

BLACK-BILE (SAWDĀ) IN UNANI SYSTEM OF MEDICINE-A REVIEW ARTICLE

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ABSTRACT

In ancient times many physicians based their medical practices on their theory of bodily humors or fluids. In the classic form of the theory physicians regarded health as depending upon the balance of four humors in the body: blood, phlegm, yellow bile (choler) and black bile. Blood was the source of vitality, choler or yellow bile was the gastric juice crucial for digestion, phlegm was a lubricant and coolant, and black bile functioned to darken other fluids. Unani philosophers contemplated that human body is composed of three basic components; solid (body organs), liquid (humours), gaseous (pneuma). The liquid substances of the body are collectively called as Akhlāt (humours). Every humour serves some specific and general functions. Basically, these are approximate principle for nutrition of organs. Black bile is one among the humours responsible for the health and the disease in the body. A right proportion of black bile keeps the body healthy, but disproportion of it causes deadly diseases. It is a fact that everything in the body is directly, or indirectly related with the four humours. In present study, a comprehensive explanation of black bile is given. Much emphasis is given on the genesis of normal and abnormal black bile. All factors responsible for alteration in black bile are enumerated thoroughly in the study. In this article author summarized the concept of Black bile in Unani scholar and various theories of Black bile and their effect on the human health.

KEYWORDS: Akhlāt Arba'a (humours); Sawdā' (black bile); health; disease.

I. INTRODUCTION AND THEORIES OF ELEMENT AND HUMOUR

The earliest known mention of bile, for use in enemas and other treatments, is found in Egypt in the Ebers Papyrus of the 16th century BCE. Yet references to the liver and bile, respectively, were far from isolated in the ancient world, understandably so considering the impressive sight of the largest internal organ in the body filled with bright red blood the life force as depicted in the Upper Paleolithic wall painting of an eviscerated bison in the caves at Lascaux and the unique body fluid with its distinctive yellow green color, odor, and bitter taste, which dictated its etymological designation and metaphors.



Fig. 1: Unani concept to Humor.

The alternative term in Latin, *bilis*, also denotes a yellow bitter liquid secreted by the liver that aids in digestion. The Latin appellation *cholera* that was used for bile until the 18th century could, like *bilis*, also signify a touchy irascible disposition because of an excess of black bile; occasionally bile and liver were metaphors for courage, anger, arrogance, daring, and amorous tendencies, even lust, in English and other languages. Bilioussness was a common symptom in Britain in the 18th century, probably related to being liverish over the next 100 to 200 years or so. Yet liverish was considered a functional rather than an organic disorder of the liver, even though the general malaise and dyspepsia and indeed bad temper that the term liverish suggested had actually been recognized by army surgeons at the time of the British Raj as premonitory warnings of a liver abscess. The French, of course, have their *crise de foie* and *colique hépatique*, but when a Frenchman was bad tempered, he was said to be *un bilieux*.

It was therefore logical to the physician of old that bile should play an important role in physical health, as well as in mood and temperament that is, a “proportioned mixture of elements,” from Latin *temperare* to control or blend together the four qualities: hot, cold, moist, and dry. A mainstay of the disciples or school of Hippocrates (c.460–c.377 BCE) was the humoral theory of diseases, a concept that originated with the Pythagoreans two centuries earlier. Health and disease were thought to be dependent on the balance between the four main humors or body fluids, that is, the choleric warm dry yellow bile, the melancholic cold dry black bile, the sanguine warm moist blood, and the phlegmatic cold moist phlegm, corresponding, respectively, to the four qualities and the four basic elements, namely, fire, earth, air, and water. The Hippocratic composition that describes in detail the formation of bile and the way bile increases in the body is in *Diseases IV*. In contrast with earlier work in which the Greek physician distinguished blood, phlegm, yellow bile, and black bile, in *Diseases IV*, Hippocrates mentions blood, phlegm, bile, and water. The balance between these four humors, an extension of the harmony of opposites, guarantees good health. Hippocrates clearly writes that the “source of bile is the part of the liver” (probably the gallbladder).

Hippocrates (460-377) who was one of the originators of the theory of humors, made analogies between these humors and the four elements of external nature. The theory of elements he drew from began with Empedocles (490-430). Empedocles theorized that everything in the world is made up of four basic elements: fire, air, water, earth. He called these four elements “roots”, and associated each with Greek gods Zeus, Hera, Nestis, and Aidoneus. This theory of the four elements became a standard cosmology for the next two thousand years. Hippocrates’ humors also corresponded to personality types or temperaments of individuals. Each individual was seen to have a unique natural balance or makeup of humors and qualities. A person whose temperament is based on blood is filled with energy. The result is a sanguine personality. Someone with a yellow bile temperament is bilious and choleric, showing a predilection toward anger. A melancholic temperament comes from an abundance of black bile resulting in a predilection toward introspection and sentimentality. And a phlegmatic or passive, calm temperament is associated with an excess of phlegm. Certain temperaments were thought to make one more susceptible to certain diseases, especially if the humors were out of balance. Weather, temperature, and seasons were thought to influence the balance of humors and in so doing caused different kinds of illnesses. The cold in winters lowered body heat causing phlegm to be produced. This additional phlegm resulted in colds and coughs. In the summer people got hot, resulting in more bile, which in turn caused diarrhea and vomiting. Mania also occurred in summers and was seen as due to bile boiling in the brain.

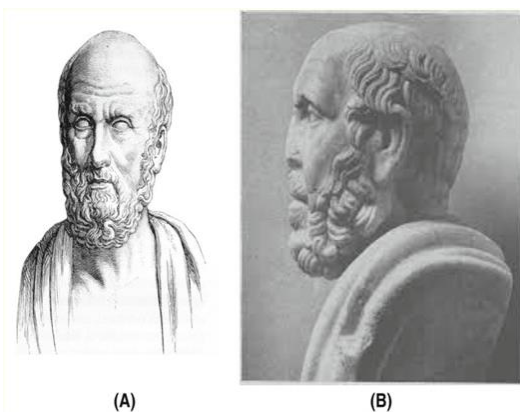


Fig. 2: Hippocrates (460-377) Father of Medicine.

Elements	Seasons	Qualities	Humors	Illness /Symptoms	Temperament
Fire	Summer	Hot-dry	Yellow bile	Fever, Vomiting, Yellow skin	Choleric
Earth	Autumn	Cold-dry	Black bile	Dry skin, Vomiting	Melancholy
Air	Spring	Hot-moist	Blood	Dysentery/Nose bleeds	Sanguine
Water	Winter	Cold moist	Phlegm	Sneezing/colds	Phlegmatic

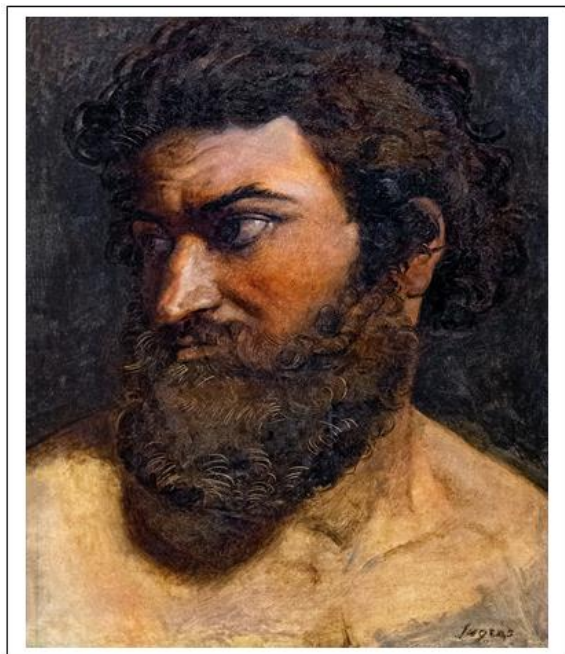


Fig. 3: Erasistratus of Chios (310-250 BCE).

Later, Claudius Galenus (Galen 129–c.216 CE) one-time physician to the gladiators of the Temple of Pergamon's High Priest and physician to several emperors in Rome, also proposed that yellow bile comes from the liver. It was not that Galen was concerned especially with bile formation *per se*. Rather, he attempted to unify those ancient notions of human physiology albeit only those with which he agreed dating from the Babylonians, the Egyptians, the Etruscans, and especially the Greeks, who were particularly preoccupied with the location and nature of the soul, as well as the mechanisms responsible for health and disease. Galen fancied a dominant role for the liver as the “seat of sanguification that is, the manufacture of blood and the source of the veins.” In his schema for the process of digestion, Galen incorporated the concept that the stomach could separate the useful from the useless constituents of food as chyle and provide for the former an absorption site into the portal vein for transport to the liver. Using innate heat or the heat of vegetative pneuma (i.e. the spirit) derived from inspired breath, the baser nutritive liver component of the tripartite soul (in contrast with the rational and noble, and the spirited, emotional, and affective thirds of the soul that are located in the brain and heart, respectively) completes the concoction by which blood is elaborated from chyle.



Fig. 4: Jean François Fernel, French physician (1497-1558).

More than a millennium later, Jean François Fernel, the eminent 16th-century French physician (1497–1558), mathematician, and astronomer, who coined the neologism Physiology, concurred with this second concoction. Incidentally, chyle was also cleansed of impure residues that become fecal matter. Galen thought that blood made by the liver could contain phlegm, air, and black bile, but he opposed the view of the distinguished Alexandrian anatomist and physiologist Erasistratus of Chios (310–250 BCE) that arteries contained air. Incidentally, Galen mocked Erasistratus's prescient hypothesis that tiny channels exist in the liver, connecting the portal to the hepatic veins.

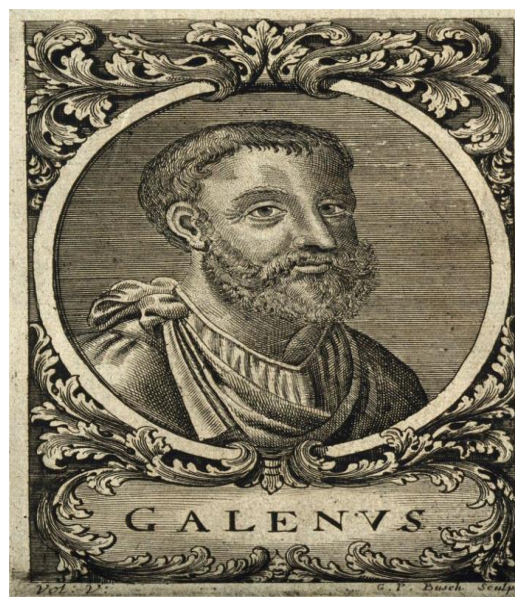


Fig. 5 Claudius Galenus (Galen 129–c.216 CE).

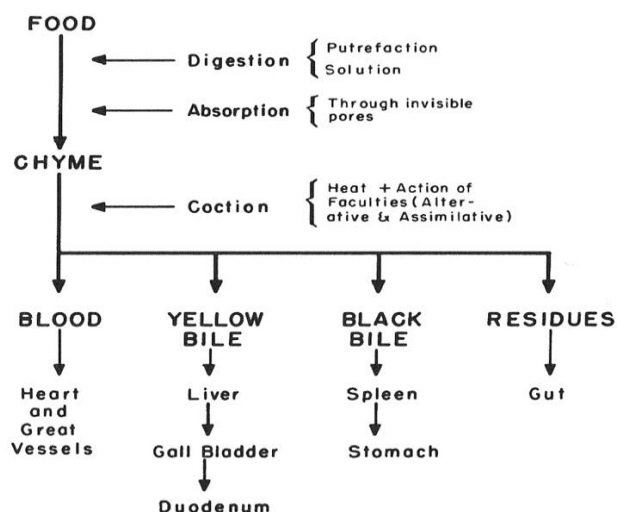


Fig. 6: Physiology of digestion and sanguification (manufacture of blood).

However, the proof that bile is really produced by the liver had to wait until the 17th century and the work of Marcello Malpighi (1628–1694), who is considered to be the founder of microscopical anatomy and histology, the father of physiology and embryology, and arguably the patriarch of plant anatomy as well. Even though Malpighi has some 50 structures named after him, at least in Italian anatomy, arguably his greatest discovery was that of the hair-like vascular structures in the frog's lung, for which he coined the term capillaries, after capillary from the Latin capillus/capillum for hair. Malpighi first communicated his discovery of the structure of the lung in two letters to his long-time friend from his days in Pisa, Giovanni Borelli, but later published it formally after an invitation to present his work at The Royal Society in London. Notwithstanding, bilinguists should value highly Malpighi's appreciation of the acinar organization of the liver and his recognition that bile originated from the liver lobule and not the gallbladder, as was popularly imagined and remained so until the mid-18th century. Malpighi's decisive experiment-based view of hepatic bile formation was not without its deluded antagonists but was soon echoed enthusiastically by Francis Glisson (1598/9–1677) in London. Glisson envisioned bile secretion as a process of filtration from the blood, although he could not visualize the necessary connections between the vascular and biliary systems. Yet despite this insight, Glisson actually proposed that the flow of bile results from the successful effort by the ducts to expel the irritating contents. Glisson further theorized that "irritability" was a vital property of all tissues, but this once-popular doctrine of physiology was abandoned in the 18th century. Although not necessarily an adherent to the Irritability Doctrine of his close contemporary, William Harvey endorsed Glisson's vision of the excretory/secretory nature of bile formation and foresaw its detergent and cathartic properties in the intestine. Harvey's intuition about the digestive role of bile in intestinal function was richly reciprocated over the succeeding centuries in studies on digestion by a

luminary roster of eager 16th to 19th century physiologists. But we digress.

II. Introduction of black bile in Unani system of medicine

The human body is composed of three basic components; solid (body organs), liquid (humours), gaseous (pneuma). The liquid substances of the body are collectively called as Akhlāt (humours). Biosynthesis of humours is attributed to the digestive tract and liver. All the humours are synthesized from Istihāla Awwal (first metabolism) of food. Based on colour, Hippocrates classified body fluids into four (4) types viz; Dam (blood), Balgham (phlegm), Şafra' (bile), and Sawdā' (black bile). The black bile is one of the four essential humours in the body. The right proportion and purity of humours are essential for maintenance of health. The main functions attributed to the humours are hemodynamic, nutritive (vegetative), excitatory, inhibitory, and transport, or carrier etc.^[1] Throughout Unani text all humoral pertinent are described in the context of two attributes i.e. quality and quantity. The complete basis of health is the right proportion and specific equilibrium of Akhlāt (humour) according to quality and quantity. They impart considerable stability and balance to the inherent temperament of the body and organs with which they come in contact. Each and every humour performs its specific function and has some effect on body which is responsible for maintenance of good health. Blood is the most beneficial as well as abundant humour in the body^[2], whereas black bile is the least conducive humour in the body, even though it has some specific functions to perform. Therefore; optimal level of black bile plays an important role in maintenance of health as other three humours.

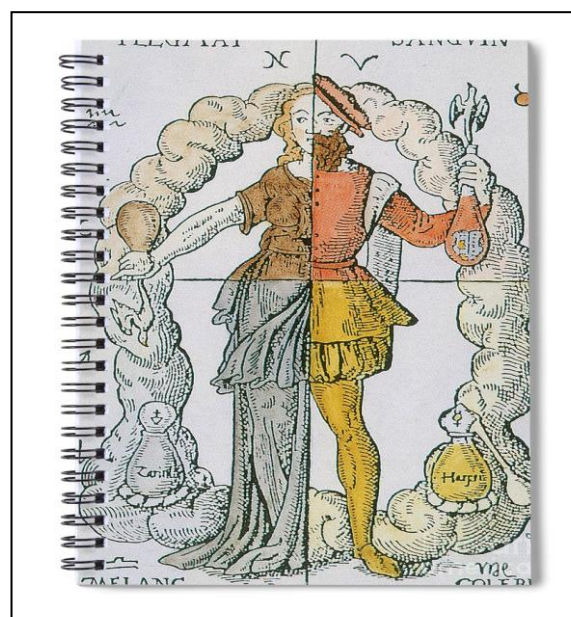


Fig. 7: Classification of Body Fluid.

A person's psychological disposition is the direct result of the proportions of the four humours in the body. Both

the health and disease are described in its own way in respect of functions. Diseases are classified distinctly into three categories viz. temperamental, structural and of integrity.^[3] There is a distinct category of diseases, which is associated with causative morbid matter. This category belongs to major category of temperamental diseases, which is based on humoral theory of Hippocrates. This theory emphasizes the occurrence of disease because of imbalance of the specific fluid, derived from the diet. Hippocrates proposed four types of body fluids responsible for health and disease, and since then humoral diseases have an ample description in Unaniliterature.

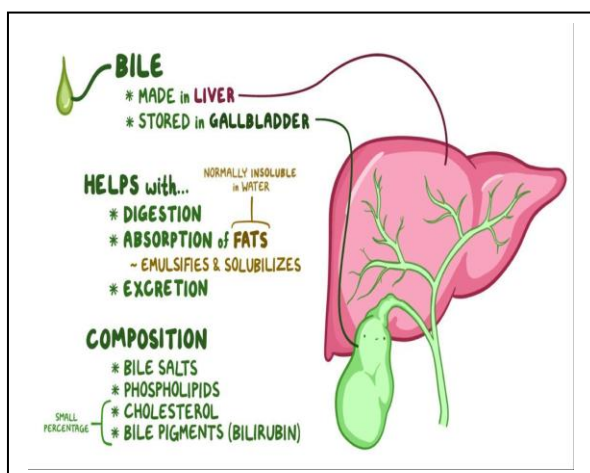


Fig. 8: Black Bile formation in Liver.

Every humour serves some specific and general functions. Basically, these are approximate principle for nutrition of the organs. Every humour is attributed with specific qualities. It is considered normal and health imparting till it is within the normal (physiological) limits of its qualities and quantity. In the human body, four humours are in a definite proportion, which is responsible for individual health.^[4] Any deviation results in disease, which maybe because of qualitative and quantitative deviations.^[4] Many diseases of various organs and systems are also attributed to the black bile.

III. The Cleansing of Harmful Black Bile from the Body

In this chapter I will investigate Galen's theory of how the different types of black bile are produced and managed in the body. Galen provides much more information on the removal of black bile than on its generation in the body. Therefore, there will be more analysis on the way that Galen describes the spleen as the organ that attracts and removes 'black bile' from the body. We shall see that Galen's explanation of the management of black bile depends on the context of his writing in a particular treatise. However, before investigating Galen's writing on the spleen and black bile, it is worthwhile considering his view on how black bile is generated in the body and for this we must start with the liver.

IV. The Importance of the Liver for the Origin of Black Bile in the Body

The liver is the organ that is most generally associated with the generation of yellow bile and black bile in the body, which can be found in some of Galen's treatises.1 The evidence for the production of yellow bile in the liver can be found in Galen's *On the Utility of the Parts*, as there is a mechanism that allows for the separation of yellow bile from blood by vessels in the liver that connect to the gallbladder.2 However, when it comes to black bile, the situation is more complex because, as we have seen above, Galen differentiates between different types of black bile. For example, in *On the Utility of the Parts*, Galen tells us that the spleen removes the 'muddy, thick, melancholic humours formed in the liver' which is the type that I have named non-ideal natural black bile, as opposed to the ideal natural or altered types of black bile.3 It is interesting that Galen uses the plural term 'melancholic humours' in this passage, as he tends to use the singular for this term more often in his writing.4 This suggests that he wants to emphasise the production of different types of non-ideal natural black bile in the liver under these conditions. We have seen already that Galen also uses the term 'melancholic humour' to refer to different types of altered black bile.5 However, I think that it is likely that only forms of non-ideal natural black bile are present in the liver under normal conditions, as altered black bile is produced by the extreme heating of natural black bile, yellow bile or blood in any part of the body. We can find more evidence for the association between the liver and black bile from a passage in *On Affected Parts*, where we are told that: '[the spleen] draws the melancholic blood from the liver to itself. In this passage Galen is using the term 'melancholic blood' to refer.

V. The Galenic Concept of Black Bile

The way humoral theory was used in ancient medicine, is of paramount importance for the importance of black bile, as a substance that can explain the cause of health and disease in the body. In Unani literature, almost all philosophers have described black bile in their treatises. Among them the Hippocratic "*On the Nature of Man*" is the very first treatise to describe about black bile. In this treatise a substance named black bile, which is associated with autumn and a particular stage in person's life i.e. old age.^[5] In this way, black bile is raised to be on equal term to blood, phlegm and yellow bile. All of which have a clear provenance as a fundamental substance in the development of medical theories. Black bile is one among the humours responsible for the health and the disease in the body. In Galen's writings, we find the following description in '*On the faculties*'- "Next, two residues produced by the way of the change of this, the one being lighter and air like, and the other being heavier and earth like".^[6] In my opinion, the one being lighter is yellow bile and 'heavy, and earth-like' is black bile which is associated with element earth. Galen in his treatise "*On black bile*" described both terms melancholic humour, and black

bile, as being like the 'lees in wine'. He also used a more direct eager zed ation of black bile relative to blood and called black bile the 'lees of blood', the same thing is written in "On Crises" and in his commentary on "Aphorism". The description of black bile as a solid within other fluids is eager zed by Galen in another work, in "On Mixture", he stated that "Of humours the most useful and particular is blood. Black bile is a kind of sediment and mud of this (blood); it is therefore colder and thicker than blood". Here Galen described black bile as a type of 'sediment' and 'mud' of blood. This is a distinctive character of black bile relative to blood and is not found applied to the other two humours, phlegm and yellow bile in any of Galen's writing. So, sediment and mud found in blood is reserved for black bile. Therefore, Galen has gone beyond the simple cold, dry and sticky substance found in the Hippocratic "On the Nature of Man" to create a broader description of black bile in terms of comparable common organic substances, such as 'lees', 'sediment' and 'mud'. These are the types of description of black bile, which are found in a range of sources beyond the content of "On the Nature of Man".^[5]

Therefore, we can say that the black bile should be considered as being the lees of blood that means when we look at composite blood, the part that is heavy, which resembles the lees is in fact the black bile.^[6]

Description of Black bile is found in many other treatises in the "Hippocratic Corpus".^[7] For example, in "On places in Man" there is a following statement about wounds of the body. "Mortal wounds; if it is any kind of a severe one and besides the wounded person vomits black bile, he dies".^[9] In other Hippocratic texts, we find that black bile is associated with different types of diseases. In "Aphorism" dysentery that begins with black bile is reported to result in death. And in "On Diseases I", Black bile is said to be the cause of paralysis.^[8] There are many other examples in treatise such as "Aphorism, Epidemics I-IV, Regimen in Acute diseases, On Internal Affections, On Affections, On Diseases I-III and On Diseases of Women II".^[7] In the above treatises, no doubt the physicians have mentioned black bile but it is an abnormal form of black bile which is responsible for diseased conditions. Therefore, Galen attempts to explain how black bile can be both an essential humour that keeps the body healthy, but also is the cause of deadly diseases.

Some people are naturally melancholic under the influence of related temperament, while others acquire it later. Black bile becomes the key word not only of the humoral theory, but of philosophy, astrology etc. Galen characterized black bile as being sharp and sour in eager, cold and dry in quality and is associated with the cosmic element earth, the spleen in the body, the season of autumn, the mature stage of life, and quartan fever.^[8]

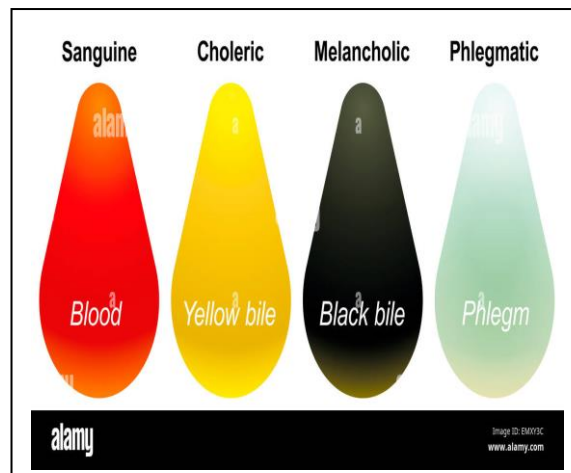


Fig. 9: Colors of Body Fluid.

VI. Opinions of Unani physicians on properties of the black bile

- According to Avicenna, Black bile is the fourth humour and is of two types; one is Sawdā' Ṭabī'ī (normal black bile)^[4,11,12] which is the sediment of normal blood. Its taste is midway between sweetness and astringent. Avicenna termed it as Sufl or Ikrud dam (residue / sediment)^[11] another is Sawdā' Ghayr Ṭabī'ī (altered black bile).^[4,11,12]
- According to Haly Abbas, the colour of black bile is black, its taste is a combination of sweet and sour.^[12]
- According to Ibn Hubl the colour of natural black bile is reddish black.^[18] Its temperament is cold and dry^[2,3,4,11,12] and consistency is thick.^[2,3,4,11,12]
- Ibn Nafees says that "The position of Black bile is next to yellow bile. Black bile is inferior most amongst the humour. However, it does not mean that it has no merits; it has also some functions to serve in the body".^[2]

VII. Synthesis and course of black bile

Humours including black bile are synthesized from the food we consume. As per Unani concept, the whole process of digestion is divided into four phases.^[11] The first phase i.e. gastric phase occurs in stomach, and intestine whereas the second phase takes place into the liver known as hepatic phase.^[11] In this phase humours are formed. A third phase in the vessels and the fourth one takes place when the humours enter the organ and tissue.^[12]

The diluted portion of chyle obtained from gastric phase enters the liver through the mesenteric vessels and the portal vein sequentially.^[3] Then it gets distributed throughout the liver in a network with small, hairy branches.^[13] Being distributed into the whole liver, the chyle is exposed to the digestive power of liver. Here, Tabakh (concoction) of chyle takes place. Various products and by products are formed during this process namely, foamy substance and a sort of precipitate are formed which are yellow bile and black bile respectively.^[11] The partially cooked portion is phlegm and the remaining mature substance is blood.^[11]

After being formed, it divides into two portions, one of which enters the blood, and the other goes to the spleen. The portion which enters into the blood sub serves two purposes.

- It takes part in the nourishment of those organs which possesses cold and dry temperament like bones, hairs, nails etc.^[2,3,11,12]
- It also activates blood and make it strong and active.^[14]

The portion which passes to the spleen such as no longer of use to the blood. Its primary use regards the body as a whole; it clears the body of so much effete matter.^[11] It uses in regards to one special organ is that it supplies nutrition to the spleen. Its secondary use is that by travelling to the fundus of stomach, which makes the stomach strong, firm and active. Its bitterness irritates the fundus of the stomach and sets up a sense of hunger and so, arouse the appetite.^[13]

Therefore, black bile has got aretentive virtue, a cooling, drying, astringing, precipitating, condensing, solidifying effect on the metabolism necessary for building the bones, teeth and all dense, solid structures of the body. Black bile also awakens the stomach and appetite and enables the digestive organs to hold on to their contents long enough to process them properly. Systematically, melancholic residue in the blood stream thickens the blood, enabling it to clot. Black bile is the last to arise and receives the coarse, most eager share of nutrients. It is the least plentiful^[2], only a slight part of it enters the circulation.

VIII. Types of black bile

Galen explained, two distinct types of black bile^[8]

- 1) Sawdā' Tabī'ī (normal black bile): It is the sediment of normal blood, cold and dry in temperament, it is one of the four humours, can only cause the harm in large quantities.^[8]
- 2) Sawdā' Ghayr Tabī'ī (abnormal black bile): which is produced by Ihtirāq (action of excess heat) of the Sawdā' Tabī'ī.^[2,8]

IX. Altered forms of black bile

Altered black bile is produced when any kind of humour, including black bile itself becomes Muhtariq (burnt out).^[2] In other words, we can say that the altered forms of black bile are the result of action of excess heat on any humour including black bile itself. This kind of black bile doesn't serve the physiological functions in the body like that of normal black bile.^[11,12] The word 'Ihtirāq' is very commonly used by the Greek physicians. This term carries very vast meaning. Here Ihtirāq (action of excess heat) stands for abnormal change, in which metabolic changes go abnormally and against the nature of the body. Which results in the production of such harmful substances which are detrimental for health.^[15]

Ibn nafis in kulliyate Nafisi, classified four kinds of altered black bile on the basis of Ihtirāq (combustion) of

substrate.^[2]

- **Sawdā' Damvi (Sanguineous Atrabile)** is formed as a result of action of excess heat on the blood, it is least morbid form and sweet and salty in taste.^[2]
- **Sawdā' Balghami (Phlegmatic Atrabile)** is formed as a result of the action of excess heat on the phlegm, its taste is salty. It is the least toxic form, because it contains moisture in it, so delays the process of action of excess heat (combustion). The diseases caused by Phlegmatic atrabile are of bad prognosis.^[2]
- **Sawdā' Şafra'wi (Bilious Atrabile)** is formed as a result of action of excess heat on Khilt Şafra', it is most toxic form and bitter in taste.^[2,4]
- **Sawdā' Sawdā'wi (Melancholic Atrabile)** is derived from the action of excess heat on black bile itself. If the black bile is more watery, attenuated form, the resultant product is extremely sour like vinegar.^[4,11,12] On being dropped to ground it immediately produces froth and gives a foul smell.^[2] When the black bile is thicker and denser, the resultant product is bitter and astringent rather than acid.^[4,11,12] The variety formed from the thinner black bile is more morbid than the variety derived from thicker black bile.^[2] Due to thinness, this kind of black bile has more penetrability than the other one; however, it can be cured easily as compare to the variety formed from thicker black bile.^[2]

Avicenna in "Canon of Medicine" stated that "The altered black bile is not obtained by the way of precipitation and sedimentation, but it obtained from the way of ashy property and Ihtirāq.^[14] It is because when the moist things blend with earthy ones, the earthy parts are separated in two ways. One is by the way of precipitation, an example of this being normal black bile in the blood.^[11] Another is by the way of Ihtirāq (combustion) so that the rarefied portion is dispersed and the denser portion remains, an example of this is Sawdā' Ghayr Tabī'ī (altered black bile).^[11] Actually, a precipitation is obtained merely from the blood whereas, like oil, phlegm leaves nothing, because of its viscosity and too sticky to leave any deposit, while the thin and light, yellow bile has only a trace of earthy matter in it. Moreover, yellow bile is present in blood only in traces; it is constantly on the move, and whatever little is formed, is either burnt or quickly eliminated by the body. In case if it gets putrefied, its rarefied part gets dissolute and the denser part remains behind as abnormal black bile, as a result of Ihtirāq, not from the sedimentation".^[11] Thus, the varieties of morbid black bile are three types. Among them one form is Ramad (ash) of Şafra' (yellow bile).^[4,11] When yellow bile gets burnt and the rarefied portion of it is dispersed.^[4,11] The more injurious and rapid in action is Sawdā' Şafra'wi (bilious atrabile), but it is more amenable to treatment.^[2] Of the remaining two varieties that one which is sourer and more harmful. Still it is amenable to treatment while it is in early stage. The third variety effervesces less on

earth which adheres little to the organ and is slower in its lethal action.^[4] But it is obstinate in dissolution, concoction and it is less amenable to treatment.^[11] Apart from the above-mentioned types of morbid black bile, one type is such that when spleen becomes weak, and unable to adequately contain, ripens or metabolizes the Sawdā, allowing excessive amount of Sawdā' to spill out into the body and produces Amrād Sawdāwiyya (diseases of black bile) like Mālankhūliya (melancholia), Yaraqan Aswad (black jaundice) and Waram Sawdā'wi etc.^[12]

X. Factors affecting the quality and quantity of natural black bile

- Dominance of Ḥārr Yābis Kayfiyāt (excessive hot and dry quality) in the liver – Excessive heat in the liver, causes excessive burning of humours.^[3,17] Charring or burning, as used by Avicenna is analogous to the burning of food on top of a stove when evaporation of water leaves charred material. Avicenna uses the eager word “Ihtirāq and Harq” to describe this process. The concept of charring was described by Avicenna to explain some abnormalities such as mental problems (epilepsy, melancholia), some types of swellings like Waram-i-Sulb, Sarātān (cancer), black urine and black faeces. According to him the charring process affects the humours and turns them into unstable waste.^[17] There are causes for the charring of humour. Excessive heat causes the separation of the light part from the thick in humours. This process is also accompanied by dehydration. On, Ihtirāq, the Ajza' Latif (light / thin portion) i.e. Ajza' Nariyya (fiery substance), Ajza' Haw'iyya (airy substance) and Ajza' Ma'iyya (watery substance) present in them are dispersed and the Ajza' Kathif (dense portion) i.e. Ajza' Arḍiyya (earthy substance) remains as ash.^[19]
- Excessive metabolic heat generated by certain types of extreme fever like choleric fever, involving the liver canal so burn and char the humour.^[3]
- Dominance of Bārid Yābis Kayfiyāt in A'da' Haḍm^[17] / Dominance of coldness and dryness in digestive tract.^[17]
- The spleen, black bile's receptacle may be weak and feeble, and unable to adequately contain, ripen or metabolize black bile in both its normal and abnormal forms, allowing excessive amount of it to spill out into the body.^[3,11,12,17]
- Excessive cold in the body congeals and solidifies the humours.^[3]
- Prolong retention of Madda (morbid matter).^[3,20]
- The existence of various long standing or often repeated diseases where by the humours reduced to ash (altered black bile).^[13]
- External factors like occupation, atmospheric air and water leads to dys temperament of black bile.^[17]
- Sometimes the disturbance in temperament of Khilṭ-i-Sawdā' is hereditary which causes diseases like Judhām.^[17]

- Dietary causes are excessive consumption of Sard Khushk Aghziyā' (cold and dry diet) or raw and astringent food like cabbage, red lentil, brinjal, dried meat, hilly and desert animal's meat etc.^[17]. Because Sabab Māddi (material cause) of Khilṭ-i-Sawdā' is concentrated part of food, excessive consumption of Sard Khushk Aghziyā' increases the production of Sawdā'.
- An unbalanced emotional state, excessive grief, loneliness etc.^[12]
- Disorganized living habits including staying up too late at night, over work, excessive sexual indulgence and not drinking enough fluids.^[3]
- When the black bile is plentiful, its lodges (not literally, but virtually) between the liver and stomach, as a result, the formation of blood and healthy fluids is interfered and less quantity of blood is formed.^[13]

XI. Spleen- A black bile's receptacle and its role in the maintenance of health

The Spleen is considered as receptacle for black bile, to be used as needed.^[4,11,12,17] Spleen is the organ that is most strongly associated with the overall management and removal of black bile in the body. It maintains an optimal level of black bile, which is necessary for healthy state.^[4,11,12,16]

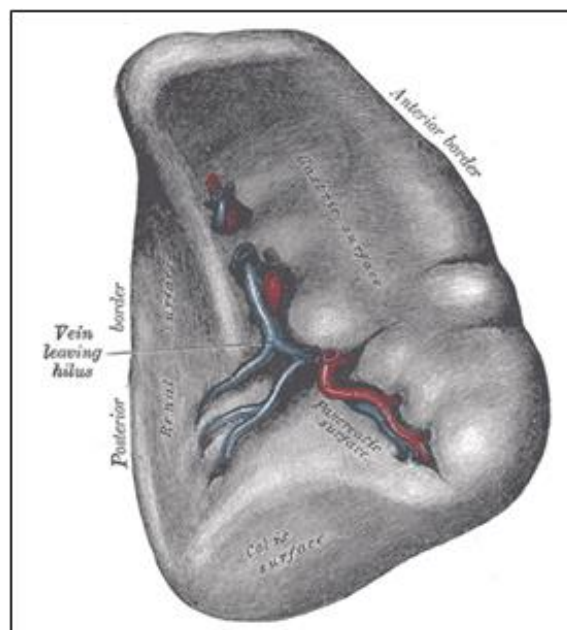


Fig. 10 Role of Spleen in Bile.

It stores the excessive amount of black bile, which is not needed by the blood.^[4,11,12] It prevents dispersion of excessive amount of black bile in the body.^[12] Since only few organs in the body take nourishment from black bile, excessive black bile in the circulation leads to instability in organs which doesn't take nourishment from black bile.^[21] The skin of man will become dark. The body will always suffer from Yaraqan Aswad.^[12] When excessive black bile reaches the brain, will develop a condition

known as Mālanhūliya. And finally, when it reaches the heart, it will kill the person.^[21] In this way spleen by absorbing the excess black bile prevent forgoing disease.

XII. The Diseases Causes by Black Bile

Now we move on to the important area of Galen's explanation of black bile as the cause of disease. At the beginning of this chapter, I will focus on Galen's writing about two specific types of disease relating to black bile. The first is the melancholy illness that by its very name has been associated with black bile in early medical theories. The second disease that I am going to write about is quartan fever. This illness is important, as it provides to be a useful insight into the way that Galen attempts to demonstrate that Hippocrates was the first to associate this fever with black bile. I will then discuss the important issues concerning some more general aspects of black bile in Galen's aetiology of disease with reference to its potential to cause terminal illness in the body. Melancholy, the Black Bile Disease. The illness known as 'melancholy' is a mental disorder causing conditions such as madness and despondency. The earliest references to an illness called melancholia can be found in the Hippocratic Corpus, but there is no explicit concept of a physiological theory of this disease at this stage. There is not even a clear association with a humour, such as black bile. However, we can find a more established theory of melancholy with a physiological basis relating to black bile in Aristotelian sources of the fourth century BCE and then later in the writings of Rufus of Ephesus 3 and Aretaeus of Cappadocia 4 in the first century CE. In Galen's system melancholy has a physiological basis and is associated with the black bile humour. In *On Affected Parts* Galen distinguishes between three different types of melancholy. Firstly, there is the condition related to the hypochondrium, which begins in the region of the stomach. Secondly, there is the condition arising from an affection of the brain. Lastly, there is a more general case of melancholy when black bile affects the whole body. Galen provides details of all three types, where he initially describes them separately and then discusses all three as part of a development of the melancholic illness. The first type begins in the stomach: If, then, the first symptoms start in the stomach and if, once they have become stronger, they are accompanied by melancholic affections, and if the patient derives relief from these by laxatives, emetics, breaking wind, and belching, we call this disease hypochondriac and flatulent. We will say that its symptoms are despondency and fear ... when a melancholic evaporation rises upwards to the brain, like some kind of sooty or smoky vapour, the melancholic symptoms affect the thinking faculty.

CONCLUSION

From the contents of literature; it is clear that black bile is the sediment of normal blood. It has a retentive virtue, a cooling, drying, astringing, precipitating, condensing, solidifying effect on the metabolism necessary for building the bones, teeth and all dense, solid

structures of the body. Black bile also awakens the stomach and appetite and enables the digestive organs to hold on to their contents long enough to process them properly. Systematically, melancholic residue in the blood stream thickens the blood, enabling it to clot. Black bile is the last to arise and receives the coarse, most eager share of nutrients. It is the least plentiful^[2], only a slight residue enters the general circulation, the rest is stored in the spleen, to be used as needed. Although black bile is only needed by the body in small amount, but it is a potent and essential catalyst. The black bile is an essential humour that keeps the body healthy. Therefore; an optimal level of black bile plays an important role in maintenance of health as other three humours. Morbid forms of black bile are more deleterious in their effects than the abnormal forms of other humours. Since black bile is the most effete of all the humours. Its pathologies almost always involve excess, with deficiency only a minor consideration. It is to be concluded that the abnormal forms of black bile are hotter and lighter in temperament than the normal variety and have a greater penetrating and corrosive power. An imbalance in quality and quantity of black bile is responsible for the diseases.

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