The remarkable cell: Intelligently designed or by evolutionary process?

Author:
Mark Pretorius[1,2]

Affiliations:
[1]Department of Dogmatics and Christian Ethics, University of Pretoria, South Africa

[2]South African Theological Seminary, South Africa

Correspondence to:
Mark Pretorius

Email:
mark@sats.edu.za

Postal address:
Po Box 903, Klerksdorp 2570, South Africa

Dates:
Received: 11 Jan. 2012
Accepted: 23 Oct. 2012
Published: 30 Apr. 2013

How to cite this article:
Pretorius, M., 2013, 'The remarkable cell: Intelligently designed or by evolutionary process?', *Verbum et Ecclesia* 34(1), Art. #708, 8 pages. http://dx.doi.org/10.4102/ve.v34i1.708

The objective of this article was to deal with the challenging theme of the *Origin of Life*. Science has been arguing the when and how of the beginning of life for centuries. It is a subject which remains perplexing despite all the technological advances made in science. The first part of the article dealt with the idea of a universe and earth divinely created to sustain life. The second part dealt with the premise that the first life forms were the miraculous work of an intelligent designer, which is revealed by the sophisticated and intricate design of these first life forms. The article concluded with an explanation that these life forms are in stark contrast to the idea of a random Darwinian type evolution for life's origin, frequently referred to as abiogenesis or spontaneous generation.

Introduction

Genesis 1:1, the first chapter and verse of the Bible, unequivocally states that God is the origin of everything. 'In the beginning God created [בדא *bārā*, create, give being to something new] the heavens and the earth' (cf. Ross 2010a:131). He is the *causa causam* [cause of all causes and the original source of everything]. This ultimately results in the belief that everything one sees and experiences comes from God. Furthermore, as explicated by Keil and Delitzsch (1981):

> Heaven and earth have not existed from all eternity, but had a beginning; nor did they arise by emanation from an absolute substance, but were created by God. This sentence, which stands at the head of the records of revelation, is not a mere heading, nor a summary of the history of the creation, but a declaration of the primeval act of God, by which the universe was called into being. (p. 46)

Conversely, there are many who believe that rather than a causal creator, one must appeal to random chance as the only explanation for the beginning of life (cf. Beatty 2009:64–70).

As a consequence, the primary questions to be argued in this article are what constituted the first life forms and does the idea of complex prokaryotic[1] and eukaryotic[2] cells, birthed approximately 3.5 billion years ago, give credence to a chemical evolution? Most biological scientists, such as Gribaldo *et al.* (2010:743–752), believe that much work is still needed to substantiate the idea of abiogenesis, meaning that life emerged from non-life through random chemical processes. According to Ellegard (1958:134–135), this concept was first introduced by Darwin in a letter to the British botanist Joseph Dalton Hooker in 1871. But today, with the technology available to peer into the previous unseen world of organisms, especially those found in primordial fossils such as *stromatolites*, the idea of abiogenesis remains perplexing (cf. Ebifegha 2007:757–9; Tymieniecka 2010:212–216).

However, before addressing this, the notion is to first show, by cosmogony,[3] that these emerging first life forms were an outcome of previous divine creation events that set the stage for life's emergence on earth by *divine fiat* [the creative command of God: 'Let there be'] rather than through the projected process of abiogenesis.

The universe created for life

As argued by Craig (2000) and Nowacki (2007) *vis-à-vis* the Kalam cosmological argument, the verity that the universe has a beginning in which time, space and matter were created required that the universe be caused by something that is timeless, spaceless, and immaterial. But, secondly, and most significantly, the universe is fine-tuned to permit life. As rightly recapitulated by Lioy (2011:16), God created everything – spiritual beings, physical beings, matter, energy, time and space (cf. Ec 11:5; Pr 3:19–20; Pr 8:22–31; Is 44:24; 45:18; Jr 10:16; Jn 1:3; Col 1:16; Hb 1:2).

1.Prokaryotic cells (in the form of bacteria) are considered to be the first life forms.

2.A more advanced cell containing a nucleus.

3.Cosmogony, as opposed to cosmology, focuses on the origin of the universe. It is an explanation of how the universe came into being, rather than a broad study of it.

In this frame of mind, Davies (2010) expresses that:

> ... it is no surprise that when modern science emerged in Christian Europe in the sixteenth and seventeenth centuries, it was perfectly natural for the early scientists to believe that the laws they were discovering in the heavens and on earth, were the mathematical manifestations of God's ingenious handiwork. (p. 199)

Davies (2010) further communicates that today:

> ... few scientists would appeal explicitly to a god to explain the laws. Nonetheless, the fact remains that the universe conforms to an orderly scheme, and is not an arbitrary muddle of events, which prompts one to wonder - God or no God - whether there is some meaning or purpose behind it all. (p. 200)

The following will concisely illustrate that there is unquestionably a divine order to the universe.

A finely tuned universe

Concerning the long periods crucial to develop the universe to the exact degree that it is now to bring forth and sustain life, Ross (2009) expressively states that:

> [t]hey [long periods] testify of a causal Agent who cares enough for humans to invest 13.73 billion years of time and 10 billion trillion stars' worth of matter and energy in preparing a just-right home. (p. 108)

Apart from this, Ross (2009) expounds further that the intricacy of each design functioning in tandem with one another:

> testifies to a creator that is above and beyond human understanding, yet was careful to make sure that everything was correct so that his ultimate creation [humanity] could have this just-right home. (n.p.)

Princeton physicist Robert Dickie (1961:440–441) notes that the universe could not contain physical life if any one of several physical constants differed in value by even a single amount. This led to the design of the Anthropic Principle[4] (a term coined by Dickie), which identifies key elements that must function for the cosmos to sustain life on earth (cf. Fumerton & Jeske 2009:593–595). Although these elements are numerous, the following presents a brief idea of its intricacies, as conveyed by Ross (2009:261; 2010b:120–129). He identifies four key elements, each with their own extensive features and requirements:

1. *Fine-tuning for life in the universe*: This element requires that 140 features of the cosmos must fall within certain narrow ranges to make physical life possible.
2. *Fine-tuning for intelligent-physical life*: This element describes 402 quantifiable characteristics of planetary systems and its galaxies that must fall within narrow ranges to make intelligent life possible. If there is a slight increase or decrease in any of the values, it would destroy the possibility of advanced life's existence.
3. *Probability estimates for the features required by various life forms*: This element identifies 922 characteristics of a galaxy and planetary system that makes physical life possible.
4. *Probability estimates on different size scales for features required for advanced life*: This element presents a breakdown of the 922 characteristics as they arise separately from the galaxy cluster, planetary system, the surface of planets and planet's other life.

One could sum these elements up as follows: if the ratio of neutron mass were higher, forming life would be impossible, and if it was lower, the universe would be an amalgamation of black holes. If the earth was ten per cent smaller or larger, it would not be able to sustain a breathable atmosphere. If it were a little closer to the sun, life would vaporise – a little further away and life would freeze. If the expansion rate of the universe was larger, there would be no galaxies and if smaller, the universe would have collapsed. If the polarity of the water molecule were smaller or greater, life could not develop. If it were not on a twenty-four-hour spin cycle, no life could exist on it. If the earth was not tilted at exactly 23.45 degrees, it would not be able to support life. If the ozone layer was a tiny fraction thinner, no living matter could survive. If the velocity of light were faster, stars would be too luminous to support life – if slower, stars would be insufficiently luminous to sustain life (cf. Angelo 2007:286; Claerbaut 2004:150–152; Pasquini 2010:30–33). One ostensibly observes that the universe expresses intelligent design, thus one would be reticent to argue that based on this fine-tuning, the universe could have evolved through chance.

Ross (2009:114) further maintains that these conclusions were developed in part, because it takes at least 9 billion years to form a stable planetary system with the right chemical and physical conditions for life (cf. Craig 2010:105–116; Gonzalez & Richards 2004:195–200; Pojman & Rea 2011:203–205). In addition, physicists have calculated that physical life is impossible unless the universe is exceptionally uniform and homogenous. In fact, the acclaimed physicist Stephen Hawking (1988) said:

> [i]t would be very difficult to explain why the universe should have begun in just this way, except as the act of a God who intended to create beings like us. (p. 131)

Although one could view this as nothing more than a deistic view of God, it is nevertheless a profound statement from someone who is reputed to be atheistic.

In addition Brandon Carter (1974:347–363), a British mathematician reflecting on the Anthropic Principle, observed that the universe took billions of years to prepare for a species with the potential to survive no longer than a few million years. In his view, 'God certainly has a plan for humanity, and he put great care in creating an environment, with all the right elements in place'. Ross (2010a) expands on this by saying:

> evidently, their worth justifies his [God's] enormous investment of time and resources in a creation program for their [humanity's] specific benefit even though humanity can last only a brief period of time. (pp. 113–115)

The origin of life

Undoubtedly, the modern theory of evolution to explain the birth of life is largely attributed to Charles Darwin and his

4.In physics and cosmology, the Anthropic Principle is the collective name for several ways of asserting that the observations of the physical universe must be compatible with the life observed in it.

work *On the Origin of Species* published in 1859. Although he argued for a biological evolution, Darwin ([1860] 1887:312) is on record as saying, 'I cannot think that the world as we see it is the result of chance, yet I cannot look at each separate thing as a result of design'. Speaking generally, Moore (1979:103) says that for some Christian anti-Darwinians the main theological objection to Darwin's theory lay in the perception that it undermined the image of design in nature, thus bringing into question the very existence of God. Indeed, concerning this, Darwin (1872:151) made the statement that '[i]f it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down'. Seemingly, Darwin was referring to the idea of irreducible complexity, discussed further on in the article.

Consequently, there have been many endeavours to demonstrate empirically that what occurred almost 3.5 billion years ago, when the first prokaryotic cell is assumed to have appeared, can be attributed to the natural process of abiogenesis rather than intelligent design. According to Rana and Ross (2004:63–69) palaeontologists have indeed assembled a body of evidence over the last decade or so indicating that life could have naturally formed on earth as far back as 3.8 billion years ago. This is attested to by Precambrian stromatolite fossils, considered to be the oldest fossils ever recorded, that contain *prokaryotic cyanobacteria*[5], the first life forms (cf. Chela-Flores, Owen & Raulin 2001:253; Hall 2010:146; Hall, Hallgrimsson & Strickberger 2008:143).

Conversely, the more scientists examine the earth, the more they realise that it is uniquely designed for life's habitation. Natural scientists who analyse how life evolved are increasingly witnessing intelligent design in the very structure of the smallest living bacteria, which is assumed to be where life first evolved. Michael Denton (1985) writes:

> Even the simplest of all living systems on earth today, bacterial cells, are exceedingly complex objects. Although the tiniest bacterial cells are incredibly small, each is in effect a veritable microminiaturized factory containing thousands of exquisitely designed pieces of intricate molecular machinery. These are far more complicated than any machine built by man and absolutely without parallel in the non-living world (p. 25).

Michael Behe uses the term irreducible complexity in his critically acclaimed book *Darwin's Black Box* to illustrate just how complex the inner workings of these cells are. According to Behe (1996:39) irreducible complexity describes 'a single system composed of several well-matched interacting parts that contribute to basic functions, wherein removal of any one of the parts causes the system effectively to cease functioning'. However, the case for irreducible complexity has had its critics, even though the design is compelling, as will be shown.

What follows, is an attempt to demonstrate that the complexity of creation and a belief that life evolved from prokaryotic, and later eukaryotic cells,[6] by no means strengthens a Darwinian belief in a chemical and biological evolution. In reality, the more one investigates the complexity and design of these cells within the broader work of creation, the more one comprehends that only an intelligent being could have brought this complex cell into existence.

In fact, although the origin of life is often explained in evolutionary terms, a recent article published in the scientific journal *Nature* (Gribaldo *et al.* 2010:743–752) raises questions of whether an evolutionary perspective can adequately account for the complex birth of these cells in life's history, as shall be discussed.

Biochemistry and evolution

For many in different scientific fields dealing with natural science, the strides made in understanding our biological make-up seemingly point to intelligent design. Rana (2008:16) states that '[t]he ever increasing understanding of the cell's chemistry has revolutionised our daily lives. Biochemistry drives many of the technological advances in biomedicine, agriculture, and even industry'. He further states that, as important as these biochemical applications are, surely the most significant outcome of the so-called molecular biology revolution is acknowledgment that biochemical systems infer a designer.

Incontrovertibly, the complexity that is evident in virtually all aspects of the cell's chemistry carries profound philosophical and theological significance that stimulates questions about the origin, purpose, and meaning of life. Even atheists, such as the renowned evolutionary biologist Richard Dawkins (1996:1), acknowledge that biology gives the appearance of having been designed. But it is not that simple for many biologists. The late influential biologist Francis Crick (1988:138), who shared the Nobel Prize for discovering the structure of DNA, cautioned '[b]iologists must constantly keep in mind that what they see was not designed, but rather evolved'.

Paradoxically, the deeper biologists study the structures of life to show a naturalistic evolution, the more they realise the complexity of what they see, thus inferring intelligent design. These designs increasingly show that biochemical systems clearly seem far more purposeful, intricate, and sophisticated than ever imagined. But how did the idea of an evolutionary pathway originate, especially when referring to these first life cells?

Chemical evolution

Evolutionary ideas, such as those proposed by Deckert *et al.* (1998:353–358) and Ruepp *et al.* (2000:508–513), often assume that life commenced with living organisms. However, these evolutionary biologists do not always agree on the 'how', except to state that it began with a chemical evolution, often referred to as a 'prebiotic soup'[7]. Hazen and Trefil (2009) write:

5.Often referred to as 'blue-green algae'.

6.Microbiologists frequently refer to these cells as protozoans.

7.A liquid rich in organic compounds, providing favourable conditions for the emergence and growth of life forms.

> Most scientists agree about one aspect of evolution. Life seems to have arisen in a two-step process. The first stage – chemical evolution – encompasses the origin of life from nonlife. Once life appeared, the second stage – biological evolution – took over. (p. 245)

The first cells to arise through this chemical evolution are commonly referred to as prokaryotes,[8] as previously stated. According to Rana (2008:54–57), these cells are the closest to the minimal requirements for life. The method used to determine this, although in its infancy, requires that life possess somewhere between 1300 to 2300 genes[9] (cf. Ross 2009:151–152), which indicate that even at its simplest level, life forms appear remarkably complex (cf. Cowan 2000:466–467; Deckert *et al.* 1998:353–358; Ruepp *et al.* 2000:508–513; Morell 1996:1043–1045; Nelson *et al.* 1999:323–329).

Rana (2008:62) affirms that prior to the mid–1990s, microbiologists had the simple view of prokaryotes as 'vessels' that contained a jumbled assortment of life molecules randomly dispersed inside the cell. Today, however, it is recognised that they display an extraordinary degree of internal organisation (cf. Gitai 2005:577–586; Shapiro, McAdams & Losick 2002:1942–1946).

Furthermore, Shapiro and Losick (1997) declare that:

> [t]he use of immunogold electron microscopy[10] and fluorescent microscopy[11] to study the subcellar organisation of bacterial cells [prokaryotes], has revealed a surprising extent of protein compartmentalisation and localisation. (pp. 712–718)

A few examples of extraordinary internal organisation in prokaryotes, according to Rana (2008:62), include a bacterial chromosome[12] DNA polymerase, cell-division proteins, the bacterial cytoskeleton,[13] and bacterial internal compartmentalisation. The intelligent design of these cells in many ways dispels the notion that they could have evolved from a 'prebiotic soup' or by the natural process of abiogenesis. Nevertheless, there have been several experiments undertaken to try and mimic the conditions of early earth to show that complex cells could have evolved naturally. The following deals with two of these major attempts.

Proposed evolutionary ideas of the first life forms

The Oparin-Haldane hypothesis

From 1922 to 1953, Alexander Oparin, a Russian biochemist, and John Haldane, an English biologist, added to what has been called the Oparin-Haldane hypothesis. Haldane's ideas about the origin of life were very similar to Oparin's. Haldane proposed that the primordial sea served as a vast chemical laboratory powered by solar energy (cf. Fry 2000:65–76; Russell, Hertz & McMillian 2011:527–529). Although their research was years apart, Schaefer (2004:87) points out that their ideas have often been grouped as the Oparin-Haldane hypothesis. Their theory deals with the origin of life by chemical evolution in a 'prebiotic soup' composed of methane, ammonia, hydrogen, and water vapour in a reducing (little or no free oxygen) atmosphere. Möller (2010:66) testifies that Haldane coined the term 'prebiotic soup', which since then has become an influential symbol of the Oparin-Haldane view of the origin of life and is often used by scientists today when addressing the issue of how the first life forms appeared.

The Miller-Urey experiment

In 1952, a biologist named Stanley Miller and a Noble Prize winning chemist, Harold Urey, performed several experiments – commonly referred to as the Miller-Urey experiment – to again mimic the conditions of early earth and show that these first life forms were a product of a chemical evolution rather than intelligent design. As conveyed by Rana (2011:99–100), Miller's work was the first experimental validation of the Oparin-Haldene hypothesis.

According to Lawrence (2008:184), Miller (the primary researcher) filled the confines of a carefully assembled glass apparatus with a mixture of hydrogen, ammonia methane, and water vapour to test this hypothesis. Miller then passed a continuous electric discharge through the gas mix to replicate lightning. After a few days, organic compounds, including amino acids, formed. Amino acids are the building blocks of life and this is what Miller was after in his experiment. This supposedly simulated conditions prevalent on the earth some 4 billion years ago. Since then, evolutionists have been pretentiously claiming that they have now proven that life could have arisen naturally in the beginning of earth's existence.

However, according to Starkey (2011:180), scientists have since 1953 concluded that the atmosphere of the early earth consisted of gases produced from the earth's volcanoes, containing water vapour, carbon-dioxide, nitrogen and some hydrogen, which thus negated the findings of the Miller-Urey experiment. In truth, even the influential journal *Science* (Schaefer 2004:93), who are most friendly to the Miller-Urey experiment, stated that '[c]ontemporary geoscientists tend to doubt the primitive atmosphere had the highly reducing atmosphere used by Miller' (cf. Lawrence 2008:184–187; Lindsey 2006:160–162; Prothero & Buell 2007:148).

Consequently, the science community concluded that neither the Oparin-Haldane hypothesis, nor the Miller-Urey experiment proved anything about the origin of life. Indeed, Starkey (2011:180) further adds that it would require a huge stretch of the imagination to conclude that producing one of

8. It is the simplest known cell, which has no nuclear membrane and hence no separate nucleus.

9. A gene is the nucleotide sequence along the DNA strands that code the amino acid sequence of a particular polypeptide.

10. A technique in which cellular components are visualised with an electron microscope by using gold particles as antibody and protein labels.

11. A fluorescence microscope is an optical microscope used to study properties of organic or inorganic substances.

12. Structures within the nucleus of bacterial cells consisting of, or containing, DNA that carry genetic information essential to the cell.

13. The internal framework of a cell.

the organic compounds found in a living cell might suggest the same phenomenon could therefore produce something as complicated as a single-cell animal. Recent research has shown that single-cell animals are extremely complicated, comparable in complexity to a city full of machinery and chemical plants, and seemingly attest to intelligent design, just as expressed in William Paley's *The Watchmaker* (1743–1805) (cf. Fortey 1991:55; Tobin & Dusheck 2005:430–431).

Irreducible complexity and flagellums

When all the caveats are factored in, it would be seemingly impractical to query that the biological world offers many cases of imposed design, meaning that many of the complex structures found within a 'simple' cell point towards intelligent design. As previously referred to, Michael Behe (1996:59–73) wrote about what he called irreducible complexity. According to C.J. Collins (2006:288) he meant that one finds complex systems in the biological world of cell structures that need a minimum number of working parts already in place before the whole system works. One of the preferred examples Behe (1996:70–72) uses of this extraordinary complexity, is the flagellum – a whip-like tail that protrudes from certain bacteria cells that they use for swimming around.

The working complexities of flagellums are often referred to as miniature molecular machines. According to F.S. Collins (2006:184–185), they have multiple uses, such as translating RNA into protein, helping cells move around and transmitting signals from the cell surface to the nucleus. F.S. Collins refers to these miniature molecular machines as 'outboard motors' that propel cells in various directions. F.S. Collins goes on to say that the structures are quite elegant – they include a base anchor, a drive shaft and universal joints. In his view, '[t]he whole arrangement is a nanotechnology engineering marvel' (2006:185). To expand on this idea, Alberts (1998) illustrates what scientists are discovering when it comes to cells:

> We have always underestimated cells ... The entire cell can be viewed as a factory that contains an elaborate network of interlocking assembly lines, each of which is composed of a set of large protein machines ... Why do we call the large protein assemblies that underlie cell functions machines? Precisely because like machines invented by humans ... these proteins assemblies contain highly coordinated parts. (pp. 291–294)

But, as was presented, irreducible complexity has had its critics, who argue that flagellums can indeed form via evolutionary pathways (cf. Blocker, Kaoru & Shin-Ichi 2003:3027–3030; Cavalier-Smith 1987:297–354, 2002; Ussery 1999:40–45; Miller 2003:202–397). Equally, the research is still in its infancy and is presently based on much speculation. But, as previously stated, it would be seemingly impractical to ignore the evidence of intelligence in the design of a cell.

William Paley's *The Watchmaker*

Vis-à-vis the cells intricate workings and irreducible complexity, one recaps the now classic analogy of William Paley's *The Watchmaker*, as mentioned earlier. For many, his analogy goes directly to the idea of the teleological argument[14] that design implies a designer (cf. Himma 2005; Ratzsch 2001). Indeed, Darwin himself is on record as stating 'I do not think that I hardly ever admired a book more than Paley's *Natural Theology*. I could almost formerly have said it by heart' (cf. Levine 1991:29).

As voiced by Rana (2008:86), for Paley the characteristics of a watch and the complex interaction of its precision parts for the purpose of telling time, implied the work of an intelligent designer. Paley asserted that, by analogy, just as a watch requires a watchmaker, so too life requires a creator. He reasoned that, like a watch, organisms (such as *microbial eukaryotes*) display a wide range of features characterised by the precise interplay of complex parts for specific purposes, thus strongly inferring intelligent design *vis-à-vis* irreducible complexity (cf. McGrath 1995:404). The question now is: how does the complexity of the cell, and the clear idea that it was intelligently designed, affect Darwin's evolutionary tree, especially his concept of common descent?

Darwin's evolutionary tree

Common descent and natural selection

In *The Origin of Species*, Darwin formulated a theory with two main claims: the first being the theory of common descent, which argues that every creature on earth is ultimately descended from a single common ancestor.[15] This led to Darwin's envisioned great branching tree, the *Tree of Life*, depicting the pathways to more evolved forms of life. For Darwin, the first one-celled organism (eukaryotic) was the root of this tree (cf. Benarde 2007:428–432; Doolittle 2006:87–91).

The second claim, according to Meyer *et al.* (2007:8), had to do with the biological process he believed was responsible for the branching patterns in his tree. Specifically, Darwin proposed a mechanism that he thought could cause existing living forms to arise. He called this mechanism natural selection and argued that it had the power to produce fundamentally new forms of life through an evolutionary process. For example, when studying biology one hears about biological evolution, which refers to the change of living things over time. Darwin concluded that biological evolution occurs as a result of natural selection, which is the theory that in any given generation, some individuals are more likely to survive and reproduce than others (cf. Levine 2008:59; Vinicius 2010:43–47).

Today, evolutionary scientists argue that species share common traits, which seemingly give further weight to common descent from a single cell and natural selection over long periods of time. This has lead to the idea of Anatomical Homology,[16] or similarity in the anatomy of animals due to

14.A teleological argument, or argument from design, attributes the existence of order and direction in nature to a kind of purpose, thereby essentially proving the existence of God.

51.This single cell is often referred to as LUCA (Last Universal Common Ancestor).

16.The argument for Anatomical Homology (similarity in structure due to common ancestry) arose when evidence gathered showed that certain skeletal structures of different animals show similarity.

common ancestry. As explicated by Meyer *et al.* (2007:40), Darwin (and modern evolutionary biologists) believed that homologies exist, because organisms inherited these structures from the ancestors they had in common. In the following section, three basic arguments will be presented briefly – those for a Darwinian type convergence from common descent, an intelligently designed convergence, and convergence via random mutation.

Anatomical homology (convergence)

Common descent convergence

According to Ross (2009:167), species unrelated in the 'evolutionary tree' often manifest identical anatomical and physiological features. Examples include the bat, flying lemurs, songbirds, and the anatomy of modern wolves with the extinct Tasmanian wolves. This evidently gives credence to the naturalist's idea of a common ancestry or convergence[17]. This is especially so when it comes to theistic evolution and their idea that the modern human is a product of hominids, rather than the product of a unique and special creation in Adam and Eve (cf. Alexander 2008:224; Collins, F.S. 2006:207; Wilcox 2003:240–245).

To add to this, F.S. Collins (2006:126–128) suggests that the study of multiple genomes presented by computer simulation, shows that a certain stretch of human DNA has a match to other species. If, for example, one picks the coding region of a human gene (that is the part that contains the instructions for a protein) and uses that for a search, it was found that there will always be a highly significant match to the genomes of other mammals *or in later evolution of hominids*. F.S. Collins and his team from the Human Genome Project conducted much study around this. They reached the conclusion that it provides powerful support for Darwin's theory of evolution at two different levels, that is descent from a *universal common ancestor* with *natural selection* operating on randomly occurring variations (Collins, F.S. 2006:127–128).

However, as compelling as this may seem, some biologists such as Goodwin (1986:57), believe the laws of nature ensure that only a certain number of anatomical patterns are possible. Therefore, one should expect to see similarities in the anatomical structure of even different types of organisms. Thus, for some scientists, like Siew and Fischer (2003:241–251), homology can be seen apart from common descent. Others, such as Santos and Tuite (2004:183–200), say that similarity is due to natural laws. These scientists argue that their theories can explain the evidence for intelligent design, as well as common descent.

Intelligently designed convergence

Nonetheless, this poses at least two problems, according to Ross (2009:168). Firstly, he proposes that, given that naturalistic evolution supposedly happened in response to many unpredictable and often dissimilar events, design convergence resulting from natural processes should be extremely rare. Yet design convergence outcomes permeate the Cambrian fossil record[18], thus one still has to account for the rapid emergence of new species after the Permian Mass Extinction[19] event. Secondly, as further explicated by Ross (2009:94), design convergence appears in species from radical different habitats, facing widely diverse survival stresses (cf. Barnes 1974:424–427). This would especially be problematic for common descent and natural selection for modern humans.

Furthermore, different habitats and different survival stresses imply dissimilar bases for natural selection rather than a common ancestor as proposed by Darwin. Also, according to Meyer *et al.* (2007:49), if anatomical homology is defined as similarity due to common descent, then to say that homology provides evidence for common descent – especially in modern humans – is nothing more than circular reasoning. As suggested by Rana and Ross (2004):

> Though the idea of convergence fits awkwardly within the evolutionary framework, it makes perfect sense if a Creator is responsible for life. Instead of convergent features emerging through repeated evolutionary outcomes, they could be understood as reflecting the work of a Divine mind. The repeated origins of biological features equate to the repeated creations by an intelligent Agent who employs a common set of solutions to address a common set of problems facing unrelated organisms. (p. 15)

Additionally, the renowned biologist Jonathan Sarfati (2002) argues that it would be reasonable and logical to use the same anatomical design for different structures simply because they work. This does not imply that a common descent is the answer to these similarities. He illustrates as an example:

> An architect commonly uses the same building material for different buildings, and a carmaker commonly uses the same parts in different cars. So we shouldn't be surprised if a Designer for life used the same biochemistry and structures in many different creatures. Conversely, if all living organisms were totally different, this might look like there were many designers instead of one. (p. 112)

Patently, one infers that God devised an archetypal framework that was effective, hence why would God not use the same prototypes for all analogous creatures, seeing as the prototypes can function effectively irrespective of who the creature is. As presented by Gilbert (2010:3–25), to reuse an ingenious and perfectly capable design, is *in itself* a sign of intelligence. But, how would this relate to random mutation *vis-à-vis* natural selection.

Random mutation and convergence

According to Strickberger (2000:632–637) it seems that natural selection channels *random variations*, believed to be responsible for evolutionary change, along similar pathways to produce similar features in unrelated organisms. This again

17. In biology, homology is defined as any structure within a creature's body that is similar in shape, placement, and/or function.

18. Most major animal groups appear in the fossil record for the first time some 545 million years ago on the geological time scale, in a relatively short period of time known as the Cambrian explosion. The time period is far too short for a Darwinian type evolutionary process.

19. The Permian period, which lasted from 290 to 248 million years ago, ended with the world's most devastating extinction event of all time. Over 90 per cent of earth's species, including insects, plants, marine animals, amphibians and reptiles, were destroyed worldwide.

doi:10.4102/ve.v34i1.708

would seem to give credence to a naturalistic view of common ancestry or convergence, as it fits into Darwin's 'tree of life'. However, if natural selection is the driving force behind the evolutionary process rather than intelligent design, then logically one would expect that if the record of emerging life were replayed the outcome would be different, since natural selection implies random mutation or a hit-and-miss process, as stated by Gould (1989:51). This would entail that a different pathway would inevitably be chosen, resulting in a different anatomical structure emerging. However, what has emerged is that even if a species takes a different pathway, that is a different environment, the anatomical structures are similar, indicating intelligent design (cf. Morris 2004).

Unfortunately for evolutionists, no known evolutionary mechanism, whether that be common descent, natural selection or random mutation, can account for the nature of biological convergence. Clearly then, biological convergence is an important component in the argument that life, throughout earth's history, is a result of the supernatural activity of a Creator.

Based on what has been uncovered in this article, one cannot but accept that the idea of intelligent design far outweighs a natural process for the emergence of life. A God that goes into this much detail to bring human life into existence is certainly one that has immense interest and care for His creation.

Nobel Prize winner Arthur Compton (1927) had this to say:

> For me, faith begins with the realization that a supreme intelligence brought the universe into being and created man. It is not difficult for me to have this faith, for it is incontrovertible that where there is a plan there is intelligence - an orderly, unfolding universe testifies to the truth of the most majestic statement ever uttered – 'In the beginning God. (pp. 440–441)

Conclusion

The complexity of a cell is beyond refutation. Its design and function in giving and sustaining life, clearly points to intelligent design, as revealed throughout this article. This leads one to the cogency that a scientific and philosophical theology is more than simply uncovering facts for life's origin. It has to do with correctly interpreting these facts and making a case that corroborates that an intelligent designer was behind the creation of the universe, thus setting the stage for the emergence of life on earth through the complex design of these first life forms. It was further shown that this is in contrast to a Darwinian type evolutionary process, which tends to influence the empirical proposition that consents to intelligent design, with a view to present a disingenuous view of life's emergence. To think otherwise than divine causation in the creation of life would be a caricature, especially when the empirical proposition is prodigiously supportive of a Creator, who transcends time, matter, and space to bring about this creative miracle. In this, one does perceive that various scientists, who study nature and its influence on humanity, are rethinking many of their proposed evolutionary views and are now openly expressing these optimistic interpretations for intelligent design in significant academic journals and seminars.

Acknowledgements

Competing interests

The author declares that he has no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

References

Alberts, B., 1998, 'The cell as a collection of protein machines: Preparing the next generation of molecular biologists, *Cell* 92, 08 February.

Alexander, D.R., 2008, *Creation or evolution: do we have to choose?*, Monarch Books, Oxford.

Angelo, J.A., 2007, *Life in the Universe*, Infobase Publishing, New York.

Barnes, R.D., 1974, *Invertebrate Zoology*, 3rd edn., W.B. Sanders Company, Philadelphia, P.A.

Beatty, J., 2009, 'Chance and natural selection, philosophy of biology: an anthology', in A. Rosenberg & R. Arp (eds.), *Blackwell philosophy anthologies* 32, Wiley-Blackwell, Hoboken, NJ.

Behe, M., 1996, *Darwin's black box: The biochemical challenge to evolution*, The Free Press, New York.

Benarde, M.A., 2007, *Our precarious habitat- it's in your hands*, John Wiley & Sons, Hoboken, N.J. http://dx.doi.org/10.1002/0470099704

Blocker, A., Kaoru, K. & Shin-Ichi, A., 2003, 'Type III secretion systems and bacterial flagella: Insights into their function from structural similarities', *Proceedings of the National Academy of Science* 100(6), 3027–3030. http://dx.doi.org/10.1073/pnas.0535335100; PMid:12631703; PMCid:152238

Carter, B., 1974, 'The Anthropic Principle and its implications for biological evolution', *Philosophical Transactions of the Royal Society,* A 310, December, 347–363.

Cavalier-Smith, T., 1987, 'The origin of eukaryote and archaebacterial cells', *Annals of the New York Academy of Sciences* 503, 17–54. http://dx.doi.org/10.1111/j.1749-6632.1987.tb40596.x; PMid:3113314

Cavalier-Smith, T., 2002, 'The phagotrophic origin of eukaryotes and phylogenetic classification of Protozoa', *International Journal of Systematic and Evolutionary Microbiology* 52, 297–354. PMid:11931142

Chela-Flores, J., Owen, T.C., & Raulin, F., 2001, *First steps in the origin of life in the universe: Proceedings of the sixth Trieste Conference on Chemical Evolution*, Springer Publishers, New York.

Claerbaut, D., 2004, *Faith and learning on the edge: a bold new look at religion in higher education*, Zondervan, Grand Rapids, Michigan.

Collins, F.S., 2006, *The Language of God*, Simon and Schuster, New York.

Collins, C.J., 2006, *Genesis 1–4: A linguistic, literary, and theological commentary*, P&R Publishing, Phillipsburg.

Compton, A., 1927, Nobel Prize in Physics (1936), Chicago Daily News. PMid:17806458

Cowan, D., 2000, 'Use your neighbour's genes', *Nature* 407, 28 September, 466–467

Craig, W.L., 2000, *The Kalam cosmological argument: Library of philosophy and religion*, Wipf & Stock Publishers, Eugene, O.R.

Craig, W.L., 2010, *On guard: Defending your faith with reason and precision*, David C. Cook Publishers, Colorado Springs.Crick, F., 1988, *What mad pursuits*, Basic Books, New York. PMCid:1141615

Darwin, C., [1860] 1887, 'Letters to Asa Gray (22 May and 26 Nov 1860)', in F. Darwin (ed.), *Life and letters of Charles Darwin*, vol. 2, pp. 312–378, John Murray, London.

Darwin, C., 1872, *Origin of Species*, 6th edn., New York University Press, New York.

Davies, P., 2010, 'Why is the universe just right for life? Astronomy and civilization in the new enlightenment: Passions of the skies', in A.-T. Tymieniecka & A. Grandpierre (eds.) *Analecta Husserliana: The Yearbook of Phenomenological Research,* p. 107, Springer, New York.

Dawkins, R., 1996, *The blind watchmaker: Why the evidence of evolution reveals a universe without design*, Norton, New York.

Deckert, G., Warren, P.V., Gaasterland, T, Young, W.G., Lenox, A.L., Graham, D.E. *et al.*, 1998, 'The complete genome of the hyperthermophilic bacterium Aquifex aeolicus', *Nature* 392, 353–358. http://dx.doi.org/10.1038/32831; PMid:9537320

Denton, M., 1985, *Evolution: A theory in crisis*, Adler & Adler Publishers, Harrisburg.

Dickie, R., 1961, 'Dirac's cosmology and Mach's principle', *Nature* 192, 04 November, 440–441.

Doolittle, W.F., 2006, 'Uprooting the Tree of Life. Evolution: a scientific American reader', *Scientific American Readers*, University of Chicago Press, Chicago.

Ebifegha, M., 2007, *The death of evolution*, Xulon Press, Maitland, F.L.

Ellegard, A., 1958, *Darwin and the general reader: the reception of Darwin's theory of evolution in the British periodical press 1859–1872*, University of Chicago Press, Chicago.

Fortey, R.A., 1991, *Fossils: the key to the past*, Harvard University Press, Cambridge, M.A.

Fry, I., 2000, *The emergence of life on earth: a historical and scientific overview*, Rutgers University Press, New Jersey.

Fumerton, R. & Jeske, D., 2009, *Introducing philosophy through film: Key texts, discussion, and film selections*, John Wiley & Sons, Hoboken, N.J.

Gilbert, S.F., 2010, *Developmental biology: Evolutionary embryology*, 9th edn., Sinauer Associates, Sunderland, M.A.

Gitai, Z., 2005, 'The new bacterial cell biology: moving parts and sub-cellular architecture', *Cell* 120(5), 577–586. http://dx.doi.org/10.1016/j.cell.2005.02.026; PMid:15766522

Gonzalez, G. & Richards, J.W., 2004, *The privileged planet: how our place in the cosmos is designed for discovery*, Regnery Publishing, Washington D.C.

Goodwin, B., 1986, 'Is Biology a Historical Science?' in S. Rose & L. Appignanesi (eds.), *Science and Beyond*, Basil Blackwell, London.

Gould, S.J., 1989, *Wonderful life*, W.W. Norton, New York.

Gribaldo, S., Poole, M.A., Daubin, V., Forterre, P., Brochier-Armanet, C., 2010, 'The origin of eukaryotes and their relationship with the archaea: Are we at a phylogenomic impasse?', *Nature Reviews Microbiology* 8, 743–752. http://dx.doi.org/10.1038/nrmicro2426; PMid:20844558

Hall, B.K., 2010, *Evolution: Principles and processes*, Jones & Bartlett Learning, Burlington, M.A.

Hall, B.K., Hallgrimsson, B. & Strickberger, M.W., 2008, *Strickberger's evolution: the integration of genes, organisms and populations,* Jones & Bartlett Learning, Burlington, M.A.

Hawking, S., 1988, *A Brief History of Time*, Bantam Books, New York City.

Hazen, R.B. & Trefil, J., 2009, *Science matters: Achieving scientific literacy*, Anchor Books, New York.

Himma, K.E., 2005, 'The application-conditions for design inferences: Why the design arguments need the help of other arguments for God's existence', *International Journal for Philosophy of Religion* 57(1), February. http://dx.doi.org/10.1007/s11153-004-5894-7

Keil, C.F. & Delitzsch, F., 1981, *Genesis Pentateuch Commentary of the Old Testament 1*, Eerdmans, Grand Rapids.

Lawrence, K., 2008, *The evolution delusion*, Xulon Press, Maitland, F.L.

Levine, D., 2008, *Darwin loves you: natural selection and the re-enchantment of the world*, Princeton University Press, Princeton, N.J.

Levine, G., 1991, *Darwin and the novelists: patterns of science in Victorian fiction*, University of Chicago Press, Chicago, IL.

Lindsey, D.M., 2006, *The beast in sheep's clothing: Exposing the lies of godless human science*, Pelican Publishing, Gretna Louisiana.

Lioy, D., 2011, *Evolutionary creation in biblical and theological perspective*, Peter Lang, New York.

McGrath, A.E., 1995, *The Blackwell encyclopaedia of modern Christian thought*, Wiley-Liss, Hoboken, New Jersey.

Meyer, S.C., Minnich, S., Moneymaker, J., Nelson, P.A. & Seelke, R., 2007, *Explore evolution*, Hill House Publishers, Melbourne.

Miller, K., 2003, 'Answering the biochemical argument from design', in N. (ed.), *God and design: the teleological argument and modern science*, London, Routledge.

Möller, D., 2010, *Chemistry of the climate system*, Walter de Gruyter, Berlin.

Moore, J., 1979, *The post-Darwinian controversies,* Cambridge University Press, Cambridge. http://dx.doi.org/10.1017/CBO9780511622830

Morell, V., 1996, 'Life's last domain', *Science* 273, 23 August, 1043–1045.

Morris, S.C., 2004, *Life's solution*, Cambridge, Cambridge University Press, U.K.

Nelson, K.E., Clayton, R.A., Gill, S.R., Gwinn, M.L., Dodson, R.J., Haft, D.H. *et al.*, 1999, 'Evidence for lateral gene transfer between Archaea and bacteria from genome sequence of Thermotoga maritima', *Nature* 399 (6734), 323–329. http://dx.doi.org/10.1038/20601; PMid:10360571

Nowacki, M.R., 2007, *The Kalam Cosmological Argument for God: studies in analytic philosophy*, Prometheus Books, New York.

Pasquini, J.J., 2010, *The existence of God: Convincing and converging arguments*, Lanham, University Press of America, Maryland.

Pojman, L.P. & Rea, M., 2011, *Philosophy of religion: An anthology*, Cengage Learning, Florence, K.Y.

Prothero, D.R., & Buell, C. D., 2007, *Evolution: what the fossils say and why it matters*, Columbia University Press, Columbia.

Rana, F., 2008, *The cell's design: How chemistry reveals the Creator's artistry*, Baker Books, Grand Rapids, M.I.

Rana, F., 2011, *Creating life in the lab*: *How new discoveries in synthetic biology make a case for the creator*, Baker Books, Grand Rapids Michigan.

Rana, F. & Ross, H., 2004, *Origins of Life: Biblical and Evolutionary Models Face Off*, NavPress, Colorado Springs, C.O.

Ratzsch, D., 2001, *Nature, design, and science: The status of design in natural science*, SUNY Press, Albany, N.Y.

Ross, H., 2009, *More than a theory*, Baker Books, Grand Rapids.

Ross, H., 2010a, *Why the universe is the way it is*, Baker Books, Grand Rapids.

Ross, H., 2010b, *Beyond the Cosmos: What recent discoveries in astrophysics reveal about the glory and love of God*, Singleman Publishing, Kissemmee, F.L.

Ruepp, A., Graml, W., Santos-Matinez, M.L., Koretke, K.K., Volker, C., Mewes, H.W *et al.*, 2000, 'The genome sequence of the thermoacidophilic scavenger Thermoplasma acidophilum', *Nature* 407 (6803), 508–513. http://dx.doi.org/10.1038/35035069; PMid:11029001

Russell, P.J., Hertz, P.E. & McMillian, B., 2011, *Biology: The dynamic science*, Cengage Learning, Florence, K.Y.

Santos, M.A.S. & Tuite, M.M., 2004, 'Extant variations in the genetic code', in *The Genetic Code and the Origin of Life* (ed.), pp. 183–200, Lluis Ribas de Pouplana Kluwer Academic/Plenum Publishers, New York.

Sarfati, J., 2002, *Refuting Evolution: Common design points to common ancestry*, Master Books, Greenforest, A.R.

Shapiro, L., & Losick, R., 1997, 'Protein localization and cell fate in bacteria', *Science* 276(5313), 2 May, 712–718.

Shapiro, L., McAdams, H.H. & Losick, R., 2002, 'Generating and exploiting polarity in bacteria', *Science* 298, 1942–1946. http://dx.doi.org/10.1126/science.1072163; PMid:12471245

Siew, N. & Fischer, D., 2003, 'Analysis of singleton ORFans in fully sequenced microbial genomes', *Proteins: Structures, Functions and Genetics* 53, 241–251. http://dx.doi.org/10.1002/prot.10423; PMid:14517975

Starkey, W., 2011, *Evolution exposed and intelligent designed explained*, Xlibris Corporation, Bloomington, I.N.

Schaefer, H.F., 2004, *Science and Christianity: conflict or coherence?*, The Apollos Trust Publishers, Watkinsville, G.A.

Strickberger, M.W., 2000, *Evolution*, 3rd edn., Jones and Bartlett Publishers, Sunberg, M.A.

Tobin, A.J., & Dusheck, J., 2005, *Asking about life*, Cengage Learning, Florence, K.Y.

Tymieniecka, A., 2010, 'Astronomy and civilization in the new enlightenment: Passions of the skies', in A-T. Tymieniecka and A. Grandpierre (eds.), *Analecta Husserliana: The Yearbook of Phenomenological Research* 107, Springer, New York.

Ussery, D., 1999, 'A biochemist's response to the biochemical challenge to evolution', *Bios* 70, 40–45.

Vinicius, L., 2010, *Modular evolution: How natural selection produces biological complexity*, Cambridge University Press, Cambridge, U.K. http://dx.doi.org/10.1017/CBO9780511762994; PMCid:2817750

Wilcox, D.L., 2003, 'Finding Adam: the genetics of human origins', in K.B. Miller (ed.), *Perspectives on an evolving creation*, Eerdmans, Grand Rapids, M.I.