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The Gut–Brain–Hormone Axis in the Light of the Qur'an and Sunnah: An Integrative Study of Islamic Dietary Principles and Contemporary Nutritional Science

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Abstract

The human gut functions as an endocrine and neurochemical organ, producing and regulating hormones such as dopamine, serotonin, ghrelin, and cortisol. Disruption of this delicate balance whether through poor diet, stress, or spiritual neglect can lead to mood disorders, metabolic dysfunction, and loss of eudemonia, probiotics and prebiotics, by sustaining healthy gut microbiota, promote hormonal equilibrium and emotional stability. This research investigates how the Qur'an and *Sunnah* of Prophet Muhammad ﷺ provide dietary and ethical guidance that aligns with modern gut–hormone science. Foods like honey, dates, milk, barley, and vinegar are frequently mentioned in scripture to possess properties that regulate gut flora and endocrine responses. Through qualitative scriptural analysis and synthesis of biomedical research, this paper argues that adherence to *ṭayyib* (wholesome) and moderate nutrition, as prescribed in Islam, fosters neuroendocrine harmony and spiritual peace are termed here as *Divine Bliss.*

Keywords: Qur'an, *Sunnah*, Prebiotics, Vinegar, *Laban*, *Ajwa*, Probiotics, Honey

Introduction

The complex physiological networks have a significant role in the maintenance of internal stability of the human body. One of these networks is brain, endocrine & get axis which helps in the integration of emotions, digestion and regulation of hormones. It is said that about more than half of the dopamine and nearly 90% of the serotonin

are produced within the gut which are the neurotransmitters responsible for motivation, focus, and above all the happiness (Strandwitz 2018). The disruption in the regulation of the neurotransmitters may lead to disturbed gut microbiota. The emotional resilience is diminished, and the stress hormone (cortisol) secretion is increased during the condition of dysbiosis (disequilibrium in the gut microbiota).

Allah the Almighty has created human beings with the best integration. Humans are blessed with *aql, nafs* and *jism*. It has been declared in the Qur'an that:

***"We have created humans in the best, indeed"* (Qur'an 95:4).**

The natural state or *fitrah* of the human must be protected and are required to be nourished in the *halal* (observant), moderate and *tayyib* (pure) manner.

It is commanded in the Qur'an:

***"O mankind, eat of what is lawful and good from the earth and follow not the footsteps of Shayṭān."* (Qur'an 2:168).**

***"So direct your face toward the religion, inclining to truth. [Adhere to] the fitrah (natural disposition) of Allah upon which He has created [all] people. No change should there be in the creation of Allah. That is the correct religion, but most of the people do not know."* (Qur'an 30:30).**

***"O children of Adam, take your adornment at every masjid, and eat and drink, but be not excessive. Indeed, He likes not those who commit excess."* (Qur'an 7:31).**

The spiritual tranquility and physiological balance both can be disturbed by the unhealthy food, stress and intemperance.

The Prophet ﷺ has told and cautioned:

"The son of Ādam fills no vessel worse than his stomach. It is sufficient for him to eat a few mouthfuls to keep his back straight. If he must, then a third for food, a third for drink, and a third for air. (Ibn Mājah 3349).

The modern science now emphasize on the importance of moderate eating, in the form of calorie deficits and keto diets just to recognize the core concept of moderation provided by the Qur'an and the Prophet Muhammad ﷺ centuries ago. This not only

helps humans to maintain their health but also prevent them from diseases and support the brain-gut and hormonal nexus.

Objectives of the Study

i. To interpret the principles of the Holy Qur'an regarding holistic approach of certain foods.
ii. To interpret the teachings of the *Sunnah* to get in depth idea of the foods through *tibb-e-Nabwi.*
iii. To explore and demonstrate the physiological relationship of gut-brain and stress influenced hormones.

Literature Review

The Brain, Gut & Hormones Correlation

There are present trillions of microbes in the gut of living organisms that have a direct impact on the different neural, immune, and metabolic pathways. The psychological parameters and mood are modulated by this correlation with the help of microbial metabolites including neurotransmitters and short chain fatty acids (SCFAs) (Smith 2025). There are a number of clinical studies which have proven that anxiety, depression and increased levels of cortisol hormone are linked to dysbiosis (Kimura 2023). The gut microbiota commonly considered as probiotics include wide range of good bacteria such as different species of *Bifidobacterium* and *Lactobacillus* have shown the reduced levels of cortisol and ameliorated regulation of emotions (Ishaq et al. 2024). As probiotics have commendable impact on moderating the human health, in the same way, prebiotics such as inulin improved the growth and prevalence of probiotic bacteria leading to increased dopamine and serotonin precursors (Strandwitz 2018). These scientific findings have shown correspondence with the principles of the Qur'an and teachings of the Prophet Muhammad ﷺ.

Modern Science & its Acquisition on Stress

The Hypothalamus, Pituitary and Adrenal (HPA) glands axis leads to the activation of stress, and higher levels of stress results in cortisol secretion. The dopamine pathways are disrupted by the increased and prolonged production of cortisol. The motivation

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gets impaired, & learning and emotions get destabilized (La Torre et al. 2023). The excessive intake of high sugar diets causing crashed dopamine which brings addiction like patterns. The balanced diet is the key to healthy gut and brain and this notion of limiting the food intake comes from Islamic principles of health.

As it is cautioned by Allah the Almighty:

***"Eat and drink, but waste not by excess; surely He loves not the wasters."* (Qur'an 7:31).**

The concept of fasting in Islam helps in regulating the release of dopamine and leads to reduction of cortisol and eventually helps in improvement of mental clarity and emotional balance. The parasympathetic nervous system and cortisol rhythms are synchronized with the help of fasting as proven by number of modern scientific studies (Schmidt et al. 2015).

As it is narrated in the famous book of *Hadees, Ṣaḥīḥ al-Bukhārī 1904*;

***"Fasting is a shield from the Fire and a protection from desires."* (*Ṣaḥīḥ al-Bukhārī 1904*).**

The impulses are disciplined spiritually and hormones are regulated physiologically by the help of fasting.

Foods Highlighted by Qur'an & *Sunnah* Support Balance of Gut & Hormones

a. Honey (*ʿAsal*)

In the recent years, number of researches have claimed that honey has natural probiotic properties, helps in modulation of cortisol and helps in the growth of beneficial gut bacteria including *Lactobacillus sp.* These claims of honey being having wound healing and antimicrobial activities have been given by the Qur'an and the *Sunnah* of the Holy Prophet.

As it is said in the Holy Qur'an:

***"There comes forth from their bellies a drink of varying colors, wherein is healing for mankind."* (Qur'an 16:68–69).**

In the same way, in *hadees* Prophet ﷺ said,

"Healing is in three things: A drink of honey, the incision of a cupper (cupping/Hijama), and cauterization with fire, but I forbid my followers from cauterization." (Ṣaḥīḥ al-Bukhārī 5680).

Now, the recent research have shown that honey has powerful medicinal properties but also have high viscosity and to overcome this limitation, honey has been embedded into hydrogels, nanoparticles and electrospun nanofibers for wound treatments. The bioactive compounds of honey are released slowly and in a controlled fashion by these materials. These honey based treatments are efficient in wound healing as compared to other natural or synthetic wound healers (Lee et al. 2011).

In another research, it has been said that honey has properties of anti-proliferation (fight against cancer) and anti-metastasis. The polyphenols and flavonoids present in the honey serve as the best antioxidants and it can complement traditional medicines in reducing their side effects e.g., chemotherapy and accelerate the recovery in cancer patients (Kim et al. 2021).

One of the studies have revealed the role of honey as anti-bacterial and anti-viral in nature. Its chemical environment is quite unique for antibiotic resistant bacteria to handle as it has high acidity, low content of water and bio-enzymes presence. It has also been proven helpful against respiratory viruses and influenza virus. It has also shown improvement in skin, cardiovascular health and many other health benefits (Taleuzzaman et al. 2020).

b. Dates (*tamar* especially *ajwah)*

Dates have rich content of fibre and polyphenols. These help in the regulation of serotonin, estrogen and metabolism of glucose. These rich content of nutrients and their health benefits have been highlighted in the Holy Qur'an and by the *Sunnah* of the Holy Prophet centuries ago. As it is mentioned in the Qur'an:

***"And shake toward you the trunk of the palm tree; it will drop upon you fresh ripe dates."* (Qur'an 19:25).**

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In the same way, in *hadees* Prophet ﷺ said,

> ***"Whoever eats seven ʿAjwah dates in the morning will not be harmed by poison or magic that day." (Ṣaḥīḥ Muslim 2047).***

And comes the turn of modern biological science which have made claims of dates being effective in prevention and cure of neuro-degenerative disorders such as Alzheimer. This study highlighted the significance of *ajwah* dates among different varieties. It has higher concentrations of glycosides and flavonoids. These compounds have the capacity to cross through the blood brain barrier and leads to the reduction in the formation of amyloid-beta plaques, which results in sensitive neuro-degenerative inflammations (Soomro et al. 2025).

Then, in another study a controlled trial was carried out to test the glycemic index and response of insulin to different varieties of dates. This lead to a wonderful breakthrough which was already given by the *tibb e Nabwi* that *ajwah* dates despite of being sweet, have very low glycemic index. The sugar spike can easily be controlled by the rich fibre content of these dates. The daily consumption of 2-3 *ajwah* dates did not impact the levels of sugar negatively in the patients with Type II diabetes (M. Abo-El-Saad and M.S. Shawir 2024).

The next research have proven that *ajwah* dates have high antifibrotic and hepatoprotective effects against the liver toxicity induced by chemicals. The presence of superoxide dismutase and catalase in the dates have demonstrated the antioxidant properties and protects liver against all the damage caused by chemicals. It must be used as an assistive treatment for fatty liver disease. *Ajwah* dates have higher content of manganese, selenium, calcium, alongwith standard potassium and magnesium (Ouais et al. 2023).

c. Milk (*Laban*)

Milk is considered one of the finest forms of natural probiotics. It helps in increased gut integrity and serotonin production is increased. These properties of milk are

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highlighted in the Qur'an and the *sunnah* of the Holy Prophet. The Holy Qur'an was revealed on to the Prophet Muhammad centuries ago yet it has the potential to be relevant in all the ages with its scientific approach and miracles.

As it is mentioned in the Holy Qur'an about milk:

***"We give you to drink of what is in their bellies, between excretions and blood—milk pure and palatable to drinkers."* (Qur'an 16:66).**

Then, it is referenced from the *hadees* of the Holy Prophet that:

***"Nothing suffices as both food and drink except milk."* (*Tirmidhī 3455*).**

Now, the evidence from different recent scientific studies says that milk in the form of laban has protective probiotic capabilities. This recent study claims that *laban* acts as a protective carrier for probiotic bacteria. In the gut, these probiotic bacteria lead to the production of short chain fatty acids (SCFA) such as butyrate which signals the brain with the help of vagus nerve. The experimental units which consumed *laban* on a daily basis have reduced production of interleukin-6, which is a systemic inflammatory marker and the levels of anxiety and stress (Balamurugan et al. 2025).

Then, in another study a randomized controlled trial was done to examine how *laban* (the fermented milk) affects the levels of blood sugar after eating (postprandial glycemia). The digestion of starches is slowed down due to the presence of lactic acid in *laban.* The concentration of biologically available calcium is high enough to support the secretion of IGF-1 (Insulin like Growth Factor 1), which helps muscles to uptake glucose. The diabetic patients who started to use *laban* as the snack has shown increased GLP-1 levels which is necessary to improve insulin secretion and satisfy brain regarding hunger (Fernández-Fígares Jiménez 2025).

d. Vinegar (*khal*)

The bioactive properties of vinegar due to presence of acetic acid and polyphenols are basically helpful in maintaining health. It is helpful in regulating cortisol levels and blood sugar. The probiotic species of *Acetobacter* are also protected by vinegar. It has also has significance in *tibb e Nabvi,* as it is said by Prophet ﷺ

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"What an excellent condiment vinegar is!" (Ṣaḥīḥ Muslim 2052).

In the same way, now science has proven the importance of vinegar in weight management, cortisol production and maintenance of sugar levels.

A study was carried out on 789 diabetic participants which were given almost 30mL/day dosage of vinegar and it leads to lowering of circumference of waist and also significant weight reduction. (Castagna) There was another study carried out showing randomized control experiment which have shown that after regularly administrating vinegar for 4 weeks has significantly lower down the depression in experimental units. It has been shown by metablomics that there was an increased in levels of indole-3-acetic acid which is considered as the precursor to serotonin which is happy hormone (Johnston and Gaas 2006).

e. Barley (*Sha'ir)*

Barley has its role as prebiotic because it contains β-glucans. These help in increased production of GLP-1 and reduce the levels of stress. The drink of barley named as *Talbinah* in arabic is the favorite drink of the Holy Prophet ﷺ. He ﷺ has said about it;

"Talbīnah gives rest to the heart of the patient and relieves sorrow." (Ibn Mājah 3448).

A recent scientific study has proven that the ratio of Tryptophan: BCAA (Branched Chain Amino Acids) is very high, approximately 1:2. Tryptophan is considered as the precursor of Serotonin, which is a happiness hormone. This ratio helps the Tryptophan to cross the barrier of blood-brain efficiently, which increases the production levels of serotonin synthesis in the brain, directly. Magnesium and Zinc (deficient in depressed people) are highly present in *Talbinah* which helps to reduce anxiety and stabilize the neural pathways. Hence, *Talbinah* acts as natural mineral supplement. The glucose crashes are prevented as the release of sugar or carbohydrates are slow in Barley, hence lowering the cortisol levels (Badrasawi et al. 2013).

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f. Olives (*Zaytun)*

Olive and its derivatives have opened a new window in the research by recognized as their role in the modulation of gut-brain-skin axis by the mechanisms of prebiotic and probiotic. These are enriched in polyphenols and dietary fibers. The plus point includes that most of its polyphenols have the capability to reach the gut in intact form. The beneficial bacteria can anchor and ferment themselves in the large intestine as physical scaffold is provided by the dietary fibers present in the olives. These recent scientific breakthroughs have been signified by the Holy Quran and the Holy Prophet centuries ago as it is said in the Holy Quran:

***"By the fig and the olive."* (Qur'an 95:1).**

And also Prophet ﷺ said,

***"Eat olive oil and anoint yourselves with it, for it is from a blessed tree."* (*Tirmidhī 1851*).**

In a recent study, it is claimed that olives are considered as the natural reservoir for Lactic Acid Bacteria which are probiotic bacteria. The acidic path of the human stomach is survived by the olives as the protective biofilm is produced by *Lactiplantibacillus* bacteria during fermentation. One of the European Union EU funded Probiolives project has demonstrated that olives have the potential to deliver probiotics as much as a dairy source can (Anagnostopoulos and Tsaltas 2022).

Conclusion & Discussion

Indeed, the gut flora gets disturbed, and cortisol levels are elevated due to chronic stress. The risk of depression increases, and inflammation leads to different cancer or metastatic forms in the body. In Islam the concept of spiritual calmness through eating right types and amount of food exists. The pleasure and motivation are derived through dopamine. This hormone is excessively stimulated due to overeating and addiction. This leads to an imbalance in neurogenic pathways. The Holy Prophet has warned about the consequences of over consumption like this,

"A human being fills no worse vessel than his stomach." (Ibn Mājah 3349).

The concept of mindful eating and fasting now supported by different scientific backgrounds were already given by the Qur'an and the *Sunnah* of the Holy Prophet. The *Sunnah* of fasting as commanded by the Holy Prophet and early sleep time has shown to regulate the circadian cortisol release. The modern concept of endocrine health draws its origin from the *Sunnah*.

Hence, it can be concluded that endocrine health, physiological and spiritual well-being are correlated and have been manifested through the teachings of Islam related to diet and spirituality. The balanced and checked *tayyab* food in the form of probiotics and prebiotics have shown to increase the fidelity of the gut bacteria which leads to healthy hormone health and relax the mind and keep cortisol levels in check and increase the levels of serotonin. The modern science has proven the ideals provided by the Qur'an and the *Sunnah*, after centuries.

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