

THE LIFE OF MUHAMMAD IBN ZAKARIYA RAZI AND THE DISCOVERY OF ALLERGIC ASTHMA

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Abu Bakr Muhammad ibn (son of) Zakariya Razi (Rhazes), (Figure 1), the great Iranian physician, philosopher, and scientist, known by some as the Arab Galen, was born in about 865 A.D. in Rey (south of modern Tehran) and died around 925 A.D. in the same city where he was born.

Razi is among the greatest physicians and scientists in the world. To the Iranians and Muslims, he is a figure like Hippocrates to the Greeks and other Europeans. In fact, he ought to be considered the father of experimental medicine.¹⁹ In addition to medicine, Razi was famous for his research on alchemy (chemistry), philosophy, mathematics, astrology, and literature. His contribution to the science of chemistry is worth examining in another paper.

We know nothing about Razi's studies in his youth except a few ambiguous references by Ibn Joljol of Andalusia in *Physicians' Biography (Tabaqat al Atebba)*, Ibn al Nadim in *Bibliography (Al Fehrest)*, Ibn abi Osibaeh in *Informational Sources (Oyoon al Anba)*, and Ibn Khallekan in *Biography of Late Nobles (Vafyat Al Aayan)*.⁴⁻⁷ On the whole, it seems Razi was involved in goldsmith's trade, money exchange, playing the lute, and magical sciences. According to Abou Rayhan Birouni, he suffered from eye disease because of the vapors of alchemy.² Abou al Hassan Zayd Bayhaghi said Razi went to an ophthalmologist for the treatment of his eyes. The ophthalmologist asked for 500 gold *denarius* coins to treat his eyes. Then he told Razi, "Medicine is better than alchemy; what you're doing is useless". So Razi quit alchemy.²³ Of course, this story seems merely fictional. At any rate, Razi studied medicine in Rey. It is said that Razi was a student of Ali ibn Rabban Tabari while he studied medicine; considering Tabari's birth and death (861 A.D.), however, Razi must have been Tabari's student indirectly. In some sources, Razi is said to have been a student of Abdus ibn Zayd (d. 900 A.D.), author of *The Life of Physicians*, but the truth of the matter remains dubious. Anyway, Razi studied medicine in Rey in his thirties. In addition to learning from his local teachers, Razi read more books and did experiments to complete his education. Later, he continued his work and gained

more experience in Baghdad. Ibn Nadim relates what one of Razi's fellow-citizens said about him: "He was continually reading, writing, and taking notes; whenever I visited him, I saw him writing and making fair copies, p. 531." Further, Ibn Nadim relates what Razi himself used to say; the same fellow-citizen told this about Razi: "I [Razi] learned philosophy from Balkhi." It seems Razi's philosophy teacher was Abu Zayd Ahmad ibn Sahl Balkhi (d. 934 A.D.). Shortly after, Razi wrote "The Sense of Smell" (*Shammyeh*), which will be discussed further in this paper.

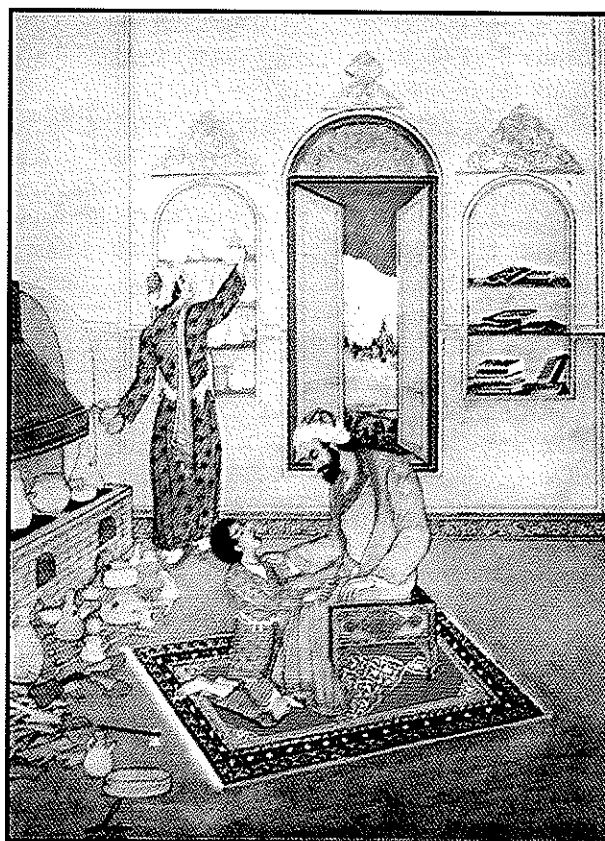


Fig. 1 . Razi is portrayed while treating a sick child. Oil painting by Hosein Behzad, painted in 1964 by the order of Razi Institute. The University of Tehran and UNESCO National Commission had the painting printed in the same year.

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Abu al Abbas-e Iranshahri, a *hakim** (wise man) from Neishabur in Iran, is also known to be Razi's philosophy teacher.^{4,7, 19, 21}

During the reign of the caliph called Al Moktafi (901-907 A.D.), Razi left for Baghdad to study medicine and philosophy. Baghdad was the center of translators and scholars of the time and followed the fashion of Jundishapur University. It is said that Razi became the head of Azodi Hospital in Baghdad. Of course, Azodi Hospital was founded by Azadodoleh Deylami in 982 A.D., that is, years after the death of Razi. Therefore, apparently Razi was in charge of another hospital in Baghdad. Once he became famous in the field of medicine, Razi was invited by emirs and physicians and wrote articles for them. But according to himself, and as we shall note too, he was never at the service of any special person as he was deeply committed to science.^{17, 19}

Razi returned home for some time, and it seems he was the head of Rey Hospital before taking charge of Baghdad Hospital. In *Four Articles (Chahar Maghaleh)* dated 1155 A.D., Nezami Aruzi points to Razi's trip to Bukhara and the treatment of an emir named Mansour ibn Nooh-e Samani who suffered from paralysis.⁹ The story, however, does not correspond with historical facts. When Abu Saleh Mansour ibn Eshagh ibn Ahmad Samani was appointed by Emir Esma'eel Samani as the governor of Rey (about 902 A.D.), Razi was put in charge of Rey hospital. Later, when Mansour ibn Eshagh was the governor of Khorasan, Razi went to Neishabur to treat him.

Ibn Nadim (909-985 A.D.) refers to Razi's medicine courses in his *Al Fehrest* (p. 531). He writes that Razi's students answered the questions according to their seniority; that is, first the juniors would try to answer the questions, then the seniors, and if they all failed, Razi himself would settle the matter.⁵

Ibn Khallakan (d. 1282 A.D.) notes of Ibn Joljol Andalusian that Razi wrote a book on alchemy for Mansour ibn Eshagh Samani. Mansour asked Razi to turn metal into gold using the book, but Razi failed. Mansour had rewarded him with one thousand *dinars* for writing the book, yet when he found Razi could not make gold, he ordered his men to pound the book on his head. For this reason, Razi got cataract.⁶ There is no reference to this incident in Ibn Abi Osibaeh's book (pp. 150-153), and it seems to be merely fiction.⁴ Razi himself says he lost his eyesight because of reading too much.¹⁷ It is said that one of his students from Tabarestan (in the north of the country) went to Rey to treat his teacher's eyes. Razi asked him about his method of treatment, and the physician suggested lentectomy. Razi thanked him and said, "I watched this

world so much that I got tired, and now death is approaching." Shortly after this, Razi passed away in 925 A.D.^{6, 19}

Razi's works and his fermentation theory concerning the cause of contagious diseases

Razi is considered one of the world's most prolific writers. He is said to have written 184 to 277 books and articles.^{2, 4, 5, 19} His most important book is *Al Havi (Continens, Continent)*, the drafts of which were kept by his sister. The book was compiled with the financial support of Ibn Amid (d. 976 A.D.), minister of Roknoddoleh, the Daylami king, and the efforts of Razi's students. It shall be discussed further in this article.¹⁸ Al Mansouri's book is a short, famous book that Razi wrote under the name of Mansour ibn Eshagh Samani. This book is Razi's most important after *Al Havi*. It has been translated into Latin and many European languages and used to be a major book in medicine throughout the world. Razi wrote *Al Teb al Molooki (Royal Medicine)* for Ali ibn Vahsudan Daylami, the governor of Tabarestan.^{19, 22} The book called *Al Jadri va al Hasbeh (Smallpox and Measles)* is the oldest book ever written on the subject of smallpox and measles, and contagious diseases in particular. Razi propounds a special theory on the cause of contagious diseases for the first time in the history of medicine. His theory is expressive of the fermentation theory, which was put forward by Louis Pasteur about one thousand years later and which led him to the discovery of microbes as the cause of infectious diseases.^{14, 21, 22}

Razi considers a kind of yeast, which exists in the body of all people, as the cause of smallpox. He believes the yeast is somehow transferred from mothers to infants. This yeast enters the blood to drive out harmful substances, and this is how smallpox appears. It might also be transmitted to others. Razi writes in this book (pp. 4, 6): "Smallpox appears when the blood boils and is infected so that extra vapors may be driven out to turn childhood blood, which looks like wet extracts, into youth blood, which looks like ripe wine. Essentially, smallpox is like the bubbles found in wine at this time . . . This disease might also be present apart from such times. The best thing to do at such times is to avoid it, that is, when the disease is seen to become epidemic."

Consequently, Razi believes smallpox is caused because of a certain yeast found in man's blood. When this yeast becomes active, he notes, it makes the blood boil until it turns into ripe wine. Therefore, one may conclude that Razi was the first person to mention the theory of fermentation—or in the modern term, theory of microbes—in contagious diseases, and he clearly points to the fact that smallpox is a contagious disease. He is also the first person to distinguish smallpox from measles. Razi's theory of fermentation was repeatedly referred to by scientists after him; especially, it was completed by Avicenna. Although today we know that the agent which transmits smallpox is a virus

*In the world of Islam, certain people were known as hakims. These were usually physicians, writers, poets, astrologists, and mathematicians. And most importantly, a wise man is called a hakim.⁸

which is not transmitted from the mother to the child, Razi's theory is basically correct regarding the fact that smallpox and other contagious diseases are caused by a certain kind of yeast; and this constitutes the foundation of the science of contagious diseases.^{14, 19, 21, 22}

Other books written by Razi and Razi's scholarly life

Razi's books and articles on medicine include *The Book for the Elite (Mofid al Khavas)*, *The Book of Experiences*, *The Cause of the Death of Most Animals because of Poisonous Winds*, *The Physicians' Experiments*, *The Person Who Has No Access to Physicians*, *The Big Pharmacology*, *The Small Pharmacology*, *Gout*, *The Doubt on Galen (Al Shakook ala Jalinoos)*, *Kidney and Bladder Stones*, etc.^{18, 19}

Among Razi's books on philosophy, the following books, as well as eight other articles, were printed in Cairo by Krauss: *Spiritual Medicine*, *The Philosophical Approach (Al Syrat al Falsafiah)*, and *The Metaphysics*.¹⁷ Razi's books on chemistry include *An Introduction to Teaching Chemistry (Al Madkhal al Talimi)*, *Proving the Science of Chemistry (Esbat al Sana'at)* and *The Secret of Secrets (Ser al Asrar)*. All of the books of Razi, who was originally from Iran, were written in Arabic. It should be noted that the language of science at the time of Razi was Arabic. Farsi could not yet express scientific subjects; and it was for this reason that Razi wrote his books in Arabic.^{19, 21}

In philosophy, Razi was mainly inclined toward Plato, and his philosophical views were chiefly in rejection of Aristotle's. He believed in the advancement of science; thus, at times, he even regarded himself above Plato and Aristotle. In philosophy, he considered himself a little lower than Socrates, and in medicine, he considered himself equal to Hippocrates. He believed that some of his views would be rejected by future scientists just as the views of the scientists of the past had been rejected by him. Razi did not merely rely on theory in medicine; he was a true physician in theory and in practice and used to say, "Experience is above science in medicine." In addition to internal medicine, Razi also specialized in gynecology, obstetrics, surgery, and ophthalmology, and he wrote great articles on contagious diseases, and common diseases between human beings and animals, and special cases in veterinary medicine.¹⁹ In his *The Doubt on Galen* (17: pp. 1-2), Razi notes "science develops through the ages, and it will take the scientists of the future only a short time to reach at what was discovered by scientists in the past in such a long time." About the methods of treatment, Razi writes, "If the patient may be treated with a diet, avoid drugs; and if he may be treated by simple drugs, avoid compound drugs." (6: p. 106). And this is truly a natural approach to the treatment of patients.

A glance at *The Philosophical Approach (Al Syrat Al*

Falsafiah), which illustrates Razi's ideas and the extensiveness of his worldview, reveals how Razi responded logically to those who lashed out at his beliefs: "In short, so far while I am writing the present book, I have written around 200 books and articles on different aspects of science, philosophy, theology, and hekmat (wisdom) . . . I was never at the service of any king as a military man or a man of office, and if I ever did have a conversation with a king, it never went beyond my medical responsibility and advice . . . Those who have seen me know that I have never gone to excess in eating, drinking, and doing blamed things . . . As for my interest in science, people know well and have witnessed how I have devoted all my life to science since my youth . . . And my patience and persistence in the pursuit of science have been to such extent that about only one special matter I have written 20,000 pages in small letters, and I spent fifteen years of my life—day and night—writing the big collection entitled *Al Havi*, and during this time, I lost my eyesight, my hand got paralyzed, and thus, now I am deprived of reading and writing as a result. Nonetheless, I never gave up, but kept on reading and writing with the help of others instead. Practically speaking, I can make concessions to my enemies and admit my shortcomings, but I wonder what they would say scientifically. If they find my approach defective, they can put forward their views and make their points clear so that I may study them. If I found their views right, I would admit it, and if I found them wrong, I could discuss the matter and prove my case. However, if this is not the case, and if they merely disagree with my approach and my way of life, I hope they would make use of my knowledge and not interfere with my attitude."¹⁷

Razi's *Al Havi*

Al Havi is Razi's most significant and comprehensive work, which is truly an encyclopedia of medicine. It was the most reliable source in medicine throughout the world for centuries. In this book, different diseases and their treatments have been discussed, and the views of previous physicians have been mentioned with relevant references. As said before, it took Razi fifteen years to write this book, and he lost his eyesight and health over it. The complete edition of *Al Havi* was quite hard to find. Ali ibn Abbas Majousi (Haly Abbas), who wrote his book some 60 years after the death of Razi, said that there were only two complete copies of the book at his time. *Al Havi* was translated into Latin by Farrgut in 1279, and later it was reprinted several times in Brescia and Venice after 1486. The Arabic text of *Al Havi* was edited by Abd al Moid Khan in 22 volumes from 1955 to 1971 in Haydar Abad, Dakan. For this edition, he used the comprehensive and unique copy in El-Escorial library in Spain (written between 1397 and 1414) as well as a few scattered copies in libraries in India. A complete copy and a couple of scattered parts of *Al*

Havi are kept in National Library of Malek of Tehran (Fig. 2).^{14-16, 19}

Al Havi covers the following subjects: Volume 1, head diseases; Volume 2, eye diseases; Volume 3, diseases of the ear, nose, and teeth; Volume 4, lung diseases; Volume 5, diseases of the esophagus and stomach; Volume 6, vomiting, obesity and cachexia; Volume 7, diseases of the breast, heart, liver, and spleen; Volume 8, stomach and intestinal ulcers, dysentery, and the difference between them; Vol-

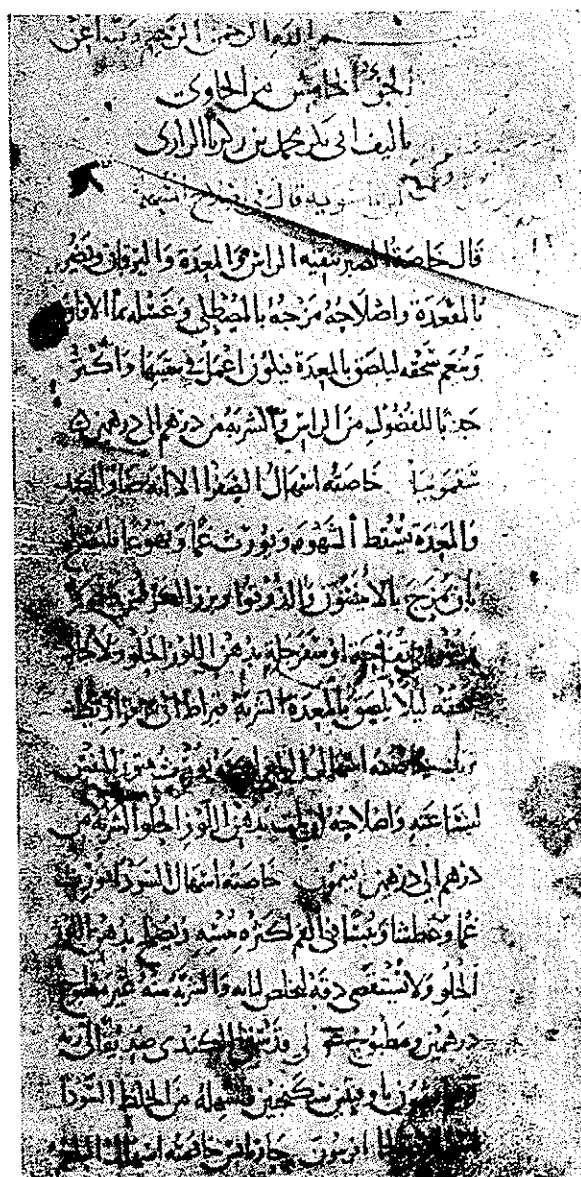


Fig. 2. The first page of the fifth volume of *Al Havi* dated 1175, manuscript 4785, National Library of Malek, Tehran.

ume 9, gynecology; Volume 10, kidney diseases, urethritis, etc.; Volume 11, stomach diseases caused by abdominal parasites, hemorrhoids, vertebral disorders, gout, varicose, elephantiasis (daa al fil), etc.; Volume 12, different kinds of cancer, inflammations, abscesses, and whatever makes the body weak; Volume 13, diseases of the bones,

fractures, internal diseases and ulcers, sores of the reproductive organs, etc.; Volume 14, fever, defecation, vomiting, etc.; Volume 15, *motbegheh* fevers (typhoid or enteric fever), acute diseases caused by the obstruction of body canals, hydrops, etc.; Volume 16, hectic fevers (*degh*) and exhaustion, fever and chills, fevers with fiery nature, choleric or infectious fevers, etc.; Volume 17, smallpox, measles, and sore throats; Volume 18, critical conditions, crises, and related matters; Volume 19, urine and related matters, as well as snake and scorpion bites, and poisons; Volumes 20 and 21 are about simple drugs*; Volume 22, pharmacology (*saydaleh*), and subjects related to medicines and pharmacology.¹⁶

Al Havi was one of the major sources in pharmacology in Europe after the Renaissance.¹⁹ A great part of *Al Havi* is about Razi's notes in hospitals in Rey and Baghdad; as a matter of fact, in the book there are 34 stories about patients and Razi's medical observations in the hospitals, which come under the title *Tales and Stories of Patients* (*Ghessass va Al Hekayat Al Marza*) printed in Egypt.¹⁵

The Discovery of Allergic Asthma by Razi

Muhammad ibn Zakariya Razi discovered allergy and was the first person to write an article on allergy and immunology. In this short article, he explains the occurrence of rhinitis when smelling rose in the spring. The article, which is entitled "The Sense of Smell" (*Shammyeh*), is about Abu Zayd Balkhi's rhinitis when smelling rose in the spring. In Abu Rayhan Biruni's bibliography of Razi, the article comes under the title "An Article on the Reason Why Abou Zayd Balkhi Suffers from Rhinitis When Smelling Roses in Spring." The title of the article slightly differs in different sources. In the article, written on the subject centuries before others, Razi talks of seasonal rhinitis, which is the same as allergic asthma or hay fever.^{2, 4, 11, 12}

Around three hundred years after Razi, Ibn Maymoun (Maimonides) (d. 1204 A.D.) wrote an article entitled "On Asthma" (*Fi Al Rabv*) which was published in Philadelphia in 1963.¹⁹ The great Iranian physician, Bahaoddoleh Razi (d. 1507 A.D.) presents an exact description and his personal observations of hypersensitivity, or allergic rhinitis, and food and drug allergy.²⁰ In Europe, Bottalo mentioned allergy to plants for the first time in 1565 A.D.³ John Bostock explained the symptoms of his own seasonal allergic asthma in 1819.¹³ Therefore, one may conclude the person who discovered allergic asthma—or in other words, allergy—was Muhammad Ibn Zakariya Razi.

Rhinitis as a result of smelling flowers was such an interesting matter that it has even appeared in ancient Persian poetry. Hakim Shabureja Ghaznavi (d. 1184 A.D.)

*Simple drugs are those which are taken directly from animals, plants, or inorganic matters and which can be used without being mixed with other medicines. Complex drugs, in contrast, are those which are produced by mixing simple drugs.

has beautifully referred to this subject in one of his poems, which is translated as follows:¹⁰

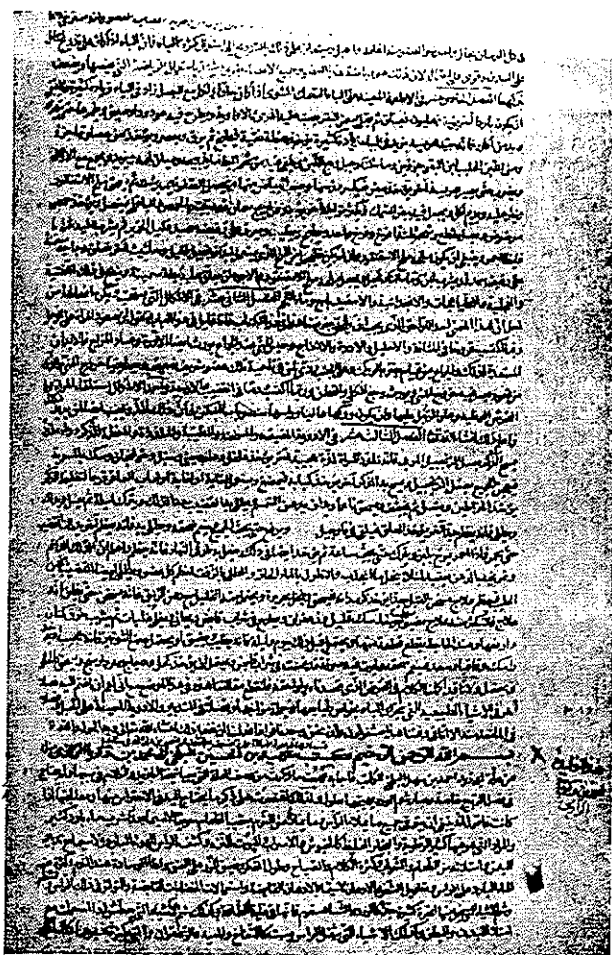


Fig. 3. The last page of the book entitled *Sexual Desire (Bah)* and the beginning of the article entitled "The Sense of Smelling" (*Shammyeh*), the first article on allergy and immunology in the world, manuscript 4573, National Library of Malek.

"When Dawn's magic hand furls, twilights carpet of velvet gray
And stars on royal stead depart
The rising sun peeps out of its filigree
As dagger pulled out slow by degree
Fighting for one's land a noble deed"

On the face of rose, a sneeze of head cold may well be fit."

Razi's article was compiled by R. Hav, using a copy numbered 461 in Oxford Library, and it was printed in the Arabic magazine called *Majaleh al Abhass*, (26, 1973) and in *Majaleh Tarikh al Oloum al Arabieh*, (1, 1, 1977). Another manuscript copy of this article in 54 lines numbered 4573 entitled "The Sense of Smelling" (*Shammyeh*) is available in the National Library of Malek (Fig. 3). This very article was translated into English in 1996, *International Allergy Immunology*. Razi's article was discussed by the writer of this article in 1994 in *Off. Int. Epiz* in Paris.²² Mehdi Mohaghegh translated the article into Farsi

in 1995.¹² In the following pages, comes a new translation of the article:^{1, 11-13}

RAZI'S ARTICLE OF "THE SENSE OF SMELLING" (*SHAMMYEH*)

In the Name of God
The Beneficent, the Merciful

Shahid ibn al Hossein al Balkhi wrote a letter to Muhammad Ibn Zakariya Razi and asked about the cause of the illness of Abou Zeid Ahmad ibn Sahl Balkhi al Kateb. Razi wrote in reply:

When I read your description of Abu Zayd's illness, I realized what the cause is and why it gets worse in spring, especially when smelling roses. Therefore, I shall tell you what you need to know to prevent the illness. The patient ought to take note of the following points:

He should avoid the surfeit of everything. He should also avoid sleeping on a full stomach, especially after drinking cold water.

He should avoid soporific medicines in the form of liquid. He should stay away from closed places, basements, and damp houses where the air is stuffy and dank.

He should cover his head, especially when he has washed his body, eaten, and drunk water.

He should avoid talking too much, yelling, fastening his neck button tightly, putting big pillows under his head, and pouring too much cold water on his head.

He should avoid growing his hair long, oiling his hair with contractive oils, and dying his hair with henna, or other contractive dyes; also, he had better avoid combing his hair too often.

He should avoid smelling things that give off a great deal of vapors, like red rose and sweet basil (*shahsparm*) as these two are so beautiful and tempting; moreover, on a full stomach, he should avoid smelling substances that cause sneezing; he should also avoid smelling soporific substances that make the head heavy, like mandrake (*loffah*), storax (*al niaih*), and saffron, and flatulent substances like broad beans, fish, chicken, onions, porreau (*korath*), garlic, ginger (*jergir*), and wine.

He should try to make his head light by observing the following things: he ought to lose weight early in spring. In this way, he will sweat and get rid of the moisture that was developed in winter because of overeating, overdrinking, and sleeping for long hours in houses that have stuffy air. These vapors go toward the head and make it heavy; thus, it is also harmful for the patient to sleep on the back.

The patient should inhale substances that make one sneeze in order to get the mucus gathered in the head to go to the nose, and this ought to be repeated several times.

It is also good to breathe the vapors of hot water containing matricaria, menta sativa, pennyroyal, and worm-

seed.

Also, before sleeping, the patient had better take substances that prevent secretion from pouring down into the chest since secretion pours into the chest when one is asleep, especially when one sleeps on the back for a long time. If such substances pour into the chest, the patient's voice will get hoarse; he will start coughing, become short of breath, and get a fever. And if the secretion is too much, it should be dissolved and brought out by dissolving medicine like *hyssop*: *Hyssopus officinalis* (*zufa*) so that the chest would become soft and clear, and the severity of coughing would not disturb the lungs. It must also stop new secretion from pouring down, help to get rid of substances that go up, and dissolve what had poured down into the nasal cavity. This should be done by massaging the head and keeping it warm when the stomach is empty.

And if it is feared that the excess of the substances might hurt the throat muscles, the patient's head ought to be shaved and anointed with mustard. Warm substances like nigella seeds (*shoniz*), onions, and mustard must be inhaled to cause sneezing and force out the nasal secretion. Substances that strengthen the throat should be gargled with rosewater. The mouth and throat ought to be washed with cold water, and water should be drunk frequently in order to prevent mucus from getting in the lungs.

The patient should avoid drugs like liquid opium (*sharab al khashkhash*) or any other medicine obtained from opium, and frankincense (*kondor*), tragacanth (*kethira*), gum (*samgh*), mucilage of pear seed, saliva of quince seeds (*loab safarjal*), cotton seeds (*bazraghatoon*), purslane juice (*baghlato al homagha*), and black nightshade (*enabo al thalab*).

Of course, if the coughing is very severe, medicines like morphine, henbane, frankincense, and Armenian slime must be used. And for moistening substances poured into the chest, *Ghyrouti* medicine taken from wallflower oil (*khiry oil*) and matricaria oil must be used. Then a warm cloth must be put on the head and chest, and the patient should stay in a house where cold air cannot get in, and is kept warm with hot water or hot bath.

To dissolve mucus, one must increase physical activities and at the same time take dissolvent medicines such as barley-water (*mao al shayir*), sugared water, honey, extract of boiled figs and raisins (*asl as sous*), maidenhair (*pare-siawashan*), and the lily of the valley root. Moreover, the patient should continually gargle with hot water.

If the illness got worse, medicines must be taken that are extracted from fenugreek (*faenugraecum: hollbah*), True horehound or bugle weed (*farasion*), urtica, termite (*arasa*), pepper, mustard, etc.

Patients who suffer severely from this disease—that is, whose nasal cavities are blocked and feel itchy, sneeze a lot and have running noses—must walk in a hot bath, per-

spire, and try venesection in addition to taking the aforementioned medicine.

Some have been treated by a cut in the vessel between their eye and ear and the vessels in their forehead. Since these vessels are in contact with the bones, they do not overflow with blood, and the face gets warm and red because of blood circulation. For those people whose faces are red and warm and their vessels get a little filled with blood, cutting the ear and bleeding is more useful. They can also eat food, which make the blood thick and cold, such as vinegar, lentil, sour grapes, and rhubarb (*rybas*).

Sometimes the patient's forehead should be massaged continually with vinegar and rose extract. I rubbed ice on the head of a man who had taken wine and was drunk; at first, he screamed, but then he totally calmed down. He felt terribly cold, and this cold feeling penetrated the depth of his head. At night, he felt a little cold and then got well. I followed the same procedure for similar patients, but it did not work. Of course, severe diarrhea, walking, and fasting turned out effective in the case of these patients.

The illness is worse in people whose neck vessels are big and suffer when they smell flowers. For these people, smelling musk, *Costus albus* (*ghost*), myrrh (*mor*) is useful, and they should massage the inside of their noses with lily of the valley (*soussan*) and ben-oil tree: *Moringa pterigosperma* (*al ban*).

This is the end of the article. May God send greeting to him and to his family and companions.

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