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# THE PHYSIOLOGICAL ROLE OF LIVER IN HUMAN BODY THROUGH UNANI PERSPECTIVE: A BRIEF REVIEW

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## Abstract

Unani scholars described the liver as the pivotal organ governing nourishment, energy regulation, and systemic equilibrium. This review examines classical interpretations of hepatic function and relates them to contemporary biomedical concepts. Traditional descriptions about the role of the liver in transforming digested material, separating waste, and supporting vitality align closely with modern insights into metabolic processing, detoxification pathways, and biosynthetic activity. The article further discusses how disturbances in hepatic temperament or structure produce wide-ranging effects across multiple organ systems. By re-evaluating classical perspectives through a modern lens, this review highlights enduring principles that emphasise dietary moderation, lifestyle regulation, and early restoration of hepatic balance as key strategies for maintaining health and preventing disease.

## Keywords

*Kabid*; Liver physiology; *Uḍw Ra'īs* ; Unani medicine;

## 1. Introduction

In Unani medicine, the liver is classified as a *Uḍw Ra'īs* (vital organ) due to its central role in nutrition, metabolism, and homeostasis.(1,2) Classical physicians, including Hippocrates, Galen, and Ibn Sīnā, describe the liver as the *Matbakh* (metabolic kitchen) of the body, where

the primary processes of digestion, transformation, and formation of *Akhlāṭ* (humours) occur.(3) The liver receives *kaylūs* (chyme) from the gastrointestinal tract through a network of *Uḍw Muhayyī* (pre-serving organs) and subsequently distributes processed nutrients to peripheral organs through *Uḍw Mu'addī* (post-serving organs). Unani scholars assert that the liver sustains *Harārat-e-Gharīziyya* (innate heat), a fundamental determinant of all physiological functions. (2,4) Innate heat is regarded as the driving force behind digestion, metabolism, growth, and temperature regulation, paralleling the contemporary understanding of hepatic metabolic thermogenesis. The concept of continuous *Taḥallul* (dissolution) of bodily substances necessitates ongoing replenishment through digestion and hepatic transformation, firmly placing the liver at the centre of functional maintenance and systemic vitality. In this article we aim to explain the role of the liver in the physiological state of body.

## 2. Materials and Methods

This narrative synthesis draws upon classical Unani texts, including *Al-Qānūn*, *Kulliyāt-e-Nafīsī*, *Kāmil al-Ṣinā'a*, *Ayn al-Ḥayāt*, and *Kulliyāt-e-Qānūn,* to identify concepts related to liver physiology, innate heat, metabolic transformation, and nutritive replenishment. No empirical experimentation was conducted; instead, the method relies on comparative textual analysis to interpret and harmonize classical and contemporary frameworks.

## 3. Observations

Classical literature consistently identifies the liver as the primary site of metabolic conversion, thermogenesis, and humoral synthesis. Observations reveal that the liver operates through multiple intrinsic faculties: *Quwwat Jādhiba* facilitates nutrient absorption; *Quwwat Māsika* retains material until transformation; *Quwwat Hāḍima* metabolically processes nutrients; and *Quwwat Dāfi'a* expels transformed substances for systemic distribution. Ibn Sīnā additionally recognizes *Quwwat Mughayyira Thāniya*, responsible for converting nutrients into *Akhlāṭ*, while Ibn Rushd proposes *Quwwat Mūmayyizā*, which distinguishes useful nutritive material from waste. These faculties act collectively to maintain metabolic efficiency, thermoregulation, and tissue nourishment.(1,5–7)

### *3.1 Tawlīd-i-Akhlāṭ* (Production of Humours)

Unani Literature highlights that *Taḥallul*, the continuous loss of bodily matter through physiological activities, requires replenishment through hepatic processing of digested nutrients. The description of *Taḥallul* as a continuous catabolic loss mirrors the modern

understanding of basal metabolic turnover and nutrient cycling. Similarly, the Unani sequence of nutrient transformation, from chyme to humours, reflects progressive biochemical digestion, absorption, and assimilation seen in contemporary physiology. The identification of multiple hepatic faculties correspond conceptually to transport mechanisms, enzymatic transformations, and endocrine regulation of metabolism. Ibn Sīnā asserts that *Quwwat-e-Mughayyira* (the transformative faculty) resides primarily in the liver and is fundamentally responsible for biological transformation across all organs. This indicates that the transformative faculty operates throughout the body, driving metabolic conversions and modifications in fluids and humours. However, Ibn Sīnā differentiates between organ-specific metabolic modifications and systemic nourishment. Localized transformations within individual organs serve only the metabolic needs of the respective organ and do not contribute to the sustenance of other organs. In contrast, the liver performs dual functions—metabolizing nutrients for itself, while simultaneously generating nourishment for all other organs.(4,7)

Abu Sahl Masīḥī further elaborates the causative framework underlying the formation of humours (*Akhlāṭ*). According to him, innate heat (*Ḥarārat-e-Gharīziyya*) is the efficient cause of humour formation, food represents the material cause, the liver is the *Sabab-i-Wujūd* (cause of existence), and the organism's Qiwām (functional integrity) serves as the final cause *(Sabab-i-Tamāmī)*. (8)

The metabolic conversion of ingested food begins in the oral cavity, where mastication and lingual movements fragment food into smaller components. Gastric digestion involves the progressive transformation of these particles into simpler, assimilable forms. The stomach initially breaks down the coarse particles, and subsequent digestion in the intestinal tract further reduces the food mass into a homogenized semiliquid substance termed *Kaymūs* (chyme), described by Masīḥī as *Mā' al-Shaʿīr* (barley-water-like fluid). The lighter and thinner portion of this product is absorbed through mesenteric vessels by *Quwwat-e-Jādhīb*a (absorptive faculty) and transported into the *Furja al-Bāb* (portal circulation). Here, minute hepatic capillary channels branch and interconnect with venous structures extending from the convex surface of the liver. (3,8–10)

Based on classical accounts, the chyle is retained within the liver by *Quwwat-e-Māsika* (retentive faculty) until complete hepatic digestion occurs. Activation of the hepatic digestive faculty *(Quwwat-e-Hāḍima)* is attributed to *Ḥarārat-e-Gharīziyya* (intrinsic heat), regarded as the fundamental driver of physiological faculties. (11,12) This process ultimately converts

the chyle into the final nutritive product referred to as *Kaymūs,* denoting its transformation into humoral entities.

At the hepatic level, distinct humours are produced according to classical physiological principles. The frothy and light upper fraction forms *Ṣafrāʾ* (bile), whose efficient cause is normal heat, deriving from foods with hot, greasy, sharp, or sweet qualities, and whose formal cause is excessive maturation. The heavy sedimented portion forms *Sawdāʾ* (black bile), associated with moderate heat; its material cause includes dense, dry food constituents. The fully matured and purified intermediate fraction becomes Dam (blood), formed under balanced heat; its material causes are nutritionally balanced foods and drinks, while its final cause is systemic nourishment. The least mature fraction forms *Balgham* (phlegm), produced under mild heat, from cold, thick, moist dietary components, with incomplete maturation as its formal cause. Following hepatic digestion (*Haḍm-e-Kabidī)*, these four humours are propelled by *Quwwat-e-Dāfiʿa* and distributed throughout the body via vascular channels to fulfil nutritional requirements. (9,10,13)

Ibn Rushd notes that blood is produced in the liver and serves as the universal nutritive substrate for all organs. On this basis, Galen designated the liver as *Rayīs-e-Muṭlaq* (absolute chief) of the nutritive faculty *(Quwwat-e-Ghādhiya)*, underscoring its central role in systemic nourishment.(1)

### 3.2 Formation of *Mizāj* (Temperament)

Classical scholars have emphasized that temperament *(Mizāj)* is fundamentally governed by the physiological attributes of major organs. Galen proposed that the structural and functional composition of the human body is determined by the temperaments of vital organs, particularly the heart and liver. Among these, the organ possessing a stronger and more dominant temperament exerts greater influence over the overall bodily temperament. (25) Al-Rāzī further expanded this concept, stating that an individual's temperament is proportional to the temperament of four principal organs: the heart, liver, brain, and testicles. (26) Within this hierarchy, the liver holds primary importance due to its metabolic role, making it central to the formation and stabilization of temperament. (14)

In Unani physiology, temperament is closely linked to the quantitative and qualitative balance of humours. The human body is believed to contain four principal humours, viz. *Dam* (blood), *Balgham* (phlegm), *Ṣafrāʾ* (yellow bile), and *Sawdāʾ* (black bile), each originating from characteristic proportions of fundamental elements. The inherent qualities of these

elements give rise to distinct humoral temperaments through the interaction of active attributes (heat and cold) and passive attributes (moistness and dryness). Accordingly, *Dam* is classified as *Ḥārr Raṭb* (hot and moist), *Ṣafrā'* as *Ḥārr Yābis* (hot and dry), *Balgham* as *Bārid Raṭb* (cold and moist), and *Sawdā'* as *Bārid Yābis* (cold and dry). (14)

An individual's overall temperament is determined by the predominance of one or more of these humours. When *Dam* predominates, the resulting temperament is hot and moist, referred to as *Damwī al-Mizāj* (sanguine temperament). Individuals with predominance of *Ṣafrā'* exhibit a *Ḥārr Yābis* (hot and dry) temperament and are described as *Ṣafrāwī al-Mizāj* (choleric). When *Balgham* is dominant, the temperament becomes *Bārid Raṭb* (cold and moist), known as *Balghamī al-Mizāj* (phlegmatic). Finally, predominance of *Sawdā'* results in a *Bārid Yābis* (cold and dry) temperament, referred to as *Sawdāwī al-Mizāj* (melancholic).

Given its central metabolic functions, the liver plays a decisive role in generating and regulating humours as well as maintaining intrinsic heat (*Ḥarārat Gharīziyya*). Therefore, the liver is considered a key organ in determining and modulating human temperament. (14)

### 3.3 Role of liver in generation of *Harārat-e-Gharīziyya*

The liver is the largest and unique organ, considered the source of *Ḥarārat Gharīziyya* (innate heat) for the body. So, it was discussed widely in Unani literature and even stated liver counterpart with the sun, a source of energy for other planets.(6,15,16)

The liver's high metabolic activity makes it the principal generator of *HG*, which is subsequently distributed through the bloodstream to maintain core body temperature and facilitate systemic physiological functions. Although Abū Suhail Masīḥī and Aḥmad Ibn Ṭabarī considered the heart to be the centre of *HG*, their view does not imply that the heart is the site of its production. Rather, the heart functions as the central organ for the regulation and dissemination of innate heat throughout the body, ensuring its uniform distribution to all tissues. (17)

The Unani concept of *Harārat-e-Gharīziyya* resembles metabolic heat production generated through mitochondrial oxidative pathways, particularly within hepatocytes, which are among the most metabolically active cells in the body. Furthermore, Unani scholars describe nutrient-derived energy as essential for sustaining innate heat, which parallels the dependence of ATP generation on nutrient substrates and mitochondrial function. The emphasis on the liver as the primary generator of systemic heat aligns with findings that the liver contributes significantly to basal thermogenesis and temperature homeostasis. Thus,

integrating Unani hepatology with modern metabolic science offers a comprehensive, multidimensional perspective on liver physiology that encompasses both structural and functional paradigms.

### 3.4 Tawlīd Mawād-i-Bawliyā (Formation of Urinary Waste) and *Islāh-i-Mawād-i-Faṣīdā* (Reformation of Waste Material)

According to ʿAllāma Burhānuddīn Nafīsī, urine represents a metabolic waste composed of two distinct fractions. Its liquid portion is the residual product of *Haḍm-e-Kabidī* (hepatic digestion), whereas its denser sediment derives from *Haḍm-e-ʿUrūqī* (vascular digestion). (18) In classical Unani physiology, the genesis of urinary constituents begins within the liver. Following intestinal digestion, *Kaylūs* (absorbable chyle), which contains excess aqueous matter, is transported via mesenteric vessels to the liver for secondary digestion. During *Haḍm-e-Kabidī*, this chyle is transformed into *Kaymūs* (humour) through metabolic processing aided by intrinsic moisture. At this stage, the humour remains relatively thin due to the excessive water content.

The liver, through its *Quwwat-e-Mūmayyizā* (discriminatory faculty), separates surplus water from the nutritive fraction of *Khilṭ.* This excess fluid, now physiologically recognized as a waste component, is directed toward the renal vasculature along with an appropriate nutritive share designated for the sustenance of renal tissues. Within the kidneys, an analogous discriminating capacity ensures selective utilization of nutritive material, while the unwanted fraction is expelled through the urinary tract by the action of *Quwwat-e-Dāfiʿa* (expulsive faculty), thus forming urine. (8,10)

Allāma Kabīruddīn, in Ifāda-e-Kabīr, asserts that the urinary humour *(Akhlāṭ-e-Bawliyā)* is essentially produced under the influence of the liver's Quwwat-e-Mughayyira (transformative faculty). Shaikh also describes urine formation as a physiological process wherein, upon transformation of *Kaylūs* into final humoral forms, their waste components are simultaneously segregated and prepared for elimination. (4)

Parallel to excretory functions, the liver is also responsible for *Islāḥ-i-Mawād-e-Faṣīdā* (detoxification or reformation of harmful substances). Owing to the liver's superior metabolic and digestive capacity, its *Quwwat-e-Hāḍima* (digestive faculty) alters the taste, colour, and quality of ingested constituents and modifies harmful or excessive materials into milder forms that can either be utilized or safely eliminated. Although every organ has some intrinsic ability to modify harmful substances, organs with stronger metabolic faculties possess greater reformative potential. As the principal organ of transformation,

nourishment, humoral regulation and waste segregation, the liver thus represents the central site of systemic detoxification in classical Unani thought.(4)

## 4. Discussion and Conclusion

The classical Unani conceptualization of hepatic physiology demonstrates striking concordance with contemporary biomedical science, particularly when viewed through the lens of functional integration rather than isolated organ-centric descriptions. In Unani doctrine, the liver is regarded as the principal organ of metabolism (Sadr-e-A'dā), entrusted with the transformation of digested material into *Akhlāṭ* (humours) and nutritive substances essential for nourishment, growth, and maintenance of tissues. This foundational idea parallels modern understanding in which the liver is recognized as the central metabolic hub, orchestrating glucose regulation (via glycogenesis and gluconeogenesis), lipid metabolism (including cholesterol synthesis and fatty acid oxidation), protein synthesis (such as albumin and clotting factors), and thermogenesis.(19) Thus, ancient perceptions of hepatic primacy symbolically correspond to the liver's role in biochemical homeostasis today.

Moreover, Unani discussions on Tabdīl-i-Ghidhā (transformation of food materials), *Tanqiya* (purification), and *Istifragh-i-Fuzūlāt* (elimination of metabolic residues) align conceptually with hepatic detoxification pathways, including drug metabolism and biotransformation. The notion of the liver producing purer nutritive substances for the heart and brain, while separating waste elements for excretion via bile and urine, reflects a highly sophisticated systemic vision. This resembles modern concepts of hepatic excretory function, bile acid synthesis, bilirubin metabolism, and urea cycle-mediated nitrogen disposal.(20)

Unani physicians also emphasized the role of the liver in maintaining innate heat, a concept now interpretable through mitochondrial activity, thermogenic pathways, and continuous metabolic fluxes generating physiological heat. The liver's thermal role was not metaphorical; rather, it was linked to vitality, organ performance, and immune resilience.

Collectively, preservation of hepatic equilibrium *(I'tidāl-e-Kibd)* is considered a prerequisite for systemic wellbeing. Contemporary evidence supports this holistic perspective, as hepatic dysfunction, arising from inflammatory conditions, fatty liver changes, mitochondrial dysfunction, or structural alteration which produce multisystem manifestations affecting cardiovascular, endocrine, neurological, and immune domains. In Unani terms, this reflects dystemperament *(Su-i-Mizāj)*, alteration in humoural composition *(Taghayyur-e-Akhlāṭ)*, or structural compromise *(Su-i-Tarkīb)*.

Therefore, maintaining hepatic health through dietary regulation, moderation in intake, lifestyle discipline, and temperament-appropriate medicinal interventions (as repeatedly emphasized in classical texts) remains a scientifically relevant preventive paradigm. Modern recognition of lifestyle-associated hepatic disorders underscores the enduring wisdom of these classical principles. The convergence of historical and current biomedical understanding reaffirms that the liver, in both ancient and modern science, functions not merely as an organ but as the physiological axis upon which systemic balance is sustained.

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