tradition of medical knowledge but as a rich material epistemic culture through which the relationships among objects, knowledge, and social organization may be reconsidered from a global historical perspective.

The present study therefore argues not that postsocial relations originated before modernity, but that several relational features associated with postsocial theory possess a broader historical genealogy than is commonly recognized. Future research based on manuscript studies, archival evidence, hospital records, and comparative analyses across other premodern scientific traditions will be essential for further evaluating the historical scope and explanatory potential of object-centered approaches within Science and Technology Studies and the history of medicine.

Conflict of Interest

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