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The Role of Iron (Fe) in Health and Medicine: Scientific Interpretation of Surah Al-Hadid Verse 25

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ABSTRACT: Iron is a vital element for life, playing essential roles in oxygen transport, metabolism, enzymatic activity, and cognitive development. Surah Al-Hadid [57]:25 of the Qur'an references iron, which aligns with its biological, medical, and cosmic significance. This review examines the intersection of Qur'anic references, astrophysical evidence, and biomedical research related to iron, highlighting the numerical correlations between the surah number (57) and Fe-57, and verse 25 with iron's atomic number (26). Modern astrophysics confirms that iron is synthesized in stars and delivered to Earth via supernovae, echoing the Qur'anic expression "We sent down iron". Biologically, iron deficiency causes anemia, impaired immunity, and cognitive deficits, while iron-based therapeutics—including oral supplements, parenteral formulations, and nanoparticle-based drug delivery systems—demonstrate its crucial role in human health. Surah Al-Hadid [57]:25 exemplifies the convergence of divine revelation and scientific knowledge, encouraging ethical and informed utilization of natural elements in medicine and technology, reflecting harmony between spiritual guidance and scientific inquiry.

KEYWORDS: Astrophysics; biological; enzymatic activity; health; iron.

1. INTRODUCTION

The Qur'an, as a divine source of knowledge and guidance for human life, often references natural phenomena that carry profound scientific implications. One verse that has attracted considerable attention from modern scientists is Surah Al-Hadid (The Iron), verse 25, which states:

وَأَنْزَلْنَا الْحَدِيدَ فِيهِ بَأْسٌ شَدِيدٌ وَمَنَافِعُ لِلنَّاسِ

"And We sent down iron, in which there is great strength and many benefits for mankind." (Qur'an, Surah Al-Hadid [57]: 25).

This verse contains a deep scientific meaning. The term "anzalnā" (translated as *"We sent down"*) is particularly noteworthy. Linguistically, it implies that iron was not originally formed on Earth but was "sent down" from beyond it—a statement that remarkably aligns with modern astrophysical discoveries. Contemporary science has revealed that iron is not produced through ordinary terrestrial processes. Instead, it is formed through nucleosynthesis within massive stars, and its presence on Earth results from supernova explosions that dispersed iron-rich material across space, later incorporated into planetary formation (Al-Maraghi, 1974).

Beyond its cosmological significance, iron holds vital importance in biological and medical sciences. In the human body, iron is an essential element for life, functioning as a key component of hemoglobin, which transports oxygen throughout the bloodstream. It is also involved in enzyme systems, cellular respiration, and immune function. Medically, iron and its compounds play a role in the development of pharmaceuticals, biomedical devices, and nutritional supplements, underscoring its immense benefit to humanity—precisely as the Qur'an states, *"and many benefits for mankind."*

Thus, the Qur'anic reference to iron not only carries spiritual and metaphorical wisdom but also reflects a scientific truth that was unveiled by modern research centuries later. This harmony between revelation and scientific discovery exemplifies the Qur'an's timeless nature as a source of both moral and empirical knowledge, guiding human understanding of the universe.

2. EXPERIMENTAL SECTION

This study is a qualitative literature review employing a scientific exegesis (tafsīr 'ilmī) approach to explore the intersection between Qur'anic revelation and modern scientific understanding. The primary data sources include the Qur'an and classical tafsir references, particularly *Tafsir Ibn Kathir* and *Tafsir Al-Maraghi*. These foundational texts were examined to understand the linguistic, theological, and interpretative context of Surah Al-Hadid [57]: 25 (Al-Quran).

Secondary data were obtained from scientific publications in the fields of physics, chemistry, astrophysics, biomedicine, and pharmacology, focusing on the atomic structure, isotopic forms, and biological functions of iron (Fe). Additional data were sourced from peer-reviewed journals in medical and pharmaceutical sciences that discuss the biomedical and technological applications of iron in human health.

The analytical process involved interpreting the Qur'anic verse (QS. Al-Hadid [57]: 25) within the framework of modern scientific knowledge. Comparative analysis was carried out by correlating numerical data from the Qur'an—such as the surah and verse number—with scientific data, including iron's atomic number (26) and its isotopic variations. This correlation was examined both symbolically and empirically to uncover potential relationships between Qur'anic linguistic expressions and scientific facts. The interpretation sought to bridge the spiritual meaning of divine revelation with the empirical evidence from contemporary scientific discoveries, particularly in biomedical and pharmacological contexts.

3. RESULTS AND DISCUSSION

3.1. Qur'anic Perspective and Scientific Facts on Iron

Surah Al-Hadid (The Iron), the 57th chapter of the Qur'an, explicitly mentions iron in verse 25. This verse highlights iron's strength and utility, underscoring its significance in human civilization. Notably, the chapter's number, 57, correlates with the atomic number of iron (Fe), which is 26. Additionally, iron has four stable isotopes: Fe-54, Fe-56, Fe-57, and Fe-58. The isotopic distribution is as follows: Fe-56 (91.754%), Fe-54 (5.845%), Fe-57 (2.1191%), and Fe-58 (0.2819%) (IAEA).

The Qur'an provides not only spiritual guidance but also profound insights into the natural world, often inspiring scientific reflection. One such example is found in Surah Al-Hadid [57]: 25, which declares: *"And We sent down iron, in which there is great strength and many benefits for mankind."* This verse captures the multifaceted importance of iron (Fe), both cosmologically and biologically, revealing layers of meaning that align remarkably with modern scientific discoveries.

Table 1. Numerical correlation in the Quran with the characteristics of Fe

Aspect	Qur'anic Data	Scientific Data	Correlation
Surah Number	57 (Al-Hadid)	Fe-57 (stable isotope)	Numerical alignment between the surah and the iron isotope
Verse Number	25	Atomic number of Fe = 26	Difference of one indicates a symbolic closeness between revelation and science
Meaning of 'Anzalna'	Interpreted as "We sent down"	Iron is formed outside Earth (supernova)	Correspondence between the meaning of revelation and the cosmic origin of iron

Fe-57, a stable iron isotope, plays an important role in medical research through Mössbauer spectroscopy. This technique is used to study the chemical bonding structure in hemoglobin and iron-containing enzymes. Interestingly, Surah Al-Hadid, the 57th chapter, highlights the benefits of iron for humans, aligning with the use of Fe-57 in biological and medical studies. Meanwhile, verse 25, which differs slightly from iron's atomic number (26), signifies that human knowledge is always one step behind divine revelation.

The integration of the numerical structure of the Quran and the atomic structure of iron demonstrates the harmony between revelation and science. The meaning of the "descent" of iron encompasses not only the physical aspect (being sent down from heaven), but also the symbolic one: knowledge and power are trusts that must be used for the benefit of humanity. This verse conveys a message of scientific ethics, that technological advances derived from natural elements must be directed toward humanitarian goals, not destruction.

3.2. Cosmic Origin of Iron

The Qur'anic expression *"We sent down iron"* (*wa anzalnā al-hadīd*) has long intrigued scholars and scientists. The verb *anzalnā* (sent down) suggests that iron did not originate from the Earth's crust, but rather was delivered from beyond our planet. Modern astrophysics supports this interpretation: iron is not produced through ordinary geological or solar processes but is instead forged within massive stars through a process known as stellar nucleosynthesis. When these stars reach the end of their life cycle, they explode as supernovae, releasing iron and other heavy elements into space. Over billions of years, this material became part of the interstellar dust that coalesced to form the Earth and other celestial bodies (Greenwood and Earnshaw, 1997). Hence, the scientific evidence confirms that iron on Earth was indeed "sent down" from the heavens—a striking parallel to the Qur'anic description (Al-Fandi, 2018).

3.3. Biological and Medical Significance of Iron

Beyond its cosmic role, iron is essential for sustaining life. In biological systems, iron serves as a central component of hemoglobin and myoglobin, enabling oxygen transport and storage within the body. It also plays a vital role in enzyme catalysis, DNA synthesis, and electron transport chains within mitochondria. Deficiency of iron leads to anemia, a global public health problem affecting energy metabolism, immunity, and cognitive development (Abbaspour, Hurrell, and Kelishadi, 2014; Khalid, M., et al., 2019).

In modern medicine, iron and its derivatives are extensively used in nutritional supplements, iron-fortified foods, and pharmaceutical formulations to combat anemia and related disorders. Moreover, iron has gained importance in biomedical technology—notably in the development of iron oxide nanoparticles for targeted drug delivery, magnetic resonance imaging (MRI) contrast agents, and cancer therapy. These applications illustrate the Qur'anic phrase *"many benefits for mankind"*, emphasizing the element's far-reaching impact on health and scientific advancement.

3.4. Iron Deficiency Diseases

Iron deficiency is among the most prevalent nutritional problems worldwide. It can lead to iron deficiency anemia, characterized by low hemoglobin levels, fatigue, and impaired cognitive function. In children, iron deficiency may hinder brain and nervous system development, while in pregnant women, it can increase the risk of complications such as preterm birth and low birth weight. Additionally, research indicates that iron deficiency is associated with reduced resistance to infections (WHO, 2021).

3.5. Iron-Derived Drugs

In the pharmaceutical field, various iron-based preparations have been developed to address iron deficiency and anemia. Oral supplements such as ferrous sulfate, ferrous fumarate, and ferrous gluconate are commonly used, while parenteral formulations like iron sucrose and ferric carboxymaltose are administered to patients who cannot tolerate oral therapy. Contemporary research is also exploring iron complexes for applications in anticancer therapy and nanoparticle-based drug delivery systems. These developments demonstrate that iron not only plays essential physiological roles but also holds significant potential in modern medical innovation (Charlebois and Pantopoulos, 2023).

3.6. Integrative Reflection

The convergence between Qur'anic revelation and scientific discovery demonstrates the Qur'an's capacity to inspire inquiry and contemplation. The mention of iron in the 7th century reflects knowledge that predates modern astrophysics by more than a millennium. From its celestial origins to its indispensable biological functions and vast technological applications, iron embodies a divine balance between cosmic order and human benefit. Thus, the verse serves as a reminder that the natural elements discussed in the Qur'an are not merely symbolic but also carry empirical and universal significance—inviting humanity to explore, understand, and utilize them responsibly for the betterment of life.

Verse Al-Hadid [57]:25 contains two layers of meaning: spiritual and scientific. Spiritually, this verse reminds humans that all power and technology originate from Allah's grace, including the ability to utilize iron. Scientifically, the discovery that iron originates from beyond the earth and plays a central role in biological life demonstrates the harmony between revelation and science. Humans are commanded to use this power (iron) wisely for the benefit of all, including in the fields of health and medicine. Thus, this verse symbolizes the harmony between Divine revelation and the advancement of science.

4. CONCLUSION

Surah Al-Hadid [57]:25 reveals a remarkable numerical and scientific correspondence: the surah number (57) matches the stable isotope Fe-57, while verse 25 aligns closely with iron's atomic number (26). This suggests that the Qur'an contains signs inspiring humans to explore the natural world. Spiritually, it emphasizes that strength—symbolized by iron—is a divine gift to be used responsibly. Scientifically, the verse highlights iron's essential role in circulation, metabolism, and cognitive development, with deficiency leading to anemia and other health issues. Its applications in modern medicine reflect the profound benefits hinted at in the Qur'an, underscoring the importance of appreciating and utilizing God's gifts ethically and scientifically.

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