I J A Z A R A B I : J o u r n a l o f A r a b i c L e a r n i n g
D O I : 10.18860 /ijazarabi.V9i4.42246
I S S N (p r i n t) : 2 6 2 0 - 5 9 1 2 | I S S N (o n l i n e) : 2 6 2 0 - 5 9 4 7
e j o u r n a l . u i n - m a l a n g . a c . i d / i n d e x . p h p / i j a z a r a b i / i n d e x

From Lexical Meaning to Scientific Interpretation: A Linguistic and Exegetical Study of Qur'anic Embryological Terminology

Received 2026-04-30
Accepted 2026-09-19
Published 2026-10-27

Umaiyatus Syarifah*[1], Idri[2], Abdul Kadir Riyadi[3], Mohammad Arif[4], Wati Susilawati[5], Kiptiyah[6]
[16]Universitas Islam Negeri Maulana Malik Ibrahim Malang, Indonesia
[2345]Universitas Islam Negeri Sunan Ampel Surabaya, Indonesia
[5]Universitas Islam Negeri Syarif Hidayatullah Jakarta, Indonesia
umayya_syarifa@fis.uin-malang.ac.id[*1], idri@uinsa.ac.id[2], abd.kadir@uinsby.ac.id[3], arif18@uinsa.ac.id[4], wati.susiawati@uinjkt.ac.id[5], kiptiyah@bio.uin-malang.ac.id[6]

Abstract
This article investigates Qur'anic embryological terminology in Q.S. al-Mu'minūn (23):12–14 by integrating linguistic analysis with comparative exegesis. It focuses on the semantic construction and transformation of key terms—*nutfah*, *'alaqah*, and *mudghah*—across classical and modern interpretive traditions. Using qualitative library research, the study applies semantic analysis grounded in classical Arabic lexicography alongside *tafsīr muqāran*, examining major classical exegetes such as al-Ṭabarī, al-Qurṭubī, Ibn Kathīr, and al-Rāzī, and contrasting them with modern scientific exegesis, particularly Zaghlūl al-Najjār. The analysis demonstrates that classical exegesis maintains a stable lexical orientation, interpreting these terms within the semantic framework of early Arabic usage as descriptive, non-technical expressions. In contrast, modern scientific exegesis adopts a correlational approach, aligning Qur'anic terminology with stages of embryological development such as fertilization, implantation, and organogenesis. This shift entails processes of semantic extension and conceptual reconstruction, often merging distinct biological stages into single Qur'anic terms. From a semantic and hermeneutical perspective, this transformation reflects a shift from descriptive-lexical meaning to reinterpretative-scientific meaning, shaped by the interaction between the historical horizon of the text and the epistemic horizon of modern science. However, such reinterpretation raises critical methodological issues, including anachronistic projection and semantic overextension. The study argues that the relationship between the Qur'an and science is indirect and interpretively mediated through language and exegetical discourse. It concludes that while Qur'anic terminology exhibits semantic flexibility, its interpretation must remain grounded in linguistic plausibility. A balanced, interdisciplinary approach is therefore necessary to preserve semantic integrity while engaging contemporary knowledge in Qur'anic studies.
Keywords: Qur'anic Linguistics; Lexical Semantics; Arabic Lexicography; Qur'anic Terminology; Tafsīr Muqāran

INTRODUCTION
The Qur'an contains numerous verses describing the origin and development of human beings. Among these passages, the embryological verses, particularly Q.S. al-Mu'minūn (23):12–14, have attracted significant attention in both classical and contemporary Qur'anic scholarship.

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

These verses describe successive stages of human creation using specific Arabic terms such as *nutfah* (a drop of fluid), *'alaqah* (a clinging entity), and *mudghah* (a chewed-like lump). The linguistic precision of these terms has long stimulated exegetical discussions among Muslim scholars, who sought to interpret their meanings within the semantic framework of the Arabic language and the broader theological context of the Qur'an (Akbar et al., 2024; Baharuddin & Putera, 2026).

Classical Qur'anic exegetes generally approached these terms through philological and linguistic analysis rooted in Arabic lexicography and early interpretive traditions (Haroun, 2025). Scholars such as al-Ṭabarī, al-Qurṭubī, Ibn Kathīr, and al-Rāzī interpreted embryological terminology primarily by referring to the lexical meanings found in Arabic dictionaries and the linguistic usage of the early Arab community. Within this interpretive framework, terms such as *'alaqah* were commonly understood as a "clot of blood," while *mudghah* was interpreted as a "small lump of flesh." These interpretations reflected the linguistic knowledge available at the time and were largely independent of empirical scientific explanations of embryological development. In the modern period, however, the interpretation of these verses has undergone a significant transformation. The emergence of scientific exegesis (*tafsīr 'ilmī*) has introduced new interpretive approaches that seek to correlate Qur'anic terminology with modern scientific knowledge, particularly in fields such as embryology, astronomy, and geology. Contemporary interpreters such as Ṭanṭāwī Jawharī and Zaghlūl al-Najjār have argued that Qur'anic descriptions of human development correspond closely with modern embryological discoveries. Within this perspective, terms such as *nutfah*, *'alaqah*, and *mudghah* are frequently interpreted as references to specific stages in embryological development, including fertilization, implantation, and somite formation.(Azlan et al., 2026; Hamdani et al., 2025).

The increasing influence of scientific interpretation has generated extensive debate in Qur'anic studies. (Bucaille, 2007; Guessoum, 2011). Supporters of scientific exegesis view these interpretations as evidence of the Qur'an's timeless knowledge and its compatibility with modern science. Critics, however, argue that such interpretations risk imposing contemporary scientific concepts onto Qur'anic language, potentially overlooking the original semantic and linguistic context of the text. (Mir, 2004; Saleh, 2010). Despite this ongoing debate, most existing studies have focused primarily on evaluating the scientific accuracy of Qur'anic descriptions rather than examining the linguistic structure of the Qur'anic terminology itself and how its interpretation evolves across different exegetical traditions. (Guessoum, 2011). In this regard, the linguistic dimension of Qur'anic embryological terminology remains insufficiently explored. (Matswah, 2017). While classical exegetes emphasized lexical meanings rooted in Arabic linguistic tradition, modern scientific interpreters often reinterpret the same terms through the lens of contemporary scientific discourse. This shift raises important questions regarding the semantic flexibility of Qur'anic language and the role of exegetical discourse in shaping its interpretation.(Bigliardi, 2014; Saeed, 2008).

This study seeks to address this gap by examining embryological terminology in the Qur'an through an integrated linguistic and exegetical approach. Rather than merely assessing the scientific accuracy of Qur'anic descriptions, this research focuses on how key terms such as *nutfah*, *'alaqah*, and *mudghah* are semantically constructed and reinterpreted across different exegetical traditions. This study is guided by the following questions: how are these terms understood within

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

classical Arabic linguistic frameworks, and how are they reconfigured within modern scientific exegesis? By comparing classical and contemporary interpretations of Q.S. al-Mu'minūn (23):12–14, this article aims to demonstrate how Qur'anic language interacts with shifting intellectual paradigms and how modern scientific discourse reshapes the interpretation of Qur'anic terminology.

METHOD

This study is a qualitative, text-based research aimed at examining embryological terminology in the Qur'an, specifically in Surah al-Mu'minūn (23):12–14. This study employs an interdisciplinary approach that integrates linguistic analysis with comparative exegetical studies to understand how key terms such as *nutfah, 'alaqah, mudghah, and khalqan akhar* are interpreted across various exegetical traditions. From a linguistic perspective, this study utilises semantic analysis by tracing the lexical meanings of these terms within the tradition of Classical Arabic. This analysis is conducted by consulting authoritative dictionaries and early Arabic usage to identify the basic (lexical) meanings and contextual meanings that emerge within the structure of the Qur'anic verses. This approach is also used to examine the extent of the Qur'an's semantic flexibility in responding to the development of knowledge. From an exegetical perspective, this study employs a comparative method (tafsīr muqāran) by comparing the interpretations of classical and modern exegetes. The classical exegeses referenced include the works of al-Ṭabarī, al-Qurṭubī, Ibn Kathīr, and al-Rāzī, which generally emphasise linguistic and philological approaches. Meanwhile, the modern exegeses analysed primarily stem from the scientific exegetical tradition (tafsīr 'ilmī), particularly the interpretations of Zaghlūl al-Najjār, who seeks to link Qur'anic terminology with modern findings in embryology.

The data sources for this study consist of primary and secondary data. Primary data comprises verses from the Qur'an relating to embryology, as well as relevant exegetical works. Secondary data, meanwhile, includes supporting literature such as books, scientific articles, and academic studies relating to Qur'anic studies, Arabic linguistics, and embryology. Data collection was carried out through documentary research, namely by identifying, classifying, and examining texts relevant to the focus of the study. Furthermore, data analysis was carried out in three stages. First, identifying and analysing the lexical meanings of embryological terms from an Arabic linguistic perspective. Second, examining the interpretation of these terms in classical exegesis and modern scientific exegesis. Third, conducting a critical comparative analysis to assess how the shift in the modern scientific paradigm influences the reinterpretation of Qur'anic terminology. Through this method, the research is expected to reveal the relationship between language, interpretation, and the development of scientific discourse, as well as to contribute to the study of Qur'anic semantics and contemporary scientific exegetical discourse.

RESULTS AND DISCUSSION

A Linguistic Analysis of the Meaning of the Qur'anic Term 'Nutfah' and Its Development in Exegesis

Linguistically, *nutfah* refers to a small drop of fluid. In the classical exegetical tradition, this term is generally understood to mean human reproductive fluid. Al-Ṭabarī interpreted it as semen, which is the origin of human creation. (al-Thabari, 2007), whilst al-Qurṭubī understood it

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

as seminal fluid in general. Ibn Kathīr also affirmed that nutfah is part of the process of human creation, originating from semen. (Kathir, 1999). Al-Rāzī (d. 1210) offers a more functional explanation, stating that nutfah is the fluid that plays a role in the fertilisation of the ovum. (al-Razi, 1995), whilst al-Zuḥailī (2009) emphasises its quantitative aspect as a small amount of fluid (Zuhaili, 2013). M. Quraish Shihab understands nutfah as the result of the mixing of sperm and ovum (Abdullah et al., 2026; Shihab, 2008). In a scientific interpretation, Zaghlūl al-Najjār broadens the meaning of nutfah by linking it to biological processes such as gametogenesis and fertilisation, and employs the concept of nutfah amsāj as the product of the mixing of sperm and ovum that results in a zygot (al-Najjar, 2008). However, in modern embryology, gametogenesis, fertilisation, and zygote formation are distinct stages; thus, the unification of these three under a single term indicates an expansion of meaning that is not entirely consistent with scientific terminology (Moore, 1986; Sadler, 2012).

Alaqah: Lexically, ‘alaqah means something that is attached, dependent, or a clot of blood. In classical exegesis, the predominant meaning is a clot of blood that is attached. Al-Ṭabarī, al-Qurṭubī, and al-Baghawī (al-Baghawi, 2010; al-Thabari, 2007; al-Qurthuby, 2006) interpreted it as congealed blood formed from the nutfah, whilst Ibn Kathīr emphasised its nature as thick, clinging blood. Al-Rāzī also understood ‘alaqah as a transitional phase from a liquid state to a more solid form. Some exegetes, such as al-Jauharī, began to associate the meaning of ‘alaqah with the process of the embryo attaching to the uterine wall, albeit still within a descriptive framework. In scientific exegesis, al-Najjār links *‘alaqah* to the process of implantation and extends it to encompass gastrulation and the early formation of embryonic structures such as somites and the neural tube. However, in modern embryology, implantation, gastrulation, and neurulation are distinct stages. The formation of the neural tube and somites occurs during the neurulation phase, which takes place after implantation. Therefore, the grouping of several biological processes into a single phase indicates a reconstruction of meaning that goes beyond the original linguistic meaning (Dudek, 2011; Sadler, 2012)

Mudghah Linguistically, mudghah refers to something that can be chewed or a small lump of flesh. In classical exegesis, the term is understood descriptively without detailed biological elaboration. Al-Ṭabarī, al-Baghawī, and al-Qurṭubī interpret it as a lump of flesh (al-Baghawi, 2010; al-Thabari, 2007; al-Qurthuby, 2006), whilst Ibn Kathīr emphasises that this form does not yet possess a clear structure (Kathir, 1999). Al-Rāzī and al-Jauharī associated it with a form of flesh resembling something chewed (al-Razi, 1995; Jauhari, 1922). In scientific exegesis, the term mudghah is linked to more complex stages of embryonic development. (al-Najjar, 2017) associates it with the phase of somite formation, which resembles bite marks, as well as subsequent processes such as the formation of the nervous system, bodily organs, and tissue differentiation. However, in modern embryology, processes such as somitogenesis, neurogenesis, and cardiogenesis occur at different stages within the framework of organogenesis. This suggests that such interpretations result from the integration of linguistic meaning and modern scientific constructs (Moore, 1986; Sadler, 2012).

Idhaman (The Formation of Bones and Their Envelopment), The next stage described in Surah al-Mu’minūn (23:14) depicts the formation of bones (‘iẓām), which are then enveloped in flesh (laḥm). In classical exegesis, al-Ṭabarī, al-Qurṭubī, and al-Baghawī understood this process as the formation of the skeletal structure, which is then covered by muscles and flesh (al-Baghawi,

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

2010; al-Thabari, 2007; al-Qurthuby, 2006). Ibn Kathīr emphasised that at this stage the human form begins to appear more complete with the presence of bones, tendons, and muscles, whilst al-Rāzī viewed it as the formation of the body's supporting structure (al-Razi, 1995; Kathir, 1999). In a scientific interpretation, al-Najjār links this phase to the process of organogenesis, specifically the development of the skeletal and muscular systems from the somites through the stages of membranous tissue, cartilage, and finally ossification. This process is then followed by the formation of muscle (myogenesis), which envelops the skeletal structure. (al-Najjar, 2008, 2017). However, in modern embryology, the formation of bone and muscle occurs in parallel and overlaps, rather than in a linear fashion as is often understood from the text. Both are part of mesodermal differentiation that develops simultaneously during organogenesis. (Kahane & Kalcheim, 2021; Moore, 1986; Sadler, 2012). This indicates that scientific interpretation seeks to align the textual sequence with the scientific framework, although they are not entirely identical.

Khalqan Ākhar (Fetal Phase), The phrase ثُمَّ أَنْشَأْنَاهُ خَلْقًا آخَرَ indicates a transformation towards a more perfect human form. In classical exegesis, Ibn Kathīr understood this phase as the stage when the foetus has a complete bodily form. Al-Ṭabarī, al-Qurṭubī, and al-Baghawī interpret it as the perfection of human creation, whilst al-Rāzī views it as a change towards a form significantly different from the previous phase. In scientific interpretation, al-Najjār associates this phase with the foetal stage, namely the period after the major organs have formed, which begins around the eighth week and continues until birth. This phase is characterised by rapid growth, the differentiation of organ functions, and the increasing clarity of human characteristics. In modern embryology, the foetal phase is indeed a stage of organ function refinement following organogenesis, with a focus on the growth and maturation of the body's systems. (Adibi et al., 2024; Rivron et al., 2023; Sadler, 2012). Thus, there is general consistency at the macro level, although the descriptive details in scientific interpretations do not always strictly adhere to scientific classification.

An analysis of the interpretation of embryological terms in Surah al-Mu'minūn (23):12–14 reveals fundamental differences between classical exegesis and modern scientific interpretation, in terms of approach, the construction of meaning, and the epistemological framework employed. In the classical exegetical tradition, exegetes such as al-Ṭabarī, al-Qurṭubī, Ibn Kathīr, and al-Rāzī understood the terms nutfah, 'alaqah, and mudghah based on the lexical meanings of the Arabic language and early exegetical traditions. Nutfah is interpreted as semen or reproductive fluid, 'alaqah as a clot of blood that adheres, and mudghah as a lump of flesh. This interpretation is descriptive and does not seek to link these terms to specific biological structures or scientific stages. Similarly, the concept of human creation from al-ṭīn is understood within the context of the origins of the creation of the Prophet Adam without being linked to modern chemical composition or biological mechanisms.

Conversely, the modern scientific interpretation, as represented by Zaghlūl al-Najjār (Syarifah & Fahimah, 2020)It adopts a reinterpretative approach by linking Qur'anic terms to concepts in embryology. Nutfah is understood as the initial phase of reproduction encompassing gametogenesis and fertilisation; 'alaqah is associated with the process of implantation and early embryonic development; whilst mudghah is linked to the stage of somite formation and organogenesis. Furthermore, the concept of al-ṭīn is interpreted within the framework of the

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

similarity in chemical composition between the human body and the elements of the earth. (al-Najjar, 2017).

However, analysis indicates that the scientific interpretative approach does not merely involve interpretation, but also the reconstruction of meaning. In some cases, there is a simplification or merging of biological stages that, in modern embryology, are actually distinct processes, such as the combination of gametogenesis, fertilisation, and zygote formation within the concept of nutfah, or the merging of implantation, gastrulation, and neurulation in the interpretation of ‘alaqah.

In light of this, a comparison between classical exegesis and scientific exegesis reveals several key differences. Firstly, in terms of the basis of interpretation, classical exegesis is grounded in linguistics and tradition, whereas scientific exegesis is rooted in the framework of modern science. Secondly, in terms of meaning, classical exegesis maintains a relatively stable lexical meaning, whilst scientific exegesis tends to reinterpret by linking Qur’anic terms to technical terminology in science. Thirdly, in terms of approach, classical exegesis is descriptive, whereas scientific exegesis is correlative, aiming to demonstrate the compatibility between the Qur’an and modern science. Thus, these findings indicate that the difference between the two approaches lies not only in the content of the exegesis but also in the underlying epistemological framework. Classical exegesis represents a language- and tradition-based approach, whereas scientific exegesis reflects an effort to adapt to developments in modern science, which in turn influences the way Qur’anic terminology is understood and interpreted.

The Dynamics of Meaning: From Descriptive-Lexical to Reinterpretative-Scientific

Research findings indicate that the meaning of embryological terms in Surah al-Mu’minūn (23):12–14 has shifted from a descriptive-lexical approach towards a science-based reinterpretation. This shift reflects broader developments in contemporary Qur’anic exegesis, in which modern interpreters increasingly employ contextual and interdisciplinary approaches rather than relying solely on classical textual explanations. (Aisa, 2024; Ichwan & Salisu, 2024). This shift can be explained through the theoretical frameworks of semantics and linguistic hermeneutics. From a lexical-semantic perspective, as proposed by Toshihiko Izutsu, the meaning of words in the Qur’an does not stand alone, but is formed within a network of semantic relations (semantic field) (Kulieva, 2025). Terms such as *nutfah*, *‘alaqah*, and *mudghah* possess basic meanings that can be understood through the use of Classical Arabic, yet these meanings are also relational and can evolve according to the discourse context. In classical exegesis, the meanings of these terms are maintained within the framework of the Arabic semantic field, thus remaining within the bounds of descriptive meanings such as ‘fluid’, ‘something clinging’, and ‘a lump of flesh’.

This approach is consistent with the concept of ‘meaning as use’ developed by Ludwig Wittgenstein, whereby the meaning of a word is determined by its use within a specific linguistic context. In this regard, classical exegetes understood Qur’anic terms based on the linguistic practices of early Arab society, so that the resulting meanings were contextual-historical in nature, rather than technical-scientific. Conversely, in modern scientific exegesis, there has been a shift towards what is known in semantic theory as ‘semantic extension’ or the expansion of meaning. The term nutfah is no longer limited to a ‘drop of fluid’, but is extended to encompass the entire

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

reproductive process, including gametogenesis and fertilisation. Similarly, ‘alaqah is not merely interpreted as a ‘clot of blood’, but is reinterpreted as the implantation phase, extending even to include the processes of gastrulation and neurulation.

This phenomenon can be explained through the theory of semantic change, specifically the mechanism of broadening, in which a term experiences an expansion of its referential meaning as the context of knowledge changes (Traugott & Richard, 2001). Recent studies have shown that changes in meaning can be read through the dimension of semantic breadth, namely the expansion or narrowing of a lexeme's reference scope in new social and intellectual contexts. In this context, developments in embryology provide a new conceptual framework that influences how modern interpreters understand Quranic terms. Furthermore, within a hermeneutical framework, this shift can be understood through the concept of fusion of horizons proposed by Hans-Georg Gadamer. Gadamer explains that understanding a text always involves a meeting between the text's historical horizon and the interpreter's horizon (Witjaksono et al., 2024). Interpretation is not simply a reproduction of the original meaning, but a productive dialogue between the past and the present that yields new understandings. In scientific interpretation, the interpreter's horizon, influenced by modern science, interacts with the Quranic text, yielding a new interpretation that is not identical to the original meaning (Bilqis & Rohmah, 2025).

However, this approach also raises methodological issues. In critical hermeneutics, there is a risk of over-interpretation, namely the tendency to ascribe meanings that are not inherently present in the text (Eco, 1992). This is evident when the terms ‘alaqah or mudghah are forced to represent very specific biological stages, whereas linguistically these terms are of a general descriptive nature(al-Isfahani, n.d.). From a philosophy of language perspective, this also relates to the distinction between natural language and technical language. The language of the Qur’an is a natural language rich in metaphors and phenomenological descriptions, whereas modern embryology employs technical language that is precise and categorical—attempts to align the two directly risk overlooking the ontological differences between these two linguistic systems. Thus, the dynamics of the meaning of embryological terms in the Qur’an can be understood as the result of an interaction between: first, the semantic structure of Classical Arabic; second, the historical context of interpretation; and third, the development of the modern horizon of knowledge. The shift from lexical meaning towards scientific reinterpretation demonstrates that Qur’anic meaning is dynamic and open-ended, yet it still requires methodological boundaries so as not to lose its linguistic grounding. In this regard, a balanced approach between semantic analysis and hermeneutic awareness is key to understanding the development of contemporary exegesis.

Epistemological Problems in Scientific Exegesis

The scientific exegesis approach is based on the assumption that the Qur’an contains scientific references that can be corroborated by modern scientific findings. This view was developed by figures such as Ṭanṭāwī Jawharī and Zaghlūl al-Najjār, who saw the correspondence between the Qur’anic text and science as a form of miraculousness (al-Najjar, 2008; Bucaille, 2007; Jauhari, 1922). However, this approach faces a number of fundamental epistemological problems. One of the main criticisms is the potential for anachronistic reading, namely the interpretation of past texts using modern categories of knowledge (Nasr, 1996; Rippin, 2021). In the context of this study, this is evident in the tendency to combine several distinct biological

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

stages into a single term, to over-extend the meaning of Qur'anic terms, and to align textual structures with a scientific chronology that is not entirely identical.

Furthermore, there is an issue concerning the epistemological differences between the Qur'an and science. As a revelation, the Qur'an is absolute and normative in nature, whereas science is relative, tentative, and constantly evolving. This disparity poses a problem when Qur'anic interpretation is based on scientific theories that are by no means definitive. Consequently, the use of science as an interpretative tool risks altering the text's meaning as scientific knowledge evolves (Guessoum, 2011). Another fundamental critique concerns linguistic and philological aspects. Al-Khūlī asserts that the terms in the Qur'an do not have a direct correspondence with modern scientific terminology. Furthermore, from a philological perspective, the language of the Qur'an was addressed to the early Arab community with a system of meaning comprehensible within their linguistic context; thus, the imposition of modern scientific meanings risks disregarding the text's original semantic context (al-Khuli, 1962; Jansen, 1997).

From a theological perspective, al-Shātibī rejected the use of science as a basis for interpretation because the Qur'an was revealed as a book of guidance, not a book of science. This view is reinforced by al-Dhahabī, who states that the Qur'an is not intended to explain scientific disciplines such as medicine, astronomy, or other natural sciences (al-Dhahaby, 1986; Syatibi, n.d.). Consequently, using the Qur'an to legitimise scientific findings is seen as potentially deviating from the primary purpose of revelation (companini, 2011; Khir, 2016). Furthermore, there is a logical issue regarding the limitations of the text. Given the limited number of verses in the Qur'an, the assumption that the text encompasses all modern scientific discoveries is considered problematic. Al-Khūlī also criticises the view that it is irrational to assume a limited text can contain scientific knowledge that is constantly evolving and changing over time (Jansen, 1997).

Similar criticism has also emerged from a modern perspective that views scientific interpretation as an attempt to reconcile religion with modern science. In some cases, this approach is even seen as a form of interpretation that is overly liberal and risks reducing religious meaning to mere scientific legitimisation (Szasz, 2012). Thus, the epistemological problem of scientific interpretation lies not only in the interpretative aspect, but also in the tension between two distinct systems of knowledge: revelation and science. Without a rigorous methodological framework, scientific interpretation risks producing epistemically unstable interpretations, whether from a linguistic, theological, or scientific perspective.

Reconstruction of Meaning and the Boundaries of Interpretation

The results of the analysis indicate that scientific interpretation not only serves as an explanatory function regarding the meaning of the text, but also undertakes a reconstruction of meaning concerning key terms in the Qur'an. This reconstruction is evident in several main patterns: (1) the expansion of the meaning of nutfah from 'a drop of fluid' to the entire sequence of the human reproductive process; (2) the reinterpretation of 'alaqah from 'a clot of blood' to 'an attached embryo' in the context of implantation; and (3) the association of mudghah with biological structures such as somites in modern embryology. These patterns demonstrate that scientific exegesis operates through a mechanism of meaning transformation from the lexical level to the conceptual-scientific level.

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

D O I : 10.18860 /ijazarabi.V9i4.42246
I S S N (p r i n t) : 2 6 2 0 - 5 9 1 2 | I S S N (o n l i n e) : 2 6 2 0 - 5 9 4 7
e j o u r n a l . u i n - m a l a n g . a c . i d / i n d e x . p h p / i j a z a r a b i / i n d e x

Within the framework of philosophical hermeneutics, this phenomenon can be explained through the concept of the 'fusion of horizons' proposed by Gadamer, namely the encounter between the historical horizon of the text and the horizon of the modern reader (Witjaksono et al., n.d.). Scientific exegesis is essentially a form of dialogue between the revealed text and the development of contemporary knowledge, so that meaning is no longer understood as a static entity, but rather as the result of a negotiation between tradition and context (Thiselton, 2009). In this context, what scientific exegetes do can be understood as a form of 'actualisation of meaning' aimed at maintaining the text's relevance across the course of history (Saeed, 2006). However, from the perspective of cognitive linguistics and lexical semantics, such an expansion of meaning must remain within the bounds of semantic plausibility. Semantic field theory asserts that every lexeme possesses a network of meanings constrained by historical usage and linguistic conventions (Geeraerts, 2010). Meanwhile, Cruse emphasises that a valid semantic extension must have an associative link that can be conceptually traced back to the core meaning (Cruse, 2011). In the case of the terms nutfah, 'alaqah, and mudghah, scientific interpretation often makes a category shift from descriptive meaning to technical scientific terminology, without an adequate semantic bridge. This indicates the occurrence of overextension, namely, an extension of meaning that goes beyond the boundaries of its original semantic field.

From the perspective of semantic change theory, this phenomenon can be categorised as a form of 'reinterpretation under conceptual pressure', that is, a change in meaning triggered by the dominance of a new conceptual framework. (Traugott & Richard, 2001). In this case, developments in modern embryology act as an interpretive framework that encourages a reinterpretation of Qur'anic terms. However, unlike natural semantic change in language, which occurs gradually within speech communities, reconstruction in scientific exegesis is intentional and discursive, and thus closer to hermeneutic practice than to linguistic evolution itself. In the study of Qur'anic exegesis, this issue is closely linked to the tension between original meaning and contextual meaning. Scholars such as Nicolai Sinai (2017) and Mustafa Shah (2013) emphasise the importance of preserving the integrity of the original linguistic context as the basis for interpretation. This is in line with the philological approach in classical exegesis, which seeks to preserve meaning based on the usage of Arabic at the time of revelation. This approach yields what might be termed semantic stability, wherein meaning is relatively consistent and independent of external developments.

Conversely, the scientific interpretation shifts the focus from stability to epistemic relevance, that is, the text's ability to engage with developments in modern science. Within this framework, meaning becomes more dynamic, yet at the same time more vulnerable to change. Nidhal Guessoum cautions that such an approach risks making the Qur'an dependent on scientific theories that are by nature tentative. If such theories change or are abandoned, the interpretations built upon them also lose their validity. Furthermore, from the perspective of the philosophy of science, this problem reflects a fundamental difference between the epistemology of revelation and the epistemology of science. Modern science operates within the framework of falsifiability (Popper, 2002), where every theory is open to testing and revision. Conversely, religious texts possess normative and symbolic dimensions that are not subject to empirical verification mechanisms. When scientific interpretation attempts to align the two directly, there is a risk of reductionism, namely, the simplification of the text's meaning into purely scientific categories.

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

Thus, the reconstruction of meaning in scientific exegesis must be situated within a rigorous methodological framework. In particular, a distinction must be made between: (1) the original linguistic meaning derived from the classical Arabic linguistic context, and (2) the contextual meaning resulting from its actualisation within the modern horizon. Without this distinction, scientific exegesis risks not only expanding meaning but also fundamentally shifting the semantic structure of the text. Therefore, a more integrative approach is required, one capable of maintaining a balance between semantic stability and contextual relevance. Such an approach does not reject dialogue between the Qur'an and science, but places it within clear epistemological boundaries, so that the resulting interpretation retains both linguistic legitimacy and contemporary significance.

The Relationship between Language, Exegesis, and Science

Whilst the previous section demonstrated how the reconstruction of meaning occurs at the semantic level, this section examines how the relationship between language, exegesis, and science operates at the epistemological level. Thus, the focus of the discussion is no longer on changes in the meaning of terms, but on the mechanisms of the relationship between the Qur'anic text and scientific knowledge. The findings of this research indicate that the relationship between the Qur'an and science is not one of direct correspondence, but is mediated by two main layers: language as the medium of meaning and exegesis as the practice of interpretation. From a Qur'anic semantic perspective, as argued by Izutsu, the language of the Qur'an forms a relational and multi-layered semantic structure, and thus cannot be reduced to technical terminological equivalents. (Kulieva, 2025). The meaning of a term does not stand alone, but is determined by a broader conceptual network within the overall structure of Qur'anic discourse.

Within this framework, terms such as nutfah, 'alaqah, and mudghah are more accurately understood as part of a descriptive-phenomenological language, rather than as technical terms in the modern scientific sense. This is consistent with the distinction in linguistics between natural language—which is contextual and flexible—and scientific language, which demands terminological precision(Cruse, 2011). Therefore, the relationship between the Qur'anic text and science does not lie in terminological correspondence, but in the possibility of a resonance of meaning mediated by interpretation. From a hermeneutical perspective, this relationship can be explained through the concept of the fusion of horizons, namely the interaction between the historical horizon of the text and the modern reader's horizon (Gadamer, 1975). In the context of scientific exegesis, the reader's horizon is shaped by the development of science, thereby encouraging readings that seek to link the text with contemporary knowledge. However, as Thiselton emphasises, this process must maintain a balance between openness to new contexts and fidelity to the text's structure of meaning, so as not to become trapped in the dominance of the reader's horizon (Thiselton, 2009).

In this context, the integrative approach proposed by Guessoum is particularly relevant, namely by positioning the Qur'an not as a source of literal scientific information, but as a source of epistemological inspiration. (Guessoum, 2011). The relationship between the Qur'an and science is understood as a dialogical relationship, in which the text provides a value orientation and a reflective framework, whilst science provides empirical explanations of natural phenomena. This model avoids a verificatory approach that seeks to 'prove' the truth of the Qur'an through

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

science, whilst also avoiding a total separation between the two. The implications of these findings for contemporary exegetical studies are significant. Firstly, this research confirms that exegesis is a contextual epistemic activity, always influenced by the interpreter's intellectual background and horizon. (Saeed, 2006). Secondly, a multidisciplinary approach is required that not only combines various disciplines but also clarifies the methodological boundaries of each, so that one field is not reduced to another. Thirdly, the relationship between the Qur'an and science needs to be situated within a dialogical framework, rather than within the rigid logic of literal correspondence. Thus, the main contribution of this study lies in the formulation that the relationship between language, exegesis, and science in Qur'anic studies is mediating and interpretative, rather than direct and deterministic. An understanding of Qur'anic terms, including in the context of embryology, must be situated within a dialogue between the stability of linguistic meaning and the dynamics of modern knowledge, without reducing either of them.

CONCLUSION

This study demonstrates that embryological terms in the Qur'an, particularly nutfah, 'alaqah, and mudghah in Surah al-Mu'minūn (23):12–14, possess dynamic semantic properties and are open to various interpretative approaches. Classical exegesis tends to uphold lexical meanings rooted in Arabic linguistic tradition, thereby ensuring semantic stability, albeit with limitations in explaining scientific aspects. Conversely, modern scientific exegesis seeks to link Qur'anic terms with embryological concepts, yet this often involves expansions and fusions of meaning that do not fully align with the original semantic structure or scientific classification. Epistemologically, this indicates a tension between the revelatory text, which is normative-linguistic in nature, and modern science, which is empirical-tentative. Consequently, the relationship between the Qur'an and science is not direct but mediated by language and the practice of exegesis. Qur'anic terms are more accurately understood as phenomenological descriptions that allow for various interpretations, rather than as rigid scientific terminology. This study emphasises the importance of a methodological approach that maintains a balance between linguistic stability of meaning and contextual relevance. Thus, the main contribution of this study lies in affirming that the dynamics of Qur'anic meaning are the result of an interaction between language, exegesis, and the development of knowledge, which must be understood within a dialogical and critical framework in contemporary exegetical studies.

ETHICAL APPROVAL

All participants received a comprehensive explanation regarding the research objectives and procedures, including their right to participate voluntarily. Participants were assured that participation was not mandatory and that they had the right to withdraw at any time during the study without negative consequences. To ensure the confidentiality of identities, all data obtained in this study underwent an anonymization process.

FUNDING STATEMENT

This research received no external funding

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

CONFLICT OF INTEREST

The author declare that there is no conflict of interest related to the research, authorship, or publication of this article.

REFERENCES

Abdullah, M. A., Fakhrunnabil, A. A., & Bagus, N. A. (2026). Qur'anic Perspectives on Human Creation and Contemporary Reproductive Ethics: A Thematic and Interdisciplinary Study. *Al-Fahmu: Jurnal Ilmu Al-Qur'an dan Tafsir*, *5*(1), 501–515. https://doi.org/10.58363/alfahmu.v5i1.1014

Adibi, J. J., Zhao, Y., Koistinen, H., Mitchell, R. T., Barrett, E. S., Miller, R., O'Connor, T. G., Xun, X., Liang, H.-W., Birru, R., Smith, M., & Moog, N. K. (2024). Molecular pathways in placental-fetal development and disruption. *Molecular and Cellular Endocrinology*, *581*, 112075. https://doi.org/10.1016/j.mce.2023.112075

Adomi, P. O., Igere, B. E., Anozie, A. J., & Owhe-Ureghe, U. B. (2025). Dysbioactive, hepato-haematological and biochemical systemic health implications of Zingiber officinale Roscoe: An experimental model. *Pharmacological Research - Modern Chinese Medicine*, *15*, 100627. https://doi.org/10.1016/j.prmcm.2025.100627

Aisa, L. D. N. (2024). Tafsir Modern di Indonesia abad ke-21: Identifikasi karakteristik produk tafsir pada tahun 2001–2022. *Nun: Jurnal Studi Alquran Dan Tafsir Di Nusantara*, *10*(2), 86–102. https://doi.org/10.32495/nun.v10i2.459

Akbar, F. H., Lailatul Fasha, F., & Abdullah, F. (2024). The Concept of Religious Moderation in a Review of the Qur'an and Hadith: Konsep Moderasi Beragama dalam Tinjauan Qur'an Hadis. *Bulletin of Islamic Research*, *2*(1), 59–80. https://doi.org/10.69526/bir.v2i1.21

al-Baghawi, A. M. al-Husein. (2010). *Ma'alim al-Tanziil*. Dar al-Kutub al-Ilmiyyah.

al-Dhahaby, M. H. (1986). *Al-Ittijahat al-Munharifah fi Tafsir al-Quran al-Karim Dawafi'uha wa Daf'uha*. Maktabah Wahbah.

al-Isfahani, A.-R. (n.d.). *Mufradāt Alfāẓ al-Qur'ān*. Dar al-Qalam.

al-Khuli, A. (1962). *Ma'alim Hayatihi Manhajuh al-Yawma*. dar al Ma'rifah.

al-Najjar, Z. R. (2008). *Tafsiir al-Ayat al-Kawniyah fi al-Qur'an al-Karim*. Dar al-Shuruq.

al-Najjar, Z. R. (2017). *Qishshat Khalq al-Insan*. al-Bidayah.

al-Razi, F. (1995). *Al-Tafsīr al-Kabīr* (Vol. 10). Dār Iḥyā' al-Turāth al-'Arabī.

al-Thabari, M. I. J. (2007). *Jami' al-Bayan fi Tafsir al-Quran* (Pnj. Abdul Raziq al-Bakri et al., Vol. 25). Pustaka Azzam.

al-Qurthuby. (2006). *Al-Jami' li Ahkam al-Quran*. Muassasah al-Risalah.

Azlan, N., Yusoff, A. M., & S A. bin. (2026). Towards A Holistic Framework For Scientific Exegesis. *Australian Journal of Islamic Studies*, *11*(2), 106. https://doi.org/10.55831/ajis.v11i2.1123

Baharuddin, B., & Putera, L. J. (2026). Traversing the Transcendent for Literary Exploration and Creative Translation of the Quran's First Revelatory. *JOLLT Journal of Languages and Language Teaching*. https://e-journal.undikma.ac.id/index.php/jollt/article/view/15030

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

Bigliardi, S. (2014). The Contemporary Debate on the Harmony between Islam and Science: Emergence and Challenges of a New Generation. *Social Epistemology*, *28*. https://doi.org/10.1080/02691728.2013.782583

Bilqis, A. M., & Rohmah, I. V. (2025). Contextual Hermeneutics of Beauty Privilege in Hadith through Gadamer's Lens. *Urwatul Wutsqo: Jurnal Studi Kependidikan Dan Keislaman*, *14*(3), 1071–1085. https://doi.org/10.54437/juw

Bucaille, M. (2007). *La Bible, Le Coran et La Science (Pnj M. Rasyidi)*. Bulan Bintang.

Companini, M. (2011). Qur'an and Science: A Hermeneutical Approach. *Journal of Quranic Studies*, *7*(1).

Cruse, A. (2011). *Meaning in Language: An Introduction to Semantics and Pragmatics*. Oxford University Press.

Eco, U. (1992). *Interpretation and Overinterpretation* (ed. Stefan Collini). Cambridge University Press.

Gadamer, H.-G. (1975). *Truth and Method*. Mohr Siebeck.

Geeraerts, D. (n.d.). *Theories of Lexical Semantics*. Oxford University Press.

Guessoum, N. (with Internet Archive). (2011). *Islam's quantum question: Reconciling Muslim tradition and modern science*. London ; New York : I.B. Tauris ; New York : Distributed in the U.S. and Canada exclusively by Palgrave Macmillan. http://archive.org/details/islamsquantumque0000gues

Hamdani, Subhan, M., Taher, I. T., Al Hamdani, R. Z., & Melawati. (2025). Qur'anic Embryology and Modern Developmental Physiology: A Comparative Analysis of Nutfah, 'Alaqah, Mudghah Stages with Contemporary Prenatal Biomarkers and Community Health Implications. *International Journal of Advanced Social Sciences and Education (IJASSE)*, *3*(6), 425-436. https://doi.org/10.59890/ijasse.v3i6.248

Haroun, Y. (2025). The Essential Role of Arabic Linguistics and Etymology in Qur'anic Translation. Journal of Islamic and Muslim Studies, 10(1), 106–121.

Ichwan, M. N., & Salisu, A. (2024). Reevaluating Qur'anic Hermeneutics: A Comparative Analysis Between Classical Tafsir and Modern Hermeneutical Approaches. *Kalam, 18*(2), 107–126. https://doi.org/10.24042/kalam.v18i2.24213

Jansen, J. (1997). *The Interpretation of the Koran in Modern Egypt (Diskursus Tafsir al-Qur'an Modern)*. Tiara Wacana.

Jauhari, T. (1922). *Al-Jawahir fi Tafsir al-Qur'an* (Vol. 1). Mustafa al-Bab al-Halabi.

Kahane, N., & Kalcheim, C. (2021). From Bipotent Neuromesodermal Progenitors to Neural-Mesodermal Interactions during Embryonic Development, 22. *International Journal of Molecular Sciences*, (22). https://doi.org/10.3390/ijms22179141.

Kathir, I. bin. (1999). *Tafsii-r al-Qur'an al-Adhim* (Vol. 5). Dar Tayyibah Linnasyr wa al-Tauzi.

Khir, B. M. (2016). The Qur'an and Science: The Debate on The Validity of Scientific Interpretation. *Journal of Quranic Studies, 8*(2).

Kulieva, L. (2025). Izutsu Toshihiko's Semantic Method of Qur'anic Studies: Criticism and Legacy. *Yearbook Japan*, *54*, 194–217. https://doi.org/10.55105/2687-1440-2025-54-194-217

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)

Matswah, A. (2017). Mustansir Mir and a Contemporary Literary Approach to the Qaṣaṣ al-Qur'ān: Study of Qur'anic Story of Joseph. *Ulumuna*, *21*(2), 391–411. https://doi.org/10.20414/ujis.v21i2.274

Mir, M. (2004). Scientific Exegesis Of The Quran: A Viable Project? *Journal of Islam & Science*, *2*(1), 33–42.

Moore, K. L. (1986). A Scientific Interpretation of References to Embryology in The Quran. *The Journal of IMA*, *18*.

Nasr, S. H. (1996). *Knowledge and the Sacred*. SUNY Press.

Rippin, A. (2021). *The Qur'an and Its Interpretative Tradition*. Ashgate.

Rivron, N. C., Martinez Arias, A., Pera, M. F., Moris, N., & M'hamdi, H. I. (2023). An ethical framework for human embryology with embryo models. *Cell*, *186*(17), 3548–3557. https://doi.org/10.1016/j.cell.2023.07.028

Ronald W D. (2011). *Embryology*. Lippincott Williams and Wilkins.

Sadler, T. (2012). *TW. Langman's Medical Embryology*. Lippincott Williams and Wilkins.

Saeed, A. (2006). *Interpreting the Qur'an: Towards a Contemporary Approach*. Routledge.

Saeed, A. (2008). *The Qur'an: An Introduction*. Routledge.

Saleh, W. A. (2010). Preliminary Remarks on the Historiography of tafsīr in Arabic: A History of the Book Approach | Journal of Qur'anic Studies. *Journal of Qur'anic Studies*, *12*(1–2). https://doi.org/10.3366/jqs.2010.0103

Shihab, Q. (n.d.). *Tafsir al-Misbah: Pesan, kesan dan keserasian al-Quran* (Vol. 14). Lentera Hati.

Syarifah, U., & Fahimah, S. (2020). Zaghlûl Râghib Muhammad Al-Najjâr's methods and principles of scientific exegesis: A review of tafsîr al-âyât al-kawniyyah fî al-Qur'ân al-Karîm. *Ulul Albab: Jurnal Studi Islam*, *21*(2), 289–311.

Syatibi, A. I. (n.d.). *Al-Muawafaqat fi Usul al-Syariah*. Maktabah al-Tijariyah al-Kubra.

Thiselton, A. C. (2009). *Hermeneutics: An Introduction*. Eerdmans.

Traugott, E. C. T., & Richard, B. D. (2001). *Regularity in Semantic Change*. Cambridge University Press.

Witjaksono, M. D. Y., Masunah, J., & Prawira, N. G. (n.d.). Hermeneutics: Fusion of horizons, Hans Georg Gadamer, in understanding graffiti motif pucuk kapal jung Lampung. *SHS Web of Conferences*, *197*, 05003.

Zuhaili, W. (2013). *Al-Tafsīr al-Munīr fī al-'Aqīdah wa al-Syarī'ah wa al-Manhaj* (Pnj. Abdul Hayyie al-Kattani et al., Vol. 15). Gema Insani.

Copyright © 2026, This is an open access article under the CC BY-SA 4.0 license
(https://creativecommons.org/licenses/by-sa/4.0/)