

# Muhammed Ibn Zakariya Al-Razi

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## Muhammed Ibn Zakariya Al-Razi

**Born:** 854 | **Died:** 925

**Nationality:** Persian

**Primary Field(s):** Medicine, Alchemy, Philosophy, Ophthalmology, Mathematics, Optics

### 1. Summary

Muhammed ibn Zakariya al-Razi, known in the Western world as **Rhazes**, was a towering figure of the Islamic Golden Age, born in the city of Ray, near modern Tehran, which contributed the suffix al-Razi to his name. A true polymath, his intellectual pursuits spanned an extraordinary range of disciplines, encompassing medicine, alchemy, philosophy, mathematics, and optics. His prolific output is evidenced by over 200 manuscripts, many of which made profound and lasting contributions to human knowledge. Al-Razi is particularly celebrated for his pioneering approach to medicine, which emphasized empirical observation and experimentation, a stark departure from the dogmatic traditions prevalent at the time.

As a physician, Al-Razi championed rational inquiry and clinical observation, advocating for a systematic approach to diagnosis and treatment. He served as the chief physician of hospitals in both his native Ray and Baghdad, then a vibrant intellectual hub, where he managed medical facilities, taught students, and conducted extensive research. His commitment to the scientific method led him to challenge established medical authorities, most notably the revered Greek physician Galen, demonstrating a critical spirit that was rare and courageous for his era. This intellectual bravery paved the way for future scientific advancements by encouraging scrutiny and verification of existing knowledge.

Beyond his medical prowess, Al-Razi was a distinguished philosopher and a practical alchemist. His philosophical system, though controversial in some circles, underscored the importance of reason and intellect in understanding the world and guiding human conduct. In the realm of alchemy, he moved away from mystical speculation, focusing instead on practical chemistry, developing new substances and apparatus. His holistic intellectual approach and unwavering dedication to empirical evidence solidified his reputation as one of the most significant and influential scholars in history, whose legacy profoundly shaped both Eastern and Western scientific thought.

### 2. Medical Innovations and Practice

Al-Razi's contributions to medicine were revolutionary, characterized by his emphasis on clinical observation, experimental methodology, and the critical evaluation of traditional medical texts. One of his most significant achievements was the precise differentiation between smallpox and

measles, detailed in his seminal work, *Kitab al-Judari wa al-Hasbah* (Treatise on Smallpox and Measles). Before his time, these two highly contagious diseases were often conflated due to their similar initial symptoms. Al-Razi meticulously described their distinct clinical courses, including the incubation period, eruption patterns, and prognosis for each, providing the first clear and accurate account that enabled physicians to diagnose and treat them separately. This groundbreaking work showcased his keen observational skills and laid the foundation for modern epidemiology and differential diagnosis.

Furthermore, Al-Razi was a strong proponent of **experimental medicine**, a concept that was nascent in his time. He did not simply record observations but actively sought to test hypotheses and verify treatments through practical application. His medical practice included detailed patient histories, careful examinations, and a systematic follow-up, reflecting a clinical approach that mirrors modern medical standards. He also made significant advancements in pharmacology, introducing various chemical compounds and herbal remedies into his therapeutic regimens. His use of alcohol as an antiseptic in surgical procedures and the preparation of medicaments further underscores his innovative spirit and practical application of chemical knowledge to medical problems.

As a hospital administrator, Al-Razi implemented high standards of patient care and hygiene. He understood the importance of a clean environment in preventing the spread of disease and promoted humane treatment for all patients, regardless of their social status. His commitment extended to the well-being of the poor, as evidenced by his work *Tibb al-Fuqara'* (Medicine for the Poor), which provided guidance on affordable and accessible treatments. Al-Razi's holistic approach to medicine, integrating diet, lifestyle, and psychological factors alongside physical treatments, demonstrated a comprehensive understanding of health that was far ahead of his contemporaries. His medical texts served as indispensable references for generations of physicians, profoundly influencing medical education and practice across both the Islamic world and medieval Europe.

### 3. Alchemical and Chemical Discoveries

Al-Razi's engagement with alchemy was largely distinct from the mystical and speculative traditions often associated with it; he approached it with a pragmatic and empirical mindset, effectively transitioning towards what we now recognize as chemistry. He systematized the classification of chemical substances, dividing them into categories such as mineral, vegetable, and animal, and meticulously described various chemical processes and apparatus. His works detail practical techniques like distillation, sublimation, calcination, and filtration, which were crucial for the isolation and purification of compounds. He designed and utilized specialized laboratory equipment, including retorts, crucibles, and alembics, laying the groundwork for experimental chemistry.

Crucially, Al-Razi was a vocal critic of the prevalent belief in the transmutation of base metals into gold, a cornerstone of traditional alchemy. He argued against the feasibility of such transformations based on his extensive practical experience in the laboratory, asserting that such claims lacked empirical evidence. This critical stance challenged a deeply ingrained alchemical dogma and marked a significant intellectual shift towards a more rational and scientific investigation of matter. His focus was on the observable properties and reactions of substances, rather than the pursuit of mythical elixirs or the philosopher's stone, thereby distinguishing his work from his more esoteric predecessors.

Among his numerous chemical discoveries, Al-Razi is credited with the preparation of sulfuric acid, a compound of immense industrial importance, and the purification of alcohol, which he widely used in medicine for antiseptic purposes and as a solvent. His book *Al-Sirr al-Makhtum* (The Sealed Secret) is a comprehensive treatise on chemical substances, equipment, and processes, offering a practical guide to experimental chemistry. Through his meticulous experimentation and systematic documentation, Al-Razi transformed alchemy from a largely mystical pursuit into a more empirical science, thereby contributing foundational knowledge and methodologies that were essential for the later development of modern chemistry.

#### 4. Philosophical and Ethical Thought

Al-Razi's philosophical thought was as distinctive and influential as his scientific work, though it often placed him at odds with the religious orthodoxy of his time. He developed a unique metaphysical system centered on what he called the **five eternal principles**: God, the Universal Soul, prime matter, absolute space, and absolute time. These principles, which he believed to be co-existent with God, formed the basis of his cosmology and his understanding of creation. This pluralistic view contrasted sharply with prevailing monistic interpretations within Islamic philosophy, which often posited a single, absolute reality derived solely from God. His philosophy emphasized the rational order of the universe and the human capacity to understand it through intellect and observation.

A staunch advocate for **reason** and critical thinking, Al-Razi believed that human intellect was the ultimate tool for attaining truth and understanding divine wisdom. He often expressed skepticism towards dogma, tradition, and blind adherence to religious authority, urging individuals to engage in independent inquiry and philosophical reflection. His writings sometimes implied a rationalist critique of prophecy and revealed religion, suggesting that reason alone was sufficient for moral guidance and understanding the world. This stance, articulated in works such as *Filosofiya al-Mutawajih* (The Spiritual Medicine), positioned him as a radical thinker whose ideas stimulated vigorous debates among contemporary Islamic philosophers and theologians regarding the relationship between faith, reason, and scientific truth.

Al-Razi's ethical philosophy was deeply rooted in the pursuit of a virtuous life through moderation and intellectual development. He argued that the human soul, being eternal, strives for liberation from the material world and its temporal pleasures, which can only be achieved through the cultivation of reason and self-control. His ethical treatise, *Al-Tibb al-Ruhani* (Spiritual Medicine), provides practical advice for achieving inner peace and moral excellence by overcoming passions and vices. He stressed the importance of intellectual inquiry, altruism, and the avoidance of excess in all aspects of life. This integration of philosophical ethics with his medical and scientific outlook reflects his comprehensive vision of human flourishing, where physical and spiritual well-being are inextricably linked through rational conduct and the pursuit of knowledge.

## 5. Major Works and Literary Output

### ***Kitab al-Hawi fi al-Tibb* (The Comprehensive Book of Medicine / Continens Liber) (900s):**

This monumental medical encyclopedia, spanning over twenty volumes, is perhaps Al-Razi's most significant work. It serves as a comprehensive collection of medical knowledge from Greek, Indian, and early Islamic sources, interwoven with Al-Razi's own clinical observations and experiences. Structured as a commonplace book, it contains extensive excerpts from various authors, personal clinical notes, and detailed case studies. Its sheer breadth and meticulous detail made it an indispensable reference work for physicians and scholars for centuries, first in the Islamic world and later in Europe through its Latin translation, *Continens Liber*. It played a crucial role in transmitting and consolidating medical knowledge across civilizations.

***Kitab al-Judari wa al-Hasbah* (Treatise on Smallpox and Measles) (Early 900s):** This groundbreaking monograph stands as a testament to Al-Razi's clinical acumen and observational skills. It provides the first clear and accurate differential diagnosis between smallpox and measles, two distinct diseases often confused due to their similar initial symptoms. Al-Razi described their respective etiologies, symptoms, progression, and treatments with such precision that it remained the authoritative text on these diseases for centuries. Its scientific rigor and empirical basis solidified his reputation as a master clinician and epidemiologist.

***Al-Shukuk ala Galinos* (Doubts on Galen) (900s):** In this influential work, Al-Razi courageously challenged the authority of Galen, the revered Greek physician whose theories had dominated medical thought for over 700 years. Al-Razi systematically questioned and refuted several of Galen's anatomical, physiological, and pharmacological assertions based on his own clinical experience and experimentation. This critical examination of an established master demonstrated Al-Razi's commitment to empirical evidence over blind tradition and profoundly influenced the spirit of scientific inquiry by encouraging physicians to question and verify received knowledge rather than simply accepting it.

***Al-Tibb al-Ruhani* (Spiritual Medicine) (900s):** This philosophical treatise delves into ethics and psychology, offering guidance on how to attain spiritual well-being and moral excellence. Al-Razi outlines principles for controlling one's passions, cultivating virtues, and achieving intellectual and spiritual balance through the exercise of reason. It highlights his belief in the interconnectedness of

physical and mental health, demonstrating his comprehensive approach to human welfare.

***Al-Sirr al-Makhtum (The Sealed Secret) (900s)***: A significant work in the field of chemistry, this book serves as a practical manual detailing chemical substances, processes, and laboratory equipment. It reflects Al-Razi's empirical approach to alchemy, moving away from mystical speculation towards systematic experimentation and the classification of materials. This work contributed significantly to the development of practical chemistry and methodology.

## 6. Intellectual Context and Enduring Legacy

Muhammed ibn Zakariya al-Razi emerged during the zenith of the Islamic Golden Age, a period of unparalleled intellectual flourishing in the medieval Islamic world. This era saw the assimilation, preservation, and expansion of knowledge from ancient Greek, Roman, Persian, and Indian civilizations. Al-Razi was a product of this vibrant intellectual environment, actively engaging with and critically building upon the works of his predecessors, particularly the Greek masters like Galen and Aristotle. He did not merely translate or transmit knowledge; he interrogated it, tested it, and often refined or refuted it based on his own empirical findings. His intellectual independence and commitment to observation set him apart and contributed significantly to the dynamic nature of scientific inquiry during this period.

Al-Razi's enduring legacy is immense, particularly in the fields of medicine and chemistry. His works, especially *Kitab al-Hawi* and *Kitab al-Judari wa al-Hasbah*, were translated into Latin during the Middle Ages and became foundational texts in European medical curricula for centuries. Scholars like Gerard of Cremona were instrumental in bringing Al-Razi's advanced medical knowledge to the West, influencing generations of physicians from Salerno to Montpellier. He is often recognized as the "Father of Pediatrics" due to his detailed observations on childhood diseases and his humane approach to treating younger patients. His emphasis on experimental medicine, clinical observation, and the importance of a physician's moral character laid down principles that remain central to medical practice today.

Beyond specific medical advancements, Al-Razi's most profound impact lies in his advocacy for a rational and empirical approach to knowledge. His willingness to question established authority, coupled with his insistence on practical experimentation and rigorous observation, was revolutionary. He fostered a spirit of critical inquiry that was essential for the progress of science. His work served as a bridge between ancient learning and modern scientific methodology, demonstrating how intellectual traditions could be both preserved and advanced through systematic investigation and fearless questioning. Al-Razi's polymathic pursuits and his unwavering commitment to reason continue to inspire scholars across diverse disciplines, solidifying his place as one of history's most important scientific minds.

## 7. Criticisms and Debates

Despite his immense contributions, Al-Razi's intellectual independence and sometimes heterodox views attracted significant criticism and sparked considerable debate during and after his lifetime. His philosophical doctrine of the five eternal principles (God, soul, matter, time, and space) was a particular point of contention. This view, which suggested that certain entities co-existed with God eternally, challenged the prevailing Islamic theological concept of creation ex nihilo (creation out of nothing) and the absolute uniqueness of God's existence. Critics, often from orthodox Islamic schools of thought, accused him of heresy and philosophical deviation, arguing that his ideas contradicted fundamental tenets of Islam and the teachings of the Qur'an. This controversy contributed to a complex reception of his philosophical works, even as his scientific contributions were widely celebrated.

His bold critique of Galen, a revered medical authority, also generated considerable friction. In his work *Al-Shukuk ala Galinos*, Al-Razi systematically pointed out errors and inconsistencies in Galen's anatomical, physiological, and pharmacological theories based on his own clinical observations and experiments. While this critical approach is now seen as a hallmark of scientific progress, at the time, challenging such an established authority was perceived by some as arrogant or disrespectful. Many physicians and scholars of the era were deeply entrenched in the Galenic tradition and found Al-Razi's direct refutations difficult to accept, leading to intellectual skirmishes and resistance to his more innovative ideas. This dynamic highlights the tension between intellectual conservatism and scientific advancement in historical contexts.

Furthermore, Al-Razi's practical and empirical approach to alchemy, which led him to reject the possibility of transmuting base metals into gold, also drew criticism from more mystical alchemists. These traditionalists often viewed alchemy as a spiritual quest rather than a purely chemical endeavor, and Al-Razi's materialistic and rationalistic stance was seen by them as a diminution of the discipline's deeper meaning. His secular inclinations and emphasis on reason over revelation in some of his philosophical writings also positioned him outside the mainstream of religious thought, leading to accusations of atheism or irreligiosity by some of his detractors. These debates underscore the intellectual ferment of his era and Al-Razi's courageous willingness to pursue truth wherever his reason and empirical observations led him, even when it meant challenging deeply held beliefs.

### Further Reading

[Muhammad ibn Zakariya al-Razi - Wikipedia](#)

[al-Razi - Britannica](#)

[Rhazes: A Genius Physician in the Islamic Golden Age - NCBI](#)

[Al-Razi and the History of Science - The University of Chicago Press Journals](#)