

The Dawkins Challenge

By Barry Krusch

***To accept the challenge, send an email to:
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One of the claims that many atheists make is that theists are “delusional” because they believe in affirmative propositions without direct evidence.

Yet it just may be that the tables are turned, that theists have evidence for their views, and that atheists do not; when atheists make the claim that they are not delusional, that they have evidence for their own affirmative proposition, that life arose on planet Earth from purely natural processes (with no need to hypothesize any other entity), they call to mind the phrase “people who live in glass houses shouldn’t throw stones.”

The purpose of the *Dawkins Challenge* is to prove conclusively that atheists¹ have no such evidence, and most likely never will, and in this respect, they just may be more “delusional” than the theists. Once they realize this, they will hopefully discover that they need to dial down their over-the-top rhetoric and return to the more civil form of communication standard in this country for so many decades.

The nature of the *Challenge* is to create a falsifiable claim; if any atheist wants to take on the challenge, they can do so, and if they are successful, they will get a financial reward, the amount of which is currently stipulated in the description to the video. And they can even act as a judge in their own cause! See the rules in the back.

The *Dawkins Challenge* is related to the video at the following link:

<http://youtu.be/kqaPuFBgTos>

That video provided an analysis that showed that the earliest form of life of which we are aware, called the Prokaryote, gave all the appearances of design (whether by God or Alien) stipulated by Dawkins’ Law (see video), but said that this initial presumption of design could be rebutted by evidence.

According to the atheist point of view, this scientific evidence exists. Indeed, if the notion of Directed Panspermia is rejected, it has to.

How to win? Just provide the counter-evidence and evidence otherwise as explained in the following *Challenges* (the *Dawkins Challenge* is the umbrella term for the *Challenges* discussed in this paper), many (but not all) of which were discussed in the video. Your evidence sources need to be articles from recognized scientific journals, such as *Nature*, *Science*, *Origins Of Life*, *The Journal Of Theoretical Biology*, etc. *Wikipedia* may be used as a source that points to those articles, but a *Wikipedia* article alone will not be accepted. In your response, you need to provide a PDF copy of the original article so that myself and/or an arbitrator (if necessary) can check your facts. The complete set of rules governing this *Challenge* can be found at the end of this document.

The judge of who wins the *Challenge* can either be myself or someone of your choosing, or even in yourself, if you choose to accept the challenge. In either of these cases, that decision is reviewable by an arbitrator with either the American Arbitration Association or some other online arbitrator. The complete details will be found in the rules section at the end of this document.

¹ Incidentally, the term “atheism” in the video and in this *Challenge* overview refers to strong atheism, the notion that the probability of God’s existence is 0%. The principles, however, can be applied to less dogmatic forms of atheism just as well.

Challenge 1: (Preliminary A) Answer this Question: Has the Origin of Life Problem Been Solved?

Has the origin of life problem been solved? To be eligible to take the *Dawkins Challenge* and advance further, you must answer "Yes."

- A. Yes
- B. No
- C. I don't know

Discussion

Before you answer "Yes", you might want to consider this quote from Eugene Koonin (Senior Investigator at the National Center for Biotechnology Information) in his 2011 book *The Logic of Chance: The Nature and Origin of Biological Evolution*, on p. 391:

The origin of life is one of the hardest problems in all of science, but it is also one of the most important. Origin-of-life research has evolved into a lively, interdisciplinary field, but other scientists often view it with skepticism and even derision. This attitude is understandable and, in a sense, perhaps justified, given the "dirty," rarely mentioned secret: Despite many interesting results to its credit, when judged by the straightforward criterion of reaching (or even approaching) the ultimate goal, the origin of life field is a failure – we still do not have even a plausible coherent model, let alone a validated scenario, for the emergence of life on Earth. Certainly, this is due not to a lack of experimental and theoretical effort, but to the extraordinary intrinsic difficulty and complexity of the problem. A succession of exceedingly unlikely steps is essential for the origin of life, from the synthesis and accumulation of nucleotides to the origin of translation; through the multiplication of probabilities, these make the final outcome seem almost like a miracle.

Didn't see that one coming, did you? When atheist Koonin pulls out the "M" word, you know you may be facing an uphill climb!

Of course, a lot can happen in a few years. Why not shoot Koonin an email to see if any new evidence has come along? He can be reached at koonin@ncbi.nlm.nih.gov, or by phone at **(301) 435-5913**. Conveniently, that legwork on your part may not be necessary. After all, if someone had solved the problem of the origin of life, that probably would have made *Wikipedia*, wouldn't it?

<http://en.Wikipedia.org/wiki/Abiogenesis>

But as you'll notice when you read that link, no such evidence or plausible coherent model has emerged since 2011, just the same old grab bag of incoherent, mutually exclusive, evidence-challenged, speculative shots-in-the-dark essentially unchanged over the last four decades. Still, maybe you know something that Koonin and *Wikipedia* don't!

Your Answer:

Circle one: **A** **B** **C**

Challenge 2: (Preliminary B) Provide Your Base Explanation For the Origin of Life

Still here? Well, that means you believe that the origin of life problem has been solved (remember, you can't advance unless you have answered "A" to the previous question). Life originated on planet Earth through purely natural causes, and you *know* how it happened. This established, please explain if that event was a **contingent** event (that is to say, it need not have happened), or an **inevitable** event (it had to have happened). In other words, was the origin of life the result of a *random* set of events, or was it the *inevitable* result of some combination of physical/chemical laws? Please choose from one of the following:

- A. The origin of life occurred through the **random, chance occurrence** of the intersection of known laws and constants.
- B. The origin of life occurred as a **necessary, inevitable consequence** of the intersection of known laws and constants.
- C. Either A or B exclusively, but I'm not sure which.
- D. Some combination of A and B.
- E. Some choice other than A or B.
- F. I don't have enough evidence to decide.

The only answer for which further justification is not necessary is Choice F. If you are going to choose any of the other choices, you need to justify your answer, as follows:

Choices A through D: Identify the laws and constants, and cite the evidence you have for your assertion.

You can get your laws and constants from the following sources, or some other source that you can discover:

| | |
|------------------------|---|
| Laws of physics | http://www.spec2000.net/06-basicphysics.htm |
| Constants | http://www.spec2000.net/05-basicunits.htm |
| Laws of science | http://en.Wikipedia.org/wiki/Laws_of_science |

Choice E identify what that choice is, and cite the evidence you have for your assertion.

Whatever your choice, your answers to the following Challenges must be consistent with your answer to this particular Challenge.

Note: if you choose choice F, from the standpoint of the Dawkin's Challenge, you get an F, because it contradicts your answer in Challenge 1 (you're not supposed to advance until you answer the first one, correct?). Remember, the whole idea of the Challenge is to provide evidence that the origin of life is due to some combination of time + natural events, i.e., purely as a function of natural law.

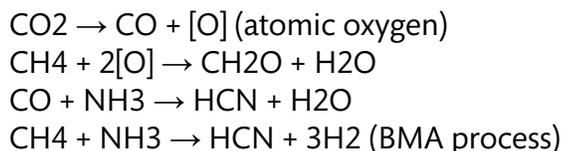
If you can't produce the evidence for that, then you obviously cannot meet the Challenge.

Discussion

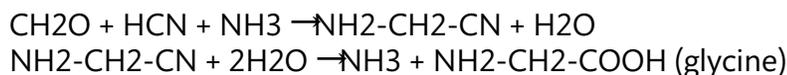
If you're going to accept this Challenge, you will be pleased to know that at least the very first step of the origin of life, or one of the first steps, the creation of amino acids, has been described in a scientific manner in the Miller-Urey experiments. At least that part of this work has been done for you (see below). However, there is a lot more to it than that! For every step of the origin of life following, you need to likewise be able to describe the chemical reactions, and any physical laws that have an impact on those reactions.

To get you started, here's the chemistry of Miller-Urey as an example:

One-step reactions among the mixture components can produce hydrogen cyanide (HCN), formaldehyde (CH₂O), and other active intermediate compounds (acetylene, cyanoacetylene, etc.):



The formaldehyde, ammonia, and HCN then react by Strecker synthesis to form amino acids and other biomolecules:



Data: (http://en.Wikipedia.org/wiki/Miller%E2%80%93Urey_experiment)

The above description will get you started, but you still need to specify the conditions under which these reactions take place, which is not done above, and you also have to establish that the geological conditions of early planet Earth allowed these reactions to take place.

Remember, when we drop a ball to the ground, we can specify the physical/natural laws which were involved in making that happen. Likewise here.

Challenge 3: Explain the Origination of Water on Earth

Life needs water. But where did that water come from? Provide one or more journal articles that provide experimental data that can explain the extraordinary amount of water that exists on earth, given that when the earth was formed it was essentially nothing more than molten rock, rock which later cooled off. How does water come from rocks? If you are going to advocate any particular theory, such as origin by comets, make sure that you can provide data that can verify this, explaining why there are over a quintillion metric tons of water on the planet, and how the extraordinary number of comets that would have had to have struck the earth to create such a volume of water did not simultaneously destroy it.

Discussion

You can get your research started here:

http://en.Wikipedia.org/wiki/Origin_of_water_on_Earth

When I posted this question on *Reddit*, I got the following answer:

"I assume you realize the answer is not known. Water from the Earth minerals may well have been a substantial source. If you haven't yet, see the *Wikipedia* article on Origin of water on Earth."

To this reply, I explained how I didn't think that the article was adequate, and asked how water could come from minerals, and got the following answer:

"It's not adequate because it's still debated. All they can do is give some ideas, and some data, and the data isn't proving much yet. It's common that salts contain water. And the water can be driven off with some heat. Sometimes it takes very little heat, sometimes a lot. It's a common high school chem lab expt to drive the water off of some copper sulfate hydrate, which is blue. After the water is gone, it's white. 36% of the original salt is water. I haven't looked at the numbers. But there is a lot of rock around, inside. Some think it could have been a significant contributor. This is a good case to sit back and enjoy watching the story develop."

These are interesting speculations, but which unfortunately lack scientific rigor. Coincidentally enough, a *New York Times* article appeared on this very topic:

http://www.nytimes.com/2014/12/11/science/rosetta-mission-data-rules-out-comets-as-a-source-for-earths-water.html?_r=0

The *New York Times* article reveals just how dangerous it is to speculate when the facts, as the article admits, are not available. Here's how the article begins:

Comet Data Clears Up Debate on Earth's Water

By **KENNETH CHANG** DEC. 10, 2014

One of the first scientific findings to emerge from close-up study of a comet has all but settled a question that planetary scientists have debated for decades.

The new finding, from the European Space Agency's mission to the little duck-shaped comet called 67P/Churyumov-Gerasimenko, appears to eliminate the possibility that the water in Earth's oceans came from melted comets.

Water vapor streaming off the comet contains a higher fraction of "heavy hydrogen" than the water on Earth does, scientists reported on Wednesday.

"That now probably rules out" comets as the primary source of terrestrial water, said Kathrin Altwegg, a scientist at the University of Bern in Switzerland and the principal investigator for the Rosetta instrument that made the measurements.

With comets unlikely, most astronomers now think Earth's water came from asteroids.

Asteroids? That's a fascinating speculation, but one wonders where the reporter got that information; notice the reporter says that "most astronomers now think." But given that the finding was new, reported just the day before the article, how could the reporter had had the time to interview the tens of thousands of astronomers required to make that statement?

See also:

http://www.esa.int/Our_Activities/Space_Science/Asteroids_Structure_and_composition_of_asteroids

The Times article concludes as follows:

In 2012, Dr. Alexander of the Carnegie Institution and his colleagues published a Science paper finding that some types of meteorites, in particular a class of primitive ones that formed beyond the snow line, have deuterium levels similar to Earth's.

In October, in another Science paper, researchers found that meteorites that originated from the large asteroid Vesta, which is believed to have formed inside of the snow line, also possess Earthlike deuterium levels. These scientists believe that ice-rich asteroids from outside the snow line were

pushed inward and were among the pieces that combined to form Vesta and Earth hundreds of millions of years before the late heavy bombardment.

In other words, Earth may have been wet from almost the beginning.

So, according to this theory, there were other asteroids that had different deuterium levels, and presumably water, in contrast to the *Wall Street Journal* description. Under this theory, meteorites blasted earth. But how many meteorites/asteroids would it have taken to produce the amount of water on the earth, and wouldn't that level of bombardment have destroyed the earth?

All interesting questions, but note how they contradict the idea raised by the *Reddit* commentator that the water simply "emerged" from minerals on earth. Apparently not.

Your Answer:

Challenge 4: Resolve The Oxygen Paradox

Provide one or more journal articles that discuss the atmospheric composition of the earth from the standpoint of the percentage of oxygen, and then explain, based on that data, how life could have formed. For example, if the article states that the atmosphere was filled with oxygen, explain how organic compounds could form in such an atmosphere when experimental data shows that just can't happen. On the other hand, if the article states that the atmosphere had no oxygen (what is called a "reducing atmosphere"), explain how the organic compounds could survive the bombardment of ultraviolet rays. If your hypothesis is that life formed in a place where the problem was not as acute, such as a deep-sea vent, provide evidence that life did in fact emerge that way, and provide refutation of the counter-arguments to that hypothesis using experimentally derived evidence.

Your Answer:

Challenge 5: Provide a Solution for the Amino Acid Formation Problem

The Miller-Urey experiment stipulates that hydrogen is a necessary element for the formation of amino acids. Assuming that is the case, provide one or more journal articles that discuss the chemical atmospheric composition of the earth from the standpoint of hydrogen. Your article needs to show that hydrogen was present in the atmosphere, and also explain how it remained in the atmosphere when the Earth's gravity was not powerful enough to retain it. Also, provide one or more journal articles that do all of the following: a) discuss the atmospheric composition of elements on earth b) using the atmospheric composition stipulated in the provided article, and c) provide additional journal articles that show how all 20 of the amino acids required for life have been formed in the necessary quantities with that particular atmospheric composition. Explain how, if in fact all 20 amino acids were actually produced, that they could have been produced on a planet completely randomly, unlike experiments run by human designers who have complete control over the environmental conditions (flasks, bent tubes, etc.) and chemical constituents.

Your Answer:

Challenge 6: Provide a Solution for The Cross-Reaction Problem

Provide one or more journal articles that discuss the cross-reaction problem: if amino acids formed in a pool of water or some other location on the planet, provide an explanation about why those amino acids did not form cross-reactions with other molecules, which would inhibit subsequent protein formation.

Your Answer:

Challenge 7: Resolve The Energy Paradox

Provide one or more journal articles that explain why the energy that can form chemical compounds in an origin-of-life scenario will not subsequently destroy those compounds (for example, heat is required to bake a cake, but if you leave the cake in the heat too long, it will destroy the cake). Provide a plausible scenario that brings that data to life, and provide evidence for that scenario.

Your Answer:

Challenge 8: Resolve The Chicken-Egg Paradox: Enzymes

Enzymes are critical for the formation of life. Given that DNA is required to make enzymes, and that enzymes are required to make DNA, explain how enzymes could emerge.

Discussion

In the third edition of the college textbook *Essential Cell Biology* (copyright 2010), we learn the following important fact about the importance of enzymes (p. 90; emphasis supplied):

Enzymes are among the most effective catalysts known. They can speed up reactions by a factor of as much as 10^{14} (that is, trillions of times faster than the same reactions would proceed without an enzyme catalyst). Enzymes therefore allow reactions that would not otherwise occur to proceed rapidly at normal temperatures. **Without enzymes, life could not exist.**

This information was made more specific in a 2008 report published in the Proceedings of the National Academy of Sciences:²

Without enzymes, biological reaction essential to life takes 2.3 billion years: UNC study

Dr. Richard Wolfenden, Alumni Distinguished Professor of Biochemistry & Biophysics, and member of the National Academy of Sciences, and co-author Charles Lewis, PhD publish a report in the November issue of the Proceedings of the National Academy of Sciences showing that without enzymes speeding the process, it would take 2.3 billion years to complete vital biological transformation.

All biological reactions within human cells depend on enzymes. Their power as catalysts enables biological reactions to occur usually in milliseconds. But how slowly would these reactions proceed spontaneously, in the absence of enzymes – minutes, hours, days? And why even pose the question?

One scientist who studies these issues is Richard Wolfenden, Ph.D., Alumni Distinguished Professor Biochemistry and Biophysics and Chemistry at the University of North Carolina at Chapel Hill. Wolfenden holds posts in both the School of Medicine and in the College of Arts and Sciences and is a member of the National Academy of Sciences.

In 1995, Wolfenden reported that without a particular enzyme, a biological transformation he deemed “absolutely essential” in creating the building blocks of DNA and RNA would take 78 million years.

“Now we’ve found a reaction that – again, in the absence of an enzyme – is almost 30 times slower than that,” Wolfenden said. “Its half-life – the time it takes for half the substance to be consumed – is 2.3 billion years, about half the age of the Earth. Enzymes can make that reaction happen in milliseconds.”



Enzymes are “absolutely essential” in creating life, says Dr. Wolfenden. Check. Now let’s return to the earlier statement in the textbook: **“Without enzymes, life could not exist.”** If this statement is true, then this creates a chicken/egg paradox seemingly impossible to resolve. One of the many essential products produced by the DNA decoding process are enzymes. Yet, as the statement indicates, and as the above study demonstrates, without those enzymes, a biological transformation deemed “absolutely essential” in creating the building blocks of

² <http://www.med.unc.edu/biochem/news/2008/without-enzyme-biological-reaction-essential-to-life-takes-2-3-billion-years-unc-study>

DNA and RNA would take 78 million years. Unfortunately, that's just a little bit longer than the amount of time within which the reaction must occur, by about 77.999999 million years.

Summary: we know that in the pre-life stage, there were no enzymes, because life is required to create enzymes. Yet, without enzymes, life could not be created.

Please resolve this paradox.

Your Answer:

Challenge 9: Resolve The Chicken-Egg Paradox: Protein Components (General)

But there are even other chicken/egg paradoxes related to the other protein components of the cell, not just enzymes. Provide one or more journal articles that explains the origin of the other proteins necessary for the replication process, since DNA is required to manufacture a protein. Your analysis should provide evolutionary pathways for all the protein components required for DNA synthesis, not just the dozens of enzymes, and explain how, given their current interlocking nature, they were able to function independently, and the process by which they interlocked into a coherent sequence.

Your Answer:

Challenge 10: Resolve The Chicken-Egg Paradox: DNA/RNA/Protein

Take a look at this diagram from the article *Biological Information – What Is It?*, p. 20, by Bitt, Compton, and Fernandez:

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W. Gitt, R. Compton and J. Fernandez.

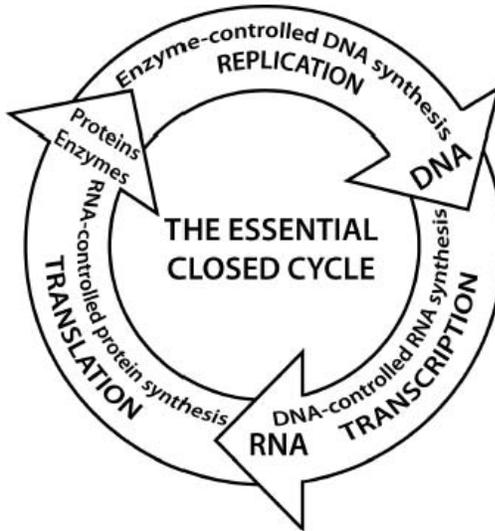


Fig. 2. A simplified representation of a UI-controlled cyclical process in living cells. The translation mechanism (protein synthesis) corresponds to the lowest level of expected action. However, the action of a protein nanomachine (DNA polymerase) is required in the next step of the cycle in DNA replication. The intricate process of mRNA synthesis (transcription) requires the DNA template and nanomachines (RNA polymerase II and spliceosome). Each of these three steps must be present *simultaneously*.

According to this diagram, RNA requires DNA requires proteins/enzymes requires RNA requires DNA requires proteins/enzymes, *ad infinitum*. Do you see a way out of this loop? Citations, please.

Your Answer:

Challenge 11: Resolve The Chicken-Egg Paradox: RNA Splicing and the Origin of Introns

Explain the evolution of RNA splicing and the origin of introns [*The Origin of Life: A Critique of Current Scientific Models*, Dr. Aw Swee-Eng, former Associate Professor of Biochemistry at the University of Singapore, CEN Tech J. v. 10, No. 3, 1996, p. 306].

Fourth, and most importantly, transport of mRNA from the nucleus to the cytoplasm is coupled to splicing and does not occur until all the splicing is complete. How does the RNA enter the cytoplasm for translation during the evolution of the splicing mechanism? This would have disrupted protein synthesis and would be powerfully selected against. Why is splicing in all its variants so rampant today?

The problem would arise too were introns abundant in cells without nuclear membranes – the prokaryotes. Mattick wrote: 'If introns were introduced into a procaryotic cell's genes, there would be no opportunity to remove them before protein is made, and the result would be "nonsense" non-functional proteins.'

This is essentially correct because spliceosomes would be needed for their removal, but again begs the question on the viability of the transitional phases.

The relationships between exons and protein domains remain to be worked out. Where introns came from and how they were integrated into the genome is a mystery . . .

Your Answer:

Challenge 12: Solve the Overlapping Codes Problem

Explain the evolution of the problem of overlapping codes [*The Origin of Life: A Critique of Current Scientific Models*, Dr. Aw Swee-Eng, former Associate Professor of Biochemistry at the University of Singapore, CEN Tech J. v. 10, No. 3, 1996, p. 307].

Messenger RNAs generally contain only one reading frame which is dictated by the position of the initiation codon. This correct reading frame translates the nucleotide code into a functional protein. Starting at an AUG codon, translation continues in triplets to a termination codon. The starting point can be altered by a mutation, usually resulting from insertion or deletion of a single nucleotide to give an alternate reading frame. A frameshift error results in the synthesis of a polypeptide that does not resemble the normal product. Typically, it will be inactive and, because stop codons are abundant in the alternative frames, shorter than the native protein.

Some organisms store information in their DNA in the form of overlapping codes. The overlapping codes are still triplet but have different initiation points. In other words, the same stretch of DNA carries the information for producing two proteins of entirely different amino acid sequence. This discovery is truly startling, because the possibility that genes might overlap in different reading frames imposes severe evolutionary constraints. A favourable mutation in one frame must be favourable in the other. A termination codon in the second frame would be fatal to the organism as a whole. So the two overlapping genes have to evolve in parallel. Yockey considered the problem from the point of view of information theory applied to biology, itself a venture fraught with caveats. In his opinion information theory shows that transcription from two or even three reading frames in a DNA or RNA sequence is possible, provided the total informational content to be transcribed does not exceed the full informational capacity of the DNA or RNA sequence. This interesting bit of information is a necessary but not a sufficient explanation for the origin of overlapping codes. The packing of information for synthesising additional essential proteins through weaving such information into a pre-existing nucleotide sequence is little short of miraculous, assuming that chance is the author.

Most of the known examples of such programmed frameshifts occur in viral genes. The notorious hepatitis B virus has four open reading frames on the long strand of its DNA to produce four different proteins. In a striking demonstration of sheer economy it turns out that each reading frame overlaps at least one other frame. And the code for the polymerase enzyme overlaps the other three. It is true that programmed frameshifts are not common, but they have been found across a wide spectrum of organisms. Yeast and *E. coli* also practise frameshifting. The mechanisms by which they work seem to involve 'shifty' messages in the mRNA, where the ribosomes may read four nucleotides as one amino acid and then continue reading triplets. Or it may back up one base before reading triplets in the new frame. 'Shifty tRNAs' are also implicated.

Your Answer:

Challenge 13: Provide the Solution for the Problem of Random Protein Synthesis

Provide one or more journal articles that have demonstrated the random synthesis of proteins from amino acids. If you are able to find one of these articles, the methodological procedure utilized must demonstrate that this process could have occurred randomly, without the intervention of a human designer and human-designed laboratory equipment in a human-designed controlled environment.

Your Answer:

Challenge 14: Provide the Solution for the Irreducible Complexity Problem

Provide one or more journal articles that can provide a plausible evolutionary pathway that will solve the problem of irreducible complexity in the cell, for example, if 60 enzymes are needed to produce a protein, and those enzymes are only produced by DNA, which requires those enzymes for replication, then how can those enzymes be produced individually? In addition, explain how, if they are produced individually, they can link up together in an interlocked process. Also explain the irreducible complexity of the other interlocking parts of the cell at a higher level, such as the cell wall and DNA. Footnotes, of course.

Your Answer:

Challenge 15: Provide the Solution for the Chirality Problem

Provide one or more journal articles that provide an explanation for the the problem of chirality: nonbiological processes (labwork or nature) produce chiral molecules in equal proportion. These random mixtures (racemic), are 50 percent left-handed and 50 percent right-handed. Since laboratory experiments demonstrate that the presence of racemic mixtures of amino acids and sugars strongly inhibits the formation of amino acid and nucleotide chains, explain how amino acids in such an environment could be formed in the first place.

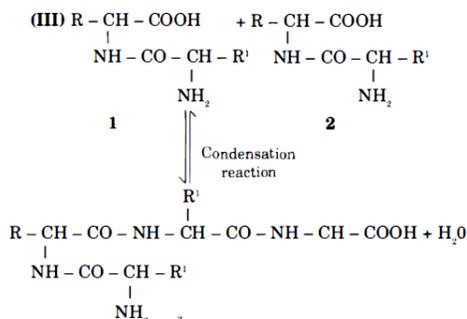
To save you some time, here is a good survey of some of the attempts to solve this problem, and why they have failed:

<http://creation.com/origin-of-life-the-chirality-problem>

Your Answer:

Challenge 16: Provide the Solution for the Reversibility Problem

The issue here is the reversibility of a condensation reaction, as follows:



(peptide 1 + peptide 2 combine to give tripeptide 3 plus water)

It turns out that polypeptides dissolve in water, meaning that a water-based world, *necessary* for life, can in another context be *hostile* to life. This can be referred to as the reversibility problem. A.E. Wilder-Smith, Professor of Pharmacology at the University of Illinois Medical Center, described this problem. [From *The Natural Sciences Know Nothing Of Evolution*, pages 15-16 (emphasis supplied)]:

Could biogenesis have occurred spontaneously from amino acids and polypeptides . . .? Biology textbooks state nearly unanimously that this is the case. But even a superficial chemical examination of the equations provides a definitive negative reply to this question. How is this possible, when textbooks practically unanimously teach the contrary? On examining the equations, the above reactions are found to be reversible – that is, they take place forward or backward depending on experimental conditions . . . The direction in which the reaction takes place depends on the concentration of reagents on both sides of the equation. For the sake of simplicity, we shall consider only one of the reagents – the water which is formed, i.e., released during this reaction. If the molecules of water which have been released by the condensation reaction on the right hand side of the equation are removed as soon as they appear, and their concentration is thus reduced in the reacting mixture, the entire reaction should tend toward the right hand side, and the theoretical yield of peptides – as represented in the equation – be obtained. Conversely by adding large amounts of water (instead of removing water) to the reacting mixture, no peptides or only very few will be formed (depending on the amount of water): instead, the initial reagents, amino acids, are obtained. Thus, **if excess water is present in the reacting mixture, peptide synthesis does not take place**, equilibrium remains on the side of the initial reagents, the amino acids, which are the building blocks of life. This phenomenon is covered by the law of mass action: it is valid for all reversible reactions.

Briefly said: **in reactions of this type, synthesis of polypeptides from amino acids does not take place in the presence of excess water.**

The consequence of this well-known fact of organic chemistry is important: concentrations of amino acids will combine only in minute amounts, if they combine at all in a primeval ocean providing excess water, to form polypeptides. Any amounts of polypeptide which might be formed will be broken down into their initial components (amino acids) by the excess water. The ocean is thus practically the last place on this or any other planet where the proteins of life could be formed spontaneously from amino acids. Yet nearly all textbooks of biology teach this nonsense to support evolutionary theory and spontaneous biogenesis. It requires a very great unfamiliarity with organic chemistry not to take into consideration the above-mentioned facts when proposing postulates for biogenesis . . .

Your Answer:

Challenge 17: Unravel the Unraveling Problem

Explain the evolution of the process of spooling, wrapping, and unraveling required in DNA transcription [From *Programming of Life*, Donald Johnson, p. 24]:

Biology professor Jerry Bergman uses a good analogy for the DNA replication process during cell division to create two cells from a single cell. Since all life starts as a single cell, this description applies to every organism. Scale-up DNA by a factor of one million to the equivalent of two 125-mile long strands of fisherman's monofilament line wrapped together to form a double-helix structure, neatly folded and packed to fit into a basketball (nucleus equivalent). Envision the engineering problem of creating an exact duplicate of each 125-mile long line to form two identical sets of those pairs of twisted lines, each packed into a new basketball! During cell division, the entire length of DNA must be split apart, duplicated, and repackaged for each daughter cell. There are about 25 million protein spools around which the DNA is wrapped, organized into an extremely complex hierarchical set of protein structures. Once an initiator protein locates the correct place to begin copying, a helicase "unzipper" unwinds the strands at approximately 8000 rpm, forming a fork area, without tangling the DNA strands as they separate. An "untwister" enzyme (topoisomerase) systematically cuts and repairs resulting strands to prevent tangling as each DNA strand is formed. Other enzymes copy the flat, untwisted sections of DNA, which are then connected together via DNA ligases into one continuous strand. There are over 30 specific functional proteins required for cell replication, each manufactured according to its own implemented computer algorithm . . . with all processes digitally controlled. It has also been recently discovered that the replication protocol has higher priority than the protein-manufacturing protocol. The replisome runs along the same path as the RNA polymerases (for protein transcription), but causes any polymerase to abort its task so that replication can be done reliably.

Your Answer:

Challenge 18: Solve the Origin of Semiosis

The molecules we see in life today are formed by biological machines, not by natural chemical or physical laws. Explain how the molecules that were a part of the original biological machines were formed by a non-programmatic process of evolution. [*Programming Of Life*, Donald Johnson, pp. 20-21]:

The question “How did life begin?” is one of the “biggest unanswered questions” in biology. “More than 30 years of experimentation on the origin of life in the fields of chemical and molecular evolution have led to a better perception of the immensity of the problem of the origin of life on Earth rather than to its solution.” [Dos88]. “What creates life out of the inanimate compounds that make up living things? No one knows. How were the first organisms assembled? Nature hasn’t given us the slightest hint. If anything, the mystery has deepened over time” [Eas07]. “The received view, today, is that life is but an extremely complex form of chemistry . . . The problem of which molecules came first has been the object of countless debates What really matters is that spontaneous genes and spontaneous proteins had the potential to evolve into the first cells. This however, is precisely what molecular biology does not support. **The genes and proteins of the first cells had to have biological specificity, and specific molecules cannot be formed spontaneously. They can only be manufactured by molecular machines, and their production requires entities like sequences and codes that simply do not exist in spontaneous processes. That is what really divides matter from life. All components of matter arise by spontaneous processes that do not require sequences and codes, whereas all components of life arise by manufacturing processes that do require these entities. It is sequences and codes that make the difference between life and matter. It is *semiosis* [symbol translation system] that does not exist in the inanimate world**, and that is why biology is not a complex form of chemistry” [Bar08S].

Discussion:

Once you accept the notion that there are biological machines, this creates the clarity that reveals the mystery. For this reason, some people want to reject what they refer to as “the machine analogy” for cell biology, but this is an “analogy” widely accepted in the field, an “analogy” that is in fact simply just a literal description of what is going on. One need look no farther for confirmation of this observation than the work of Richard Dawkins, who wrote the following in his book *The Blind Watchmaker*, p. 199:

Certainly the modern cellular machinery, the apparatus of DNA replication and protein synthesis, has all the hallmarks of a highly evolved, specially fashioned machine. We have seen how staggeringly impressive it is as an accurate data storage device. At its own level of ultra-miniaturization, it is of the same order of elaborateness and complexity of design as the human eye is at a grosser level. All who have given thought to the matter agree that an apparatus as complex as the human eye could not possibly come into existence through single-step selection. Unfortunately, the same seems to be true of at least parts of the apparatus of cellular machinery whereby DNA replicates itself, and this applies not just to the cells of advanced creatures like ourselves and amoebas, but also to relatively more primitive creatures like bacteria and blue-green algae.

So, there is no question that what is going on in the process of DNA replication and protein synthesis involves a set of interlocking remarkably elaborate, remarkably sophisticated algorithms, algorithms which have been in place for over 4 billion years. So sophisticated, in fact, that it even sets Dawkins against himself. As you can see in the quote above, he wants to refer to what is going on as both "highly evolved" and "specially fashioned," so much so that it contains the same "complexity of design" as the human eye. But if it is "specially fashioned", how could it be specially fashioned through a purely naturalistic multiple-step evolutionary process, when the laws of physics and chemistry know nothing of information-generating algorithms? Who's doing the fashioning? Who's responsible for the design?

Notice Dawkins' use of the word "unfortunately." Observe, that's not a scientist talking, that's an atheist talking; to any scientist coming at the problem from a neutral point of view, what's unfortunate? The observation can only be unfortunate for the person with a pre-existing metaphysical ax to grind, an ax that's opposed to the evidence!

In case you needed any more elaboration on what is providing Dawkins so much consternation, here is Dr. Donald Johnson's description of what is going on from his perspective as a Ph.D. in Computer and information Science [*Programming Of Life*, pp. 48-50, footnotes omitted]:

[I]t is impossible (zero probability): 1) to set up, store, or transmit information without using a code; 2) to have a code apart from deliberate convention determined by rules (not law); 3) to have information without a sender; and 4) that information can exist apart from a formal source.

From the information perspective, the genetic system is a preexisting operating system of unknown origin that supports the storage and execution of a wide variety of specific genetic programs (the genome applications), each program being stored in DNA. DNA is a storage medium, not a computer, that specifies all information needed to support the growth, metabolism, parts manufacturing, etc. for a specific organism via gene subprograms.

DNA has been compared to a computer's disk drive, which makes sense in a NUMA (non-uniform memory access) model. Early real computers used disk-like drums and other sequential-access main memories. This author has peer-reviewed publications describing concepts of distributed sequentially-accessed special-purpose and general memories (analogous to those in life) in heterogeneous (different) multiprocessor systems. In cells, there are many RNAs and micro-proteins, most with unknown functions, which may function as registers and inter-processor communications channels.

Technically, DNA is an example of shared memory in a distributed heterogeneous multiprocessor system with Flynn classification multiple input streams and multiple output streams. For DNA, there are multiple differing enzyme computers simultaneously reading different portions of the DNA genetic code, each producing its own output (for example, via mRNA). Each cell has over 2,000 different enzyme computers that read the shared memory data in DNA, processing that data according to the individual programs, many operating independently (though many operations require multiple cooperating enzymes).

The native language includes a coding system (e.g. codon-based encryption) whose codes are read by enzyme "computers." Often, smaller sections of RNA from different genes are spliced together to form the mRNA for a particular protein specification. The mRNA output is ultimately to another OS in a ribosome, which has its own program stored in its RNA, where the codes are decrypted. The needed output signals are then transmitted to the tRNA computer (which has been programmed to pick up its associated amino acid via its own program and OS) so that the amino acid specified by the codon is transported to the construction site to be added to the protein being built.

"Due to the abstract character of function and sign systems [semiotics –symbols and their meaning], life is not a subsystem of natural laws. This suggests that our reason is limited in respect to solving the problem of the origin of life and that we are left accepting life as an axiom . . . Life express[es] both function and sign systems, which indicates that it is not a subsystem of the universe, since chance and necessity cannot explain sign systems, meaning, purpose, and goals." Necessity refers to characteristics determined by "law," such as a released object falling due to gravity, or burning hydrogen in oxygen to produce water.

The coded information system in a cell *"may be compared to a book or to a video or audiotape, with an extra factor coded into it enabling the genetic information, under certain environmental conditions, to read itself and then to execute the information it reads. It resembles, that is, a hypothetical architect's plan of a house, which plan not only contains the information on how to build the house, but which can, when thrown into the garden, build entirely of its own initiative the house all on its own without the need for contractors or any other outside building agents . . . Thus, it is fair to say that the technology exhibited by the genetic code is orders of magnitude higher than any technology man has, until now, developed. What is its secret? The secret lies in its ability to store and to execute incredible magnitudes of conceptual information in the ultimate molecular miniaturization of the information storage and retrieval system of the nucleotides and their sequences."*

Every case of coded information, where the source is known, invariably requires formalism for its creation. Bill Gates, founder of Microsoft, writes, *"Human DNA is like a computer program but far, far more advanced than any software we've ever created."*

Your Answer:

Challenge 19: Provide the Solution for the Problem of Coordinated Mutations

Can every evolutionary advance be accomplished by a series of single mutations that are passed along in a linear manner, one after the other? Or are there any advances which require double, triple, quadruple simultaneous mutations? If so, calculate the odds of this occurring using one of the better documented transitions: how many coordinated morphological mutations are required to turn a land dwelling animal into a whale? If no coordinated morphological mutations are required, explain why. Justify your evidence using facts that have been gleaned from textbooks and/or journal articles.

Discussion

What is described above is extremely difficult to achieve in real life, if not impossible. There are several experiments on this point. For example, consider an excerpt from an essay Ann Gauger wrote called *Science And Human Origins*, in the book of the same name, on pp. 19 through 20:

Proteins that look alike are commonly assumed to have a common evolutionary origin. If the proteins have different functions, then it is assumed that some sort of neo-Darwinian process led to their duplication and divergence. This is the story of common descent writ small. But unlike humans and chimps, proteins can be easily manipulated and tested in the lab for successful functional change. We can actually establish how many mutations are required to switch old proteins to new functions, and thus determine what kinds of innovations are possible according to the rules of neo-Darwinism. If the neo-Darwinian story fails here, it fails everywhere.

My colleague Douglas Axe and I took two bacterial proteins that look a great deal alike, but have distinctly different functions. They are thought to be evolutionary cousins, descended from a common ancestor millions of years ago, because of their similar structures.

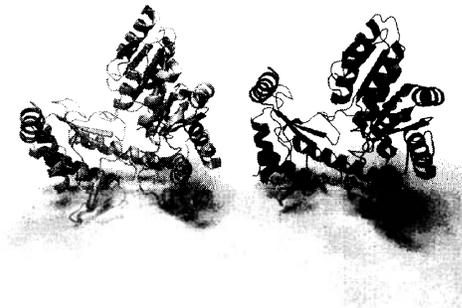


Figure 1-2: Kbl and BioF, two structurally similar proteins from *E. coli*.
Illustration: Ann Gauger and Douglas Axe.

These proteins, I called Kbl and BioF, are shown in Figure 1-2 above. Kbl and BioF are not directly descended from the other; nonetheless, a functional

shift from something like Kbl to something like BioF must be possible if neo-Darwinism is true. Functional shifts like this one are found everywhere in families of related proteins, and so should be relatively easy to achieve.

Yet when we experimentally determined how many mutations it would take, we found that it would take at least seven mutations to evolve one enzyme into the other – too many mutations to have occurred by an unguided neo-Darwinian process. Bacteria are genetic workhorses for evolutionary research, precisely because they are capable of rapid adaptation – as long as it takes only one or two mutations. Three coordinated mutations are a stretch even for bacteria, if all of the intermediates are neutral (have no beneficial effect for the organism). But for one of our enzymes to evolve the other's function, it would take at least seven and probably many more mutations. The waiting time for seven coordinated neutral mutations to arise in a bacterial population is on the order of 10^{27} years. To put that in some sort of perspective, remember that the universe is only about 10^{10} years old. It can't have happened.

Yet this is precisely the kind of transition that neo-Darwinism is meant to explain – structurally similar, yet functionally distinct proteins should be able to diverge by a process of mutation and selection. If this shift in function is not within reach of known neo-Darwinian mechanisms, something else must be going on. In case you are wondering, our result is in line with other published research on recruitment of proteins to new functions. Attempts to convert proteins to genuinely new functions typically require eight or more mutations, well beyond the reach of neo-Darwinian processes.

Your Answer:

Challenge 20: Choose the Most Plausible Chemical Pathway to the Prokaryote

A number of naturalistic origin-of-life scenarios stipulating possible chemical pathways to the Prokaryote have been proposed by scientists over the last few decades. Many of these scenarios are contradictory, yet all of them have been said to be buttressed by available scientific evidence. Choose one of those scenarios that you think is the most likely, provide journal articles that justify your decision, and explain why the contrary journal articles justifying the other scenarios are wrong:

- Directed Panspermia (Earth seeded by alien civilization)
- Nondirected Panspermia: Extraterrestrial Delivery Of Organic Compounds (Comets, Meteorites)
- Thermophile
- Iron-Sulfur World
- Hydrothermal Vents
- Clay Genes
- Mineral Catalysts
- Protein World
- DNA World
- RNA World

Note: your chemical pathway must account for each and every chemical and organelle in the Prokaryote, as well as all of the interactions.

If you're going to argue for the RNA world hypothesis as the most likely, since that is the one that has been given the most airplay, you're going to have to deal with the following objections raised by physical chemist Dr. Graham Cairns-Smith, in his book *Genetic Takeover* (pp. 56-58):

If it is hard to imagine polypeptides or polysaccharides in primordial waters it is harder still to imagine polynucleotides. But so powerful has been the effect of Miller's experiment on the scientific imagination that to read some of the literature on the origin of life (including many elementary texts) you might think that it had been well demonstrated that nucleotides were probable constituents of a primordial soup and hence that pre-vital nucleic acid replication was a plausible speculation based on the results of experiments.

There have indeed been many interesting and detailed experiments in this area. But the importance of this work lies, to my mind, not in demonstrating how nucleotides could have formed on the primitive Earth, but in precisely the opposite: these experiments allow us to see, in much greater detail than would otherwise have been possible, just why pre-vital nucleic acids are highly implausible.

Let us consider some of the difficulties:

1. First, as we have seen, it is not even clear that the primitive Earth would have generated and maintained organic molecules. All that we can say is that there might have been pre-vital organic chemistry going on, at least in special locations.
2. Second, high-energy precursors of purines and pyrimidines had to be produced in a sufficiently concentrated form (for example at least 0.01 M HCN).
3. Third, the conditions must now have been right for reactions to give perceptible yields of at least two bases that could pair with each other.
4. Fourth, these bases must then have been separated from the confusing jumble of similar molecules that would also have been made, and the solutions must have been sufficiently concentrated.
5. Fifth, in some other location a formaldehyde concentration of above 0.01 M must have built up.
6. Sixth, this accumulated formaldehyde had to oligomerise to sugars.
7. Seventh, somehow the sugars must have been separated and resolved, so as to give a moderately good concentration of, for example, D-ribose.
8. Eighth, bases and sugars must now have come together.
9. Ninth, they must have been induced to react to make nucleosides. (There are no known ways of bringing about this thermodynamically uphill reaction in aqueous solution: purine nucleosides have been made by dry-phase synthesis, but not even this method has been successful for condensing pyrimidine bases and ribose to give nucleosides (Orgel & Lohrmann, 1974).)
10. Tenth, whatever the mode of joining base and sugar it had to be between the correct nitrogen atom of the base and the correct carbon atom of the sugar. This junction will fix the pentose sugar as either the alpha or beta-anomer of either the furanose or pyranose forms (see page 29). For nucleic acids it has to be the beta-furanose. (In the dry-phase purine nucleoside syntheses referred to above, all four of these isomers were present with never more than 8% of the correct structure.)
11. Eleventh, phosphate must have been, or must now come to have been, present at reasonable concentrations. (The concentrations in the oceans would have been very low, so we must think about special situations – evaporating lagoons and such things (Ponnamperuma, 1978).)
12. Twelfth, the phosphate must be activated in some way – for example as a linear or cyclic polyphosphate – so that (energetically uphill) phosphorylation of the nucleoside is possible.
13. Thirteenth, to make standard nucleotides only the 5'hydroxyl of the ribose should be phosphorylated. (In solid-state reactions with urea and inorganic phosphates as a phosphorylating agent, this was the dominant species to begin with (Lohrmann & Orgel, 1971). Longer heating gave the nucleoside cyclic 2',3'-phosphate as the major product although various dinucleotide derivatives and nucleoside polyphosphates are also formed (Osterberg, Orgel & Lohrmann, 1973).)
14. Fourteenth, if not already activated – for example as the cyclic 2',3'-phosphate – the nucleotides must now be activated (for example with

polyphosphate; Lohrmann, 1976) and a reasonably pure solution of these species created of reasonable concentration. Alternatively, a suitable coupling agent must now have been fed into the system.

15. Fifteenth, the activated nucleotides (or the nucleotides with coupling agent) must now have polymerised. Initially this must have happened without a pre-existing polynucleotide template (this has proved very difficult to simulate (Orgel & Lohrmann. 1974)); but more important, it must have come to take place on pre-existing polynucleotides if the key function of transmitting information to daughter molecules was to be achieved by abiotic means. This has proved difficult too. Orgel & Lohrmann give three main classes of problem:

- While it has been shown that adenosine derivatives form stable helical structures with poly(U)—they are in fact triple helixes—and while this enhances the condensation of adenylic acid with either adenosine or another adenylic acid—mainly to di(A) stable helical structures were not formed when either poly(A) or poly(G) were used as templates.

- It was difficult to find a suitable means of making the internucleotide bonds. Specially designed water-soluble carbodiimides were used in the experiments described above, but the obvious pre-activated nucleotides—ATP or cyclic 2',3'-phosphates—were unsatisfactory. Nucleoside 5'-phosphorimidazolides, for example were more successful, but these now involve further steps and a supply of imidazole, for their synthesis (Lohrmann & Orgel, 1978).

- Internucleotide bonds formed on a template are usually a mixture of 2'-5' and the normal 3'-5' types. Often the 2'-5' bonds predominate although it has been found that Zn²⁺, as well as acting as an efficient catalyst for the template-directed oligomerisation of guanosine 5'-phosphorimidazolide also leads to a preference for the 3'-5' bonds (Lohrmann, Bridson & Orgel, 1980).

16. Sixteenth, the physical and chemical environment must at all times have been suitable—for example the pH, the temperature, the M²⁺ concentrations.

17. Seventeenth, all reactions must have taken place well out of the ultraviolet sunlight; that is, not only away from its direct, highly destructive effects on nucleic acid-like molecules, but away too from the radicals produced by the sunlight, and from the various longer lived reactive species produced by these radicals.

18. Eighteenth, unlike polypeptides, where you can easily imagine functions for imprecisely made products (for capsules, ionexchange materials, etc.), a genetic material must work rather well to be any use at all – otherwise it will quickly let slip any information that it has managed to accumulate.

19. Nineteenth, what is required here is not some wild one-off freak of an event: it is not true to say 'it only had to happen once'. A whole set-up had to be maintained for perhaps millions of years: a reliable means of production of activated nucleotides at the least.

Now you may say that there are alternative ways of building up nucleotides, and perhaps there was some geochemical way on the early Earth. But what we know of the experimental difficulties in nucleotide synthesis speaks strongly against any such supposition. However it is to be put together, a nucleotide is too complex and metastable a molecule for there to be any reason to expect an easy synthesis.

You might want to argue about the nineteen problems that I chose: and I agree that there is a certain arbitrariness in the sequence of operations chosen. But if in the compounding of improbabilities nineteen is wrong as a number that would be mainly because it is much too small a number. If you were to consider in more detail a process such as the purification of an intermediate you would find many subsidiary operations – washings, pH changes and so on. (Remember Merrifield's machine: for one overall reaction, making one peptide bond, there were about 90 distinct operations required.)

Still think the RNA world hypothesis has merit? Then perhaps more reading is required. To aid you in your research, here is a collection of articles to get you started:

http://krusch.com/dawkinschallenge/RNA_World_Reader.pdf

Your Answer:

Challenge 21: Create a Timeline for the Plausible Chemical Pathway to the Prokaryote

Provide one or more journal articles that discuss the amount of time that was available for life formation. With reference to your plausible chemical pathway and proposed evolutionary path to the Prokaryote, create a timeline for that development, and reference that timeline to journal articles that provide evidence for your timeline from the geological perspective.

Your Answer:

Challenge 22: Provide a Solution for the Information Storage Problem

Provide one or more journal articles that gives a solution for the information storage problem, which goes as follows: a Prokaryote could have 4,700 genes. Explain which genes are responsible for the formation of DNA, and where the information required for the replication process is stored in those genes. Explain how the DNA, in as little as 4 MB, could store all that information, including the algorithms that specify the composition of the molecular processes, their placement in the cell, and all of their functioning.

To help you understand the nature of the problem, consider this excerpt from the article *Mathematical Challenges Of Darwinism* (footnotes omitted):

Computer buffs would be interested to learn that it has been estimated that in the first year of life the number of chromosomal copy operations amounts to the transfer of over 40 Terabytes of information per second. Come across any backup systems that match that?

A space measuring just tens of micrometers across contains sufficient information to control the placement of 6,000,000 skin cells per cm², maintain a red blood cell density of approximately 5,000,000 cells per mm³, develop a brain with 100,000,000,000 cells – deployed at approximately a quarter of a million per minute – establish an estimated 10,000,000,000,000,000 neural interconnections with the aid of 500,000 to 1,000,000km of neural wiring – and then for good measure wire the brain to the rest of the body through an additional 380,000km of nerve fibres – the latter matching the distance to the moon. . . .

Sounds complex? Here's a key question: how much more complex do you think the human genome is when compared to – say – a computer product like Microsoft Office or Ubuntu Linux? Hundreds of thousands of times? Millions?

The human genome consists of approximately 3 billion DNA base pairs (150 billion atoms). Every three nucleotides in the string of 3 billion codes for one of twenty amino acids. Assuming equal frequencies, this equates to 4.32 bits per amino acid, which when apportioned back to the nucleotide level, means each base pair encodes for 1.44 bits of information. The human genome thus contains 515MB (megabytes) of encoded information.

Molecular biologists assure us that only 1.1% to 1.5% of the genome actually codes for function, so assuming the central dogma of molecular biology to be correct – the human phenotype is defined by 5 to 7MB of information – 200 times smaller than a typical Microsoft Office installation, and leaving us only 60% ahead in the race against the fruit fly!

Even allowing for the fact that the component parts of our 22,287 genes can be recombined in a multitude of different ways, the crunch question is whether a total of 5-7MB of information is sufficient to run a “universe sized” chunk of molecular machinery.

Perhaps it comes as no surprise to hear that Dr Craig Venter, whose company Celera Genomics produced the first complete sequence of the human genome, commented in 2001: "We simply do not have enough genes for this idea of biological determinism to be right. The wonderful diversity of the human species is not hard-wired in our genetic code. Our environments are critical."

Similarly the late biologist Stephen Jay Gould wrote in the New York Times in 2001: "The collapse of the one gene for one protein, and one direction for causal flow from basic codes to elaborate totality, marks the failure of [genetic] reductionism for the complex system we call cell biology."

Fifty years of faith and billions of dollars research grants in deference to the single gene / single phenotype thesis failed to demonstrate appropriate dividends in medical and behavioural genetics: the tale of the "selfish gene" is catalogued under fictional history.

As a replacement, Richard Strohman proposes that "In order to assemble a meaningful story, a living cell uses a second informational system. . . . Let's say you have 100 genes related to a heart disease or cancer. These genes code for at least 100 proteins, some of which are enzymes, so you have a dynamic-epigenetic network, consisting of 100-plus proteins, their many biochemical reactions and reaction products. It is 'dynamic' because it regulates changes in products over time, and it is 'epigenetic' because it is above genetics in level of organization. And some of these changed products feed back to DNA to regulate gene expression. The key concept here is that these dynamic-epigenetic networks have a life of their own – they have network rules – not specified by DNA. And we do not fully understand these rules.

"In short, genetics alone does not tell us who we are, or who we can be. While, as Gould says, the reductionist theory of genetics has collapsed, the dynamic-epigenetic point of view retains genetics as part of a new paradigm for life, one that has striking implications for the future of the life sciences."

The new vista is visible on the educational front: "Genomes are the handmaidens, not the blueprints . . . not 'selfish genes' but self organization, self-assembly, and emergent traits that are adaptive, purposive, taking advantage of genes to instantiate themselves. Organisms create themselves, bottom up. There's no blueprint for a human in the human genome. Rather, regulated expression of genes in human embryos generates proteins that interact to bring about the adjacent possible – the next trait – which in turn makes possible the next trait."

At least this generous explanation hints at an extraordinary degree of foreknowledge about the environment, and a complexity across all genomes capable of actively facilitating adaptation when catalyzed by external pressure.

Unfortunately, the key question – how the original informational content was generated that facilitates such highly sophisticated recombinational techniques under control of genes that preceded

particular selection pressures is not touched on. The explanation is once again implicitly attributed to evolution and pushed back in time under the assumption that evolution is already known to be true.

(<http://www.darwinsmaths.com/>):

In addition to the initial challenge, provide one or more journal articles that provides a similar discussion of the location of brain chemistry, structure, and formulation on the human genome. For example, there are approximately 30,000 genes on the human genome. Which of these genes control the structure and formation of brain chemistry? There are literally trillions of brain connections, and dozens, if not hundreds of brain chemicals and brain structures, so explain the interactions between them and their development in the human body over time, and how what conceivably could be terabytes upon terabytes of information (if done by human beings) are stored in an area that is probably approximating half a gigabyte. Provide experimental data for your conclusions.

Your Answer:

Challenge 23: Write a Plausible Atheist Fairy Tale for the Origin of Life

Atheists believe that the story of the creation of the planet in the first book of Genesis is not justified by the scientific evidence extant, and in any event, seems ridiculously implausible. Perhaps you think that a more plausible creation scenario can be created using the scientific evidence gathered to date.

NYU chemistry professor Robert Shapiro attempted to do just that, quoted later here. If you think he was successful, you could just submit his entry. If you don't think he was successful, author and submit your own version, which must satisfy three parameters: 1) it needs to provide an extensively detailed, gap-free pathway for the origin of life, 2) it has to be justified by the scientific evidence in the same way that Shapiro's version was, and 3) it has to be plausible. Each fact in your story needs to be footnoted; inclusion of a fact without footnoting will disqualify that entry.

Discussion:

I posted this Challenge on *Reddit*, and unfortunately, instead of getting one *plausible* alternative fairytale with experimental evidence behind it, I instead received 2 *implausible* fairytales with *no* experimental evidence behind them, neither one providing a pathway for the origin of life, incidentally. Here is the first submission:

One objection to comparing the evidence for unicorns to the evidence for gods is that they're not the same thing. Unicorns didn't create the universe, God did. But how do you justify this claim? There's just as much evidence to support the creation of the universe by a herd of unicorns as there is creation by a god.

Thus I introduce the Cult of the Celestial Unicorn Herd. Rather than there being a single, omnipotent unicorn running everything, the universe is instead segregated into specific tasks. There's a herd of unicorns dedicated to maintaining gravity, and another to maintain magnetism. There are herds to oversee inertia and chemical bonds, biology and everything else we see in the universe, as well as more that we haven't discovered. What we misinterpret as natural processes are actually supernatural forces governing everything.

There is, of course, a special herd of unicorns dedicated to guiding intelligent life throughout the universe. There are intelligent species everywhere and these unicorns look out for them. These unicorns have a plan for universal harmony, but of course they struggle in how to implement them because intelligent life often works at cross purposes to that plan. Sometimes it's easy to help, like finding your lost keys. Other times it's a lot harder, like when biology results in cancer or there's not enough food to go around.

As a whole the Celestial Unicorn Herd is omnipotent. Individually they're powerful but very limited. You never know when you've seen a Celestial Unicorn, often mistaken for angels, demons or other mythological creatures. It's impossible to say where they come from, but it's been suggested that they may be serving the will of a higher power of unfathomable noodly intent.

Plausible? Of course not. But that's what happens when you don't read the instructions. Here's the second submission:

I haven't read the example, but if I want to make an unsupported and wholly untestable claim, I fall back to the multiverse hypothesis in the following unconventional way:

The universe is 45 minutes old. Always. How is this possible? The multiverse hypothesis says it is possible. In that hypothesis, there are an infinite number of universes, and at any instant there are infinitely more being created. So as time moves on, the continuity of experience that we perceive in our consciousness is an illusion; our consciousness is simply (simply! ha!) being shuttled around to the next universe most similar to where the one we were just experiencing.

This accounts for the randomness observed at the quantum level. The quantum theory of matter is incorrect. What is really happening is that the universe that our experience is shuttled into at every instant is different from the one we were just experiencing according to the laws of classical mechanics (this is how it was chosen that we'd start experiencing that universe- the extreme similarity, and only the slight progression through time). Except the new universe is different at the subatomic level in a random way. This randomness is described fairly accurately by quantum theory, but the scientists are misattributing the randomness.

Before our consciousnesses arrive in the new universe to experience it however briefly, the bodies that host us are having their own experience of consciousness, and they have been for the entirety of the existence of that universe: 45 minutes. The laws of quantum theory as observed by them are different, since their non-quantum universe doesn't display the randomness we experience because our experience is hopping all over the place.

This explains many of the facets of human experience: *deja vu* is when your consciousness went and repeated a short part of its trek through universes (while almost everyone else's did not, of course). It accounts for the disorientation upon transitions between conscious and unconscious states.

And if you ask how it is that the quantum theory textbooks exist, since the inhabitants of non-quantum universes won't observe quantum effects, that's simply because that universe is only 45 minutes old, and nobody (who isn't part of the whole consciousness-hopping) has yet had a chance to look at the textbooks and figure out that they're bogus.

Game. Set. Match.

Less loony, but still loony, this fairytale still doesn't fill the bill, and the promise of "Game. Set. Match." at the end is just wishful thinking.

The astute reader will notice that neither of these submissions fit the parameters; they had to provide a plausible, extensively detailed, gap-free pathway to the origin of life, and that pathway had to be conformant with the experimental evidence extant. So the score so far is 0-2.

But, as it turned out, in January 2015, a different topic on *Reddit* called *Explain Evolution Like I'm Five, Please* produced the modern-day version of the atheist fairytale, the fairytale of the moment which, unlike the others above, at least attempts to satisfy the plausibility criterion. This was written by "WildZontar". Here it is:

http://www.Reddit.com/r/evolution/comments/2so8nw/explain_evolution_like_im_five_please/

4 billion years ago there wasn't life as we know it, but there were many places on earth where organic molecules could be found. As geothermal and solar energy was added to these pools of organic material chemical reactions were constantly taking place, and eventually self-replicating molecules started to form. This was the beginning of the RNA world. As these self-replicating molecules were competing for the resources necessary for their self-replication, they started to produce additional structures to aid in that process (the cell wall, very rudimentary organelles, etc.) and the continued survival of those molecules. It is likely that this process happened in parallel and independently in many places at roughly the same time. However, as these processes became more complex over hundreds of millions of years, one lineage managed to outcompete and displace all the rest, which is what is considered to be the last universal common ancestor to all life.

To its credit, this fairytale attempts to align itself with what the scientific thinking is today. It's also on point. And, happily enough, it's short, which makes it easy to read.

Unfortunately, in evolutionary biology, brevity is not necessarily the soul of wit – the problem with brevity is that it *hides all the problems*. Let's analyze this fairytale line by line:

4 billion years ago there wasn't life as we know it, but there were many places on earth where organic molecules could be found.

Notice the weasel word "could". The fairytale does not say that the organic molecules *actually existed*, it just says that they "could" be found. Well, maybe yes, maybe no. An additional weaselly characteristic of the sentence is the phrase "organic molecules." Just what, pray tell, are those organic molecules? Adenine? Cytosine? Uracil? Phenylalanine? And how did those molecules get formed? For example, what conditions were required to form them, and were those conditions present on the early Earth? The fairytale, with no scientific evidence, simply assumes what it needs to prove.

As geothermal and solar energy was added to these pools of organic material chemical reactions were constantly taking place, and eventually self-replicating molecules started to form.

OK, chemical reactions are always taking place, what of that? The problem in this sentence is the slippery slide from a scientifically demonstrable fact, that chemical reactions were taking place, to the implied assumption that when self-replicating molecules started to form, that they did so purely from some random or otherwise purely natural-law-based process. The question here, of course, is HOW? Scientists have not been able to emulate this process, that is to say, the process from chemical raw materials to self-replication. The fairytale simply *assumes* that it happened, *with no scientific evidence*. Well, that's not "science," folks, that's *religion*. The irony is that the spreaders of these fairytales call themselves "scientists", when what they are doing has absolutely nothing to do with science, and everything to do with the creation of fairytales that are in accord with their metaphysical assumptions, science-to-the-contrary be damned.

This was the beginning of the RNA world.

Notice the reliance on the RNA world hypothesis. But, if you read the previous Challenge related to that hypothesis, and the ancillary materials in the *RNA World Reader*, you know that this hypothesis is anything but established. For your convenience, here is the link again:

http://krusch.com/dawkinschallenge/RNA_World_Reader.pdf

Here again, the fairytale assumes what it needs to prove, that the hypothesis of an “RNA world” is an established scientific fact. But the article *The RNA World Hypothesis: The Worst Theory Of The Early Evolution Of Life (Except For All The Others)* in the *Reader* shows the true status of this hypothesis. Consider this honest evaluation by peer reviewer Eugene Koonin: (emphasis supplied)

I basically agree with Bernhardt. **The RNA World scenario is bad as a scientific hypothesis: it is hardly falsifiable and is extremely difficult to verify due to a great number of holes in the most important parts. To wit, no one has achieved bona fide self-replication of RNA which is the cornerstone of the RNA World.** Nevertheless, there is a lot going for the RNA World (Bernhardt summarizes much of the evidence, and I add more below) whereas the other hypotheses on the origin of life are outright helpless. Moreover, as argued in some detail elsewhere, **the RNA World appears to be an outright logical inevitability. ‘Something’ had to start efficiently replicating to kick off evolution, and proteins do not have this ability.**

Reviewer Koonin thus correctly positions the status of the scenario: it is a bad scientific hypothesis, and as hypotheses go, it can’t be falsified. It has significant holes just in the places where those holes should not be. Furthermore, the central assumption that self-replication could occur has not been demonstrated. In fact, if you were intellectually honest, you could conclude from these experiments that the scenario was in fact, most likely falsified due to the numerous failed attempts. But when you are an atheist, never say die! The real reason the hypothesis is continually discussed, as atheist Koonin so candidly admits, is that the other hypotheses are “outright helpless”, and once you exclude a designer hypothesis, it’s all you’re left with; in other words, we have an RNA-world-of-the-gaps stipulation. Unfortunately, the nature of science is not *deductive*, it’s *inductive*: you don’t start off with the assumption that there is no designer, and because there is no designer, conclude that the RNA world is inevitable, and assume that the hypothesis is true purely on that basis. After all, if you were going to do something like that, what do you need science for? Just assume the hypothesis is true, and be done with it! So Koonin’s “logical inevitability” is *scientifically* irrelevant.

Really, right out of the box Koonin establishes that the RNA world is not a valid scientific hypothesis, because it’s not falsifiable, and given the lack of experimental evidence, one would hardly pin a fairytale supposed to be based on scientific evidence on its “foundation.”

But that is exactly what “WildZontar’s” fairytale attempts to do. Let’s continue on:

As these self-replicating molecules were competing for the resources necessary for their self-replication, they started to produce additional structures to aid in that process (the cell wall, very rudimentary organelles, etc.) and the continued survival of those molecules.

Notice, by this stage, we have already assumed one of the most unlikely assumptions of this scenario, that self-replicating molecules can simply emerge on their own from natural laws. But we're not done with the question-begging assumptions! We next see that these self-replicating molecules "started to produce additional structures," purely on their own. In short, simply from natural chemical reactions, information was injected into these primitive bodies seemingly from nowhere and purely at random, information required to maintain their structures and their self-replication and metabolic processes. And just how did that occur? The fairytale doesn't say.

Let's go to our final quotation:

It is likely that this process happened in parallel and independently in many places at roughly the same time. However, as these processes became more complex over hundreds of millions of years, one lineage managed to outcompete and displace all the rest, which is what is considered to be the last universal common ancestor to all life.

Here's an interesting addition: "It is *likely* this process happened in parallel and independently many places at roughly the same time." Really? "Likely?" Now, that's fascinating, because what was described above would involve some very, very specific events, given their extraordinary lack of probability. How could all of these extraordinarily improbable events occur not just *once*, but in parallel and independently in *many* places at roughly the same time? We don't have just one person winning the lottery 100 times in a row, now we have a whole continent of people!

I think you see the problem. But, in fairness to the author, the topic was titled *Explain Evolution Like I'm Five, Please*. So, this certainly would be an appropriate explanation for an atheist father or mother to give their five-year-old daughter or son if they were more interested in evangelicizing their atheist religion than teaching their five-year-old daughter or son to think scientifically and critically.

Well, even though this fairytale is better than the other two, it also fails the parameters. Right now, the score is 0-3. Three strikes, they're out.

So, if you're looking for examples of fairytales that don't fit the bill, there you go. At this point, if you happen to be an atheist, you might be despairing that you might actually have to write out this fairytale yourself.

But the good news is that you don't necessarily need to put in the time; as I mentioned at the top of this Challenge, the cavalry arrived many years ago, in a book written by atheist Robert Shapiro.

Shapiro died in 2011, but he was one of the leading lights in the origin of life field. Shapiro was professor emeritus of chemistry at New York University, and not only published dozens of papers, he also wrote two books on the topic: *Origins, a Skeptic's Guide to the Creation of Life on Earth* (1986) and *Planetary Dreams* (2001). Shapiro opposed the RNA world hypothesis, believing that the spontaneous emergence of a molecule as complicated as RNA was highly unlikely. Instead, Shapiro proposed that life arose from some self-sustaining and compartmentalized reaction of simple molecules: "metabolism first" instead of "RNA first". This reaction would have to be able to reproduce and evolve, eventually leading to RNA. He

claimed that in his view life was a normal consequence of the laws of nature and potentially quite common in the universe.

Shapiro's alternate fairytale has far more scientific plausibility than the previous fairytales, but is it plausible enough? See what you think:

Robert Shapiro's Atheist Fairy Tale for the Origin of Life

[From *Origins: A Skeptic's Guide to the Creation of Life on Earth*, pp. 182-185.]

Once upon a long time ago when the earth was quite young, a group of high mountains rose above the ocean, forming a large island. It was volcanic, somewhat like a Hawaiian island of today, for continents as we know them had not yet formed. Because of the height and extent of these mountains, and because of the prevailing wind and weather patterns, a variety of climate zones existed on the island.

Thunderstorms were frequent on the rainy side, where it was always cloudy. In the high altitudes, near the mountaintops, the rain froze, and the precipitation came down as snow or hail. The atmosphere was reducing³, and these conditions favored the formation of hydrogen cyanide in the discharges. The rain and snow were rich in this chemical.

Large glaciers descended from the highest peaks. At their base, in the summer season, lay a number of partly frozen alkaline lakes. Hydrogen cyanide collected in them, and reacted with itself extensively, until the time came when the lakes froze solid in the winter. When warmer weather resumed, the lakes thawed in part and the reaction started again. In one very important year, however, spring did not return. The climate in the highlands had taken a turn for the worse. More snow fell at the mountaintops and the glaciers advanced, pushing the frozen lakes down the mountain. The flow path of one glacier led it away from the wetter side of the island toward a central plateau, which was geothermally active. In this more temperate climate the glacier tip melted, and the hydrogen cyanide reaction mixture flowed into a boiling acidic spring. Such boiling springs exist today in areas like Yellowstone Park and Iceland. Bacteria, which belong to the same broad class as the methanogens, are able to grow there. In the early days that we are considering, of course, no life existed, but over the course of an hour the boiling acid converted a small amount (about 0.1 percent) of the solids that the glacier had brought into adenine. The acid would eventually also have destroyed the adenine, but before that could happen the spring waters flowed into a broader stream. In doing so, they passed over some alkaline soils which neutralized them.

It seldom rained in this broad plateau area, and when it did, it fell in the form of sunshowers, rather than thunderstorms. The rays of the sun caused formaldehyde, rather than hydrogen cyanide, to be formed. The formaldehyde rain flowed in tiny streams into a geologically different, but also geothermally active, part of the central plateau, which contained boiling neutral pools, thick with suspended minerals.

As each formaldehyde stream flowed into a boiling mineral pool it was converted into a complicated mixture by a process called the formose reaction. The sugar ribose formed a small part of this product. Moving waters carried the mixture down the length of the pool over the next several hours, allowing enough

³ *Reducing*: there was little or no oxygen in Earth's atmosphere.

time for the change to be completed. At this point the product flowed out of the hot pool and was swept downstream by a rapid icy brook. This escape was fortunate, as the ribose would have decomposed if it had remained too long in the pool. The adenine and ribose streams merged in the central plateau, but they could not yet form adenosine. They needed a hot environment and the presence of sea salt for that purpose. Happily, a precipitous waterfall took them almost to sea level, on the hot, dry side of the island. Time was of the essence, as the sugar was not stable and was being lost.

At the base of the waterfall, the stream widened to form a broad delta. The waters flowed over a variety of different types of rock and mineral formations. At some point they entered a tidal pool which had been cut off from the sea at low tide. Minerals lining the pool had a special affinity for both adenine and ribose, and retained them, while most of the other substances were swept away as the tide filled and drained the pool.

It was a very hot day. The sun evaporated the remaining water in the pool and heated the adenine and ribose in the presence of salt, converting them in part to the nucleoside adenosine. As this was happening, a violent storm occurred far out at sea, creating large waves. The tides returned to the tidal pool in a rush, sweeping out its contents and transporting them farther inland. They were deposited in a nearby pond, which we name Darwin Pond. This was to be the chosen site for the origin of life.

No sooner had the adenosine reached Darwin Pond when successive waves, each flowing from a different direction, brought in supplies of the other nucleosides needed to make RNA. Had these chemicals only been human, they would have embraced at the joy of their first meeting, and in anticipation of the glorious future that lay ahead of them. They would then have taken turns, each describing the marvelous and different series of events that had led to its own creation. We must not inject our own feelings into the story, though. Let nature continue the synthesis.

Phosphate was needed for the conversion of nucleosides to nucleotides. Several geologists have contended that phosphate was not readily available on the early earth, and only increased in concentration in the waters gradually, as appropriate rocks weathered. Darwin Pond, however, was one of the few choice locations blessed with the right kind of mineral; it already had abundant phosphate. Thus, when the continuing heat wave evaporated the pond almost to dryness, the nucleosides were converted to nucleotides. This process was aided by an additional catalyst which was found in the minerals lining the pond.

The nucleotides now needed to combine, to form the replicator. This process was helped greatly by the presence of certain chemicals called amines which were brought in by another temporary flood. The amines would have been unwelcome earlier in our account, as they would have interfered with several earlier steps.

The climate now stabilized. Days were as hot as before, enough to dry up the pond. Each night, however, winds brought in enough moisture to form a thin liquid film at its bottom. These alternative periods of heat and moisture afforded the nucleotides a chance to come together in various ways and then to break apart again. One evening, by chance, the replicator was formed. It took charge immediately, assembling other nucleotides into copies of itself, more rapidly than they could come apart. Life had been created and evolution could begin.

Phew!

What ought to make this tale plausible is that it is, unlike the submissions by the folks on *Reddit*, based on actual scientific data. As Shapiro noted on page 185 of his book, “the very different reaction conditions have been published, as well as suggestions for appropriate prebiotic locations, such as the frozen pond, the boiling mineral pool, the tidal pool, and the dry, desertlike environment. I had to devise most of the transport to move the chemicals between locations. The glaciers and the separate rains of hydrogen cyanide and formaldehyde have also been published, however.”

Now, your challenge is to write a myth like Shapiro’s, if you don’t think it’s adequate. Alternatively, if you do think it’s adequate, you could just submit it. Before you do, though, you should read Shapiro’s own assessment of the probability of truth of his fairytale, in screen captures from the actual book itself, which you can find at:

http://krusch.com/dawkinschallenge/Atheist_Fairy_Tale.pdf

After you have read Shapiro’s own assessment of the truth of this fairytale, it will probably occur to you that you’re going to have to write the myth your own way. Bummer: lots of research, lots of time, lots of potholes to fill, with no real expectation of success.

But if you don’t want to do the hard work yourself, just watch these *YouTube* videos, and you can summarize them. As they blithely attempt to describe how “easily” the Origin of Life problem can be solved in 20 minutes or less, recall Koonin’s remark that the problem has *never* been solved. So, if the problem has never been solved, why do these “editors” believe that it has? Just what information are they leaving out? (Hint: read the Challenges in this document, and then see how many of those issues are discussed in these videos):

The Origin of Life – Abiogenesis – Dr. Jack Szostak

<https://www.youtube.com/watch?v=U6QYDdgP9eg&feature=youtu.be>

The Origin of Life Made Easy

<https://www.youtube.com/watch?v=v8nYTJf62sE>

The Origin of Life Made Easy (for schools)

<https://www.youtube.com/watch?v=3H0RXDrfyZc>

Your Answer:

Challenge 24: Provide the Pathway to Photosynthesis

The process of metabolism and cells is fueled by energy, and in the earliest forms of life, scientists speculate that the energy came from the sun, using the process known as photosynthesis, where plants convert carbon dioxide from the air and water to usable energy (in the form of glucose), with oxygen as a waste product. It's a bloody complicated process, but like all of nature's miracles, it occurred randomly, no designer in sight, as we have been told.

But exactly what is the evolutionary pathway for photosynthesis? Please explain this using experimental data that has appeared in peer-reviewed journals. For example, you might claim that the evolution of photosynthesis began with the photoreduction of carbon dioxide by ferrous ions in self-replicating iron-rich clays. If so, provide experimental data that would justify this point of view, and explain how that photoreduction would occur. If you believe that the next stage involved the entry of sulfur into the evolving clay system which led to the formation of acetyl thioesters and the polymerization of thioesters, explain the necessary chemical constituents for an environment that could produce acetyl thioesters. If your claim is that subsequently this complex iron-rich clay system now was able to fix nitrogen which led to the formation of pyrrole, flavin, nicotinamide, phycobilins, porphyrins and chlorophyll, explain the evolutionary pathways for all of those components, especially chlorophyll. If your next claim is that phosphate entered the evolving system and the formation of ATP became the energy currency of the evolving clay system, explain the evolutionary pathway to ATP, and how organic ATP and inorganic clay were able to interface.

In addition, you need to also explain the evolutionary pathway of the citric acid cycle (aka, the Krebs cycle), and the evolutionary sequence of eight enzymes that are used in that cycle. Also answer the question, if eight enzymes are used in the cycle, could the cycle have taken place with fewer than eight enzymes, and if so, how? Not only must the enzyme formation be explained, but the cycle itself. For example, was there an earlier cycle that only used five enzymes? And, if there was such a cycle, how did it then transition to a six-enzyme cycle? Or, did it just skip up to the eight-enzyme cycle? In your analysis, please provide the experimental data that justifies your conclusions.

Also, explain the evolution of chlorophyll, and the process by which chlorophyll was utilized in the citric acid cycle. Did the cycle occur first, and then chlorophyll evolved? Or was chlorophyll already present, and the cycle "adapted it" for "its" own use? If it "adapted it" for "its" own use, explain how a non-thinking, non-sentient collection of molecules has the power to behave as a sentient entity. Provide experimental data for all of your conclusions.

Finally, in your analysis, explain how the C4 metabolic pathway developed independently 62 times in over 18 different plant families, given that the evolutionary development process is said to have been random.

I posted this query on *Reddit*, and received no direct answer, not surprisingly. I did, however, have some people tell me that I needed to do my own research. Of course, I have done my own research, and have not been able to find that pathway, which is why I posted the query.

I did, however, get this snide reply:

Rather than attempting to launch an attack on a well-supported and extensively studied scientific theory, maybe you should consider searching for existing literature.

Here's a couple of articles to get you started. You can find plenty more simply by searching on any search engine for something like "evolution of photosynthesis."

Of course, I wasn't launching "an attack" on anything, I was simply asking someone to provide the evidence for the pathway. At any rate, I decided to take a look at the links this individual provided to see if it provided evidence for his assertion that the evolution of photosynthesis was "well-supported." One of the big strategies that you see on the Internet is something we can call *link-mining*; when person X asks a question, instead of being given a cogent, analyzed summary of a point of view, person X is instead given a series of links by person Y that supposedly refute the point, which the unlucky receiver of links X is then expected to click, read, and digest.

What we discover all too often, however, is that those links just don't do the refutation job, as I discovered in this case. For example, when I went to the first link that was supposed to explain the origins of photosynthesis, I read this in the abstract:

We know very little about the earliest origins of photosynthesis. There have been numerous suggestions as to where and how the process originated, but there is **no direct evidence** to support any of the possible origins (Olson and Blankenship, 2004; emphasis supplied in this and next quote).⁴

Oh brother! This fellow gives me a series of links that are supposed to prove to me that scientists understand the origin of photosynthesis, and one of the first things I read in an abstract are two sentences that directly contradict this! Too much!

And when I went to the second link, I came across this sentence:

The nature of the earliest photosynthetic organisms is **not well understood**.⁵

Woops! Strike Two! You know, if you're going to do link-mining, it might be a good idea to actually *read* the contents of those links before you post them. You know, the old RTFM dictum.

The next two links that he gave me were not as bad (i.e. contradictory), but they were just as irrelevant, and didn't have a whole lot of information anyway (see the footnote).⁶

That takes us to our final link, where, at long last, on page 18, we finally get something that is on point, even though ultimately it turns out to be inadequate:

⁴ <http://www.plantphysiol.org/content/154/2/434.full>

⁵ http://www.life.illinois.edu/govindjee/Part3/31_John_Olson.pdf

⁶ http://www.life.illinois.edu/govindjee/recent_papers_files/Ch.12a03B&G_07.pdf,

http://www.javeriana.edu.co/Facultades/Ciencias/neurobioquimica/libros/metabolismo/metabolismo_archivos/Evolution%20of%20Photosynthesis.pdf

Once selection acts on duplicated genes, reproductive barriers could appear rapidly and genetically isolate populations (Lynch & Conery, 2000). In the absence of reproductive barriers, gene flow from source populations could conceivably swamp the appearance of C4 genes in populations evolving C4-like traits.⁷

Well, like I said, that is somewhat on point, but as you can see, it lacks any chemical evolutionary pathway, as well as any data related to the pathway, and has weasel words like "could" which have essentially zero empirical value.

In short, to respond to this *Challenge* correctly, you will not be able to win if all you do is provide links. Instead, you need to provide the analysis, with footnotes, as well as the original documentation so that the accuracy of the footnotes can be checked.

Your Answer:

⁷ <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-8137.2004.00974.x/pdf>

Challenge 25: Calculate the Probability of Photosynthesis Evolving Randomly

Calculate the probability of amino acids in an environment combining randomly to form each individual enzyme used in photosynthesis (e.g. Citrate synthase, Aconitase, Isocitrate dehydrogenase, Pyruvate carboxylase, Ribulose 1,5-Bisphosphate Carboxylase, Phosphoenolpyruvate Carboxylase, PEP carboxykinase, Malate Dehydrogenase, Protochlorophyllide Oxidoreductase, etc.). When that is done, calculate the probability of all of those enzymes combining together to work to form a photosynthetic reaction.

The number you're going to get is going to far, far exceed the Dawkins' Law threshold of a trillion-to-one, so explain how an event like that can occur on planet Earth with only hundreds of millions of years for the event to occur. If you decide to go to a multiverse or emergent properties explanation, provide the scientific evidence for either (and explain why one is superior to the other), and why, whichever one you decide is accurate, that explanation does not explain everything else that occurs on planet Earth, including what some argue is evolution. For example, if you think the explanation for photosynthesis is a multiverse, then explain why we can be sure that evolution is real but not an illusion created by a series of random events capable of being created by a multiverse.

Your Answer:

Challenge 26: Explain How Positive Mutation Bypasses the Cell's Error Correction Abilities

Understanding what goes on inside a cell, and the processes of error correction within the cell that maintain its integrity over subsequent generations, creates a problem which we will shortly analyze. But first, to get a flavor for the nature of this error correction processing capability, consider the following facts from the textbook *Essential Cell Biology* (Alberts, Bray, et al 2010), on pp. 198-222:

- Cells duplicate DNA at rates as high as 1000 nucleotides per second.
- DNA copies billions of nucleotide pairs every time a cell divides. The copying must be carried out with speed and accuracy. In about eight hours, a dividing animal cell will copy the equivalent of 1000 700 page books and, on average, get no more than a letter or two wrong.
- DNA polymerase is so accurate that it makes only about one error in every 10^7 nucleotide pairs it copies.
- Enzymes carefully monitor the base-pairing between each incoming nucleotide and a DNA template strand. Only when the match is correct does DNA polymerase catalyze the nucleotide addition reaction. Second, when DNA polymerase makes a rare mistake and at the wrong nucleotide, it corrects the error through an activity called proofreading.
- Most DNA damage is only temporary because it is immediately corrected by processes collectively called DNA repair.
- Only rarely do the cell's DNA replication and repair processes fail and allow a permanent change in the DNA. Such permanent changes are called mutations, and they can have profound consequences. A mutation that affects just a single nucleotide pair can severely compromise an organism's fitness if the change occurs in a vital position in the DNA sequence (e.g, sickle-cell hemoglobin).
- The high fidelity of the cell's replication machinery generally prevents mistakes and copying. Despite these safeguards, however, such errors do occur. Fortunately, the cell has a backup system – called DNA mismatch repair – which is dedicated to correcting these rare mistakes. The replication machine itself makes approximately one error per 10^7 to the seventh power nucleotides copied; DNA mismatch repair corrects 99% of these errors, increasing the overall accuracy to one mistake in 10^9 to the ninth power nucleotides copied.
- Thousands of random chemical changes that occur every day in the DNA of a human cell, through metabolic accidents or exposure to DNA-damaging chemicals, are repaired by a variety of mechanisms, each catalyzed by a different set of enzymes.
- Humans and chimpanzees, after about 5 million years of evolution, still have DNA sequences that are at least 98% identical.

As this last point indicates, this error correction works extremely well, because many species of animals are essentially unchanged from their predecessor fossils

over hundreds of millions of years, like the coelacanth, butterflies, salamanders, cockroaches, horseshoe crabs, etc. etc.

Yet, while some species are static, others have by comparison seen ridiculously fast transformation, such as the land-dwelling animal whose progeny was ultimately said to have resulted in a whale (according to modern evolutionary theory), a transformation believed to have occurred in the short space of 10 million years (*Darwin on Trial*, p. 51); see also:

<http://www.smithsonianmag.com/science-nature/how-did-whales-evolve-73276956/?no-ist>

Here are some details indicating what a land-dwelling animal not-a-Cetacean (the biological order within which whales and dolphins are found) need to evolve in that 10 million year time span:

Cetaceans have many unique features to enable them to live in water [BK: *features which had to be evolved*]. For example:

- Enormous lung capacity with efficient oxygen exchange for long dives.
- A powerful tail with large horizontal flukes enabling very strong swimming.
- Eyes designed to see properly in water with its far higher refractive index, and withstand high pressure.
- Ears designed differently from those of land mammals that pick up airborne sound waves and with the eardrum protected from high pressure.
- Skin lacking hair and sweat glands but incorporating fibrous, fatty blubber.
- Whale fins and tongues have counter-current heat exchangers to minimize heat loss.
- Nostrils on the top of the head (blowholes).
- Specially fitting mouth and nipples so the baby can be breast-fed underwater.
- Baleen whales have sheets of baleen (whalebone) that hang from the roof of the mouth and filter plankton for food.

Many cetaceans find objects by echo-location. They have a sonar system which is so precise that it's the envy of the U.S. Navy. It can detect a fish the size of a golf ball 230 feet (70 m) away. It took an expert in chaos theory to show that the dolphin's 'click' pattern is mathematically designed to give the best information.

One amazing feature of most echo-locating dolphins and small whales is the 'melon,' a fatty protrusion on the forehead. This 'melon' is actually a sound lens – a sophisticated structure designed to focus the emitted sound waves into a beam which the dolphin can direct where it likes. This sound lens depends on the fact that different lipids (fatty compounds) bend the ultrasonic sound waves traveling through them in different ways. The different lipids have to be arranged in the right shape and sequence in order to focus the returning sound echoes. Each separate lipid is unique and

different from normal blubber lipids, and is made by a complicated chemical process, requiring a number of different enzymes.

For such an organ to have evolved, random mutations must have formed the right enzymes to make the right lipids, and other mutations must have caused the lipids to be deposited in the right place and shape.⁸

All of the above had to have evolved in this 10 million years. But that's only part of the story. Here is just a small subset of some of the additional changes:

Let us notice what would be involved in the conversion of a land quadruped into, first a seal-like creature and then into a whale. The land animal would, while on land, have to cease using its hind legs for locomotion and to keep them permanently stretched out backwards on either side of the tail and to drag itself about by using its fore-legs. During its excursions in the water, it must have retained the hind legs in their rigid position and swim by moving them and the tail from side to side. As a result of this act of self-denial we must assume that the hind legs eventually became pinned to the tail by the growth of membrane. Thus the hind part of the body would have become like that of a seal. Having reached this stage, the creature, in anticipation of a time when it will give birth to its young under water, gradually develops apparatus by means of which the milk is forced into the mouth of the young one, and meanwhile a cap has to be formed round the nipple into which the snout of the young one fits tightly, the epiglottis and laryngeal cartilage become prolonged downwards so as tightly to embrace this tube, in order that the adult will be able to breath while taking water into the mouth and the young while taking in milk. These changes must be effected completely before the calf can be born under water. Be it noted that there is no stage intermediate between being born and suckled under water and being born and suckled in the air. At the same time various other anatomical changes have to take place, the most important of which is the complete transformation of the tail region. The hind part of the body must have begun to twist on the fore part, and this twisting must have continued until the sideways movement of the tail developed into an up-and-down movement. While this twisting went on the hind limbs and pelvis must have diminished in size, until the latter ceased to exist as external limbs in all, and completely disappeared in most, whales. (D. Dewar, *More Difficulties of the Evolution Theory*, pp. 23-4)

Even with 10 million years of working time, this would be remarkable, but especially remarkable considering the molecular changes at the cellular level required to make these transformations are always opposed by the error correction abilities of the cell acting to continually obliterate them. Consider the following analogy:

⁸ <http://creation.com/refuting-evolution-chapter-5-whale-evolution#r2>

You are a playwright, and your two-year-old toddler goes to your computer every day and decides to change letters in your script at random every so often. You want him to have fun at the keyboard, so you write an error correction program that fixes every one of his changes after he makes them, so it takes 10 years for even one of his letter changes to go through. But your error correction program is so sophisticated that when it actually *does* fail to correct an error, it does so *only* when the "error" that was made was really an *enhancement*, so that each of the "errors" that slip through result in a *plausible coherent play*, ready to stage! 10 trillion transformations, 10 trillion plausible, coherent plays!

Your child starts off with the play *Hamlet* you have up on the screen. Knowing that his changes that make it through your system are totally random and there is no specific target, but all the changes which managed to slip through result in plays that retain coherence throughout their transformations, ready to stage, many years will it take before *Hamlet* morphs into *Macbeth*? Or, more precisely, how many cycles of the contraction and expansion of the universe would it take?

So, here is the challenge: explain how, given the error correction abilities of the cell, a Prokaryote could have evolved from some form of sub-Prokaryote with those error correction abilities in place. If your hypothesis is that those error correction abilities were not in place, explain how the cell was able to maintain its integrity to preserve its self-replicating nature.

Your Answer:

Challenge 27: Evolution of Error Correction

With your understanding of error correction from the previous challenge, explain the evolutionary pathway to error correction, and calculate the probabilities of each step to that pathway.

Your Answer:

Challenge 28: Provide an Experimental Design That Eliminates Intelligent Interference

Defeating the *Dawkins' Challenge* requires evidence, but in the gathering of evidence, there is a "Heisenberg principle of uncertainty" problem which may make the gathering of that evidence extremely difficult (if not impossible). The problem is to create an experimental design that proves that an event can randomly occur which has no interfering inputs from an intelligent designer (i.e., a scientist who has both designed and executed the experiment). As noted, this is extremely difficult to do, as exemplified by the experimental design of the Miller-Urey experiment, a highly contrived scenario that had no realistic analogues to the reality it was attempting to demonstrate. Here is a short, more simplified view of the problem:

A scientist makes the claim that Scrabble pieces thrown into a can and dumped on a table will spontaneously assemble themselves into the phrase "TO BE OR NOT TO BE" within 500 dumping incidents. Here's how he does it: he throws the tiles on the table, and every once in a while (well within the 26 x 26 trials that would set the upper boundary of occurrence), he gets a two character string from his target string, such as "TO". He then pulls those tiles out, and lays them on his board. Then he repeats the procedure, until he gets a "BE". And continues on, until he rather rapidly creates the string.

While this is a fantastic way of accelerating the progress of what ought to be a random process, it has nothing to do with reality.

Evolutionary scientists know this, of course, but they say, "well, you wouldn't really expect us to come up with a totally random design, because the processes we are talking about occur over tens of millions of years, so we have to do something to accelerate the process." All well and good, but in taking that action, they have introduced the uncertainty principle into their experimental design, and that uncertainty principle basically destroys the integrity of their experiment, rendering it essentially pointless.

Your challenge is to come up with an experimental design that will show an evolutionary pathway which does *not* take shortcuts that introduce this uncertainty principle. If you cannot do that, see the next *Challenge*.

Your Answer:

Challenge 29: Prove that the Origin of Life Problem Is Knowable

Professor Hubert Yockey, who worked under Robert Oppenheimer on the Manhattan Project, and who published numerous articles in the *Journal of Theoretical Biology*, believes that the origin of life is unsolvable as a scientific problem. In his book *Information Theory, Evolution, And The Origin Of Life*, Professor Yockey wrote the following on p. 173:

[T]he genetic code is much like all codes used in communication. Looking backward in time, through a glass darkly, how near to the origin of the genetic code can we see? It is often speculated that the genetic code began as a binary alphabet. This is not a fruitful speculation as DNA and RNA are composed of four compounds that form a primary four letter alphabet. Even with some imagination we may consider a sixteen-member code composed of the doublets of UCAG. The origin of the genetic code is unknowable. I have no doubt that if the historic process leading to the origin of life were knowable it would be a process of physics and chemistry. Thus, the process of the origin of life is possible but unknowable.

If Professor Yockey is correct, this will essentially eliminate the ability to refute the rebuttable presumption of design provided by Dawkins Law; to put it another way, to be able to refute the rebuttable presumption of design, the origin of life problem must be a problem that is *capable* of being solved. Therefore, you need to refute Professor Yockey's allegation, and explain why indeed the process of the creation of the origin of life in a purely naturalistic way is knowable. See the preceding *Challenge*, which is a prerequisite towards answering this one.

Your Answer:

Challenge 30: Explain Why the Power of the Billions Is Not All-Powerful But Could Still Take that Big, Bad Leap

Some people have what can be seen as an almost superstitious faith in the power of “time” and “nature” to do basically anything, given enough of it. This type of magical thinking, however, runs into numerous counterexamples when we dig a little deeper.

For example, one hypothesis for the origin of life is that the universe has supposedly billions upon billions of planets capable of supporting life, and billions and billions of years to produce that life, so it is no surprise (according to the all-powerful Power of the Billions hypothesis) that our planet has produced the Prokaryote. After all, so the story goes, we do live on a planet with a Prokaryote, which from this perspective is the ultimate proof of the assertion.

But if that is the case, that billions upon billions of years and billions upon billions of planets intersecting can produce pretty much anything, then why (when all the archaeological digging is done) is life the only seemingly designed object we find (remember, even Dawkins admits that life appears to be designed [on p. 4 of *The Blind Watchmaker*, he said “Biology is the study of complicated things that give the appearance of having been designed for a purpose.”]). Why are far, far simpler objects giving the appearance of design not found?

For example, a fork is a much, much, much simpler object than a Prokaryote, a grain of sand in the Prokaryote’s vast beaches of complexity. In a fork, practically nothing is going on, whereas a Prokaryote is so complex it actually dwarfs the “intelligence” of a supercomputer (<http://www.npr.org/blogs/13.7/2014/11/21/365753466/artificial-intelligence-really-is-pseudo-intelligence>). Yet, were we to find a fork buried thousands of feet underground that carbon dating revealed to be 3.5 billion years old, everyone would be scrambling to revise the biology textbooks. Likewise were we to find other objects indicating design, such as knives, blenders, toaster ovens, DVD players, pens, scanners, lamps, light bulbs, license plates, fuses, cable ties, literally hundreds of thousands of similar objects.

Yet though there are hundreds of thousands of similar objects that the billions upon billions of planets and billions upon billions of years had to get the party rolling, not one of them ever appears on this planet. While that magical, all-powerful, Power of the Billions could not produce the simplest of these designed objects, it somehow managed to produce something more complex than our most complex supercomputer!

With reference to this *Challenge*, there are three things you need to explain:

- 1) If the Power of the Billions could take that big, bad leap to life, why are the hundreds of thousands of far simpler seemingly designed objects nowhere to be seen, and
- 2) If you saw a DVD player buried thousands of feet in the ground in 3.5 billion-year-old strata, would you consider that as evidence of design, and
- 3) If finding that object would be evidence of design, why isn’t finding 4 billion-year-old life likewise evidence of design?

Discussion:

I posted 2 of these questions on *Reddit*, and received the following answers. I could analyze these and point out the interesting contradictions that emerged from the answers, but rather than do that, I will just put these here mostly without comment, apart from two. Your answer can just copy the best answers that you see here, if you think one of them is adequate.

So, here is my first comment: you will note, if you analyze these answers carefully, that they actually admit the major premise that underlies Dawkins' Law: that mechanical processes do not spontaneously pop into existence, and that if such an event occurred, it would be a violation of natural law, and evidence that something other than natural law was responsible. In short, these atheist respondents have rejected, and quite properly too, the notion that atoms and molecules can randomly assemble themselves into mechanical objects, and by doing so they are in accord with the entire theoretical framework upon which the Intelligent Design framework they supposedly scorn is built: philosophy does make strange bedfellows, doesn't it? With this major premise established, the respondents have then accepted the notion that *the emergence of a mechanical process*, if there is a naturalistic explanation (apart from Directed Panspermia), *must occur through a scientifically demonstrable evolutionary pathway*, which is, in fact, the entire point of *The Dawkins Challenge*.

My second comment is this: atheists now have to play their only ace in the hole, the elastic concept "Evolution" whose chief reason for existence, we ultimately find, is not a foundation built from scientific evidence but instead a "foundation" of quicksand supplied by a bottomless well of funding that hires mouthpieces to proclaim its "truth", a concept burdened with intellectual IOUs creating an intellectual deficit that conceptually rivals our \$18 trillion national debt – that is to say, never confuse a bustling, robust economy for one built on a limitless credit card.

That's quite a few mixed metaphors, but one or two more and we should be done!

This concept, due to its vast funding, and the subsequently resultant "Hall of Mirrors" effect (built on the famous Asch effect, i.e., because it's everywhere you turn, its truth is assumed), now functions as the new God of the 21st century, the God which can achieve all by acting as an assumed-as-true major premise in whatever deductive syllogism you want to create. Can't otherwise explain a biological phenomenon? Just pull out the concept "Evolution", and you are done! Invention of photosynthesis? Evolution! Development of the DNA/RNA/enzyme cycle? Evolution! Instantiation of the Prokaryote? Evolution! Easy, peasy! No need for *evidence*, just pull out The Word, the atheist substitute for "abracadabra."

Unfortunately, that question-begging strategy just isn't going to work here; "Evolution", as the concept is described in our textbooks, requires the prior existence of elaborate, extraordinarily sophisticated interlocking biomachinery that does the work of mutation, propagation, replication, metabolic conversion, and information storage, among others. The conundrum now is, just *how* did that machinery emerge, *without* the machinery required to instantiate this phenomenon of "Evolution", if indeed it be real? You can't play the "Evolution" card, because the machinery required to create that card had not yet been invented!

Now on to the questions, and answers.

1) If the Power of the Billions could take that big, bad leap to life, why are the hundreds of thousands of far simpler seemingly designed objects nowhere to be seen?

- A. It's not like these complex life forms sprung out of nonexistence with their full complexity. The complexity came from millions of years of small adaptations, stacking upon one another. Look at some of the earliest forms of life we've found in the fossil record – hardly complex compared to many examples in modern life.
- B. A fork isn't capable of evolving (forks don't reproduce, for starters), **nor are there any other known forces of physics capable of producing one without intelligent interference.** That's the difference.
- C. The system (lets just say matter and time) only creates things which follow it's natural mathematical laws. Prokaryotes, salt, and suns do. Calculators and fire breathing dragons do not.
- D. **There are physical laws that limit what is possible.** Over billions of years, creating stars is as simple as blowing bubbles because that's what hydrogen does, that's hydrogen's nature. It doesn't create square stars because that's not how gravity works. **Similarly, nature can't create calculators because you need intelligence to do that.** But, again, please listen, it doesn't matter that both prokaryotes and calculators are complex and look designed to you. It does matter that one of those things evolved from a basic simple form, of which was made from inorganic compounds that existed in plenty. **It's not a random system, it follows the laws of physics,** and those laws govern the behavior of amino acids, and despite and/or because of those laws, those amino acids started replicating. (So the theory goes).
- E. **The possibilities of the universe don't allow truly random things to appear.** They have to be shaped by the laws of nature. And for lots of things **the combined possibility of complex parts like transistors or microchip is so mindbogglingly small, that we would not need a law of billions but of like googols or something.**
- F. What kind of objects are you talking about? Rocks are objects and they're littered about. I'm sure a pile of rocks made a crude chair at some point and that's an object. . . . You mentioned objects like toasters and DVD players. **Such objects take billions upon billions of molecules combining in just the right shape using modern manufacturing processes that do not occur naturally,** and so are actually much more complex and unlikely than the first life which might have only been comprised of a few hundred naturally occurring molecules.
- G. Because **the odds for certain "simple" objects occurring by "time and nature" are much lower than you think they are. Objects don't pop into existence, and the processes for creating these objects are not simple. A pencil may be simple, but the process to create that pencil is incredibly complex.** Several elements from different parts of the world have to be brought together in a unique combination.
- H. Because **those things require a lot of intelligence, forethought, and intent to create.** Most objects like them are made using chemistry that is not organic chemistry, and while some parts of dvd players may by chance come about naturally, **it is absurdly unlikely for a dvd player, fully assembled, to appear in strata that are 3.5 billion years old, because the processes to form one naturally just aren't there.** Is it impossible for a dvd play to come about naturally? No. But it is extraordinarily, absurdly unlikely. Asymptotically approaching zero in a chance of that happening.

- I. Over time, anything that already has the possibility to happen increases. If the formation of simple life is a higher probability than “toasters in rocks”, then life will occur more often than the occurrences of toasters in rocks. In your case you’re asking we do not commonly see forks in rock strata. The reason is because while the structure of a fork is simple, there’s already a simpler structure: iron ore. Forks do not pop into formation fully formed. The odds of forks appearing as iron ore are much higher than iron ore arranging itself as a fork. There may be some planet, somewhere in the universe where iron ore is melted and reforms in the shape of a common fork, but the odds for such an occurrence are low enough that it’s unlikely we’ll ever find such an occurrence.
- J. Finding a fork in the wild (which was not made by humans) would be evidence that forks are a naturally occurring phenomenon. Forks are not natural though, but they are made by people and machines. Metal doesn’t occur in pure form either, it occurs in ores where the metal is mixed with the rock. You melt it down and get the metal out of it, which you then use to make a fork. Ore is found deep down in the earth, which is why we have to dig mines to find it. A fork would not survive at these depths, because it would be compressed into a non-fork.
- K. Strawman. No one believes in this “Power of Billions” gibberish.

3) If finding an object as simple as a 4 billion-year-old fork would be evidence of design, why isn’t finding 4 billion-year-old life likewise evidence of design?

- A. The first living organisms would have been very simple. Just enough to replicate themselves, which would require a relatively small amount of DNA. We know that the building blocks for DNA naturally form in the simulated environments similar to prehistoric earth. So **it seems possible that these building blocks came together by chance into a structure that could replicate itself**, creating the first basis of DNA or more likely RNA.
- B. A random universe didn’t produce life as we know it, by chance. **Randomness produced the first life**, and then life evolved in a manner that we have plenty of evidence for. **Evolution isn’t a random, chance thing**. Evolution is a process where organisms that are better at reproducing will reproduce more . . . As they reproduce, they change slightly, so that after a long time, we have things that are good at reproducing. This isn’t random, this is a slow transition governed by a natural, well understood process. If we see some objects, all of which appear designed (to you), we look at them more closely. We study them. We find out that complex objects can arise without design if they can self-replicate in a way that encourages the species to become more fit.
- C. Because if a solid answer to abiogenesis is proven, it’s likely such an occurrence doesn’t require life popping into existence fully formed (i.e. irreducible complexity), as you seem to picture forks, DVDs, toasters, and pens come from. **Reproduction allows chemical reactions among things that would hardly be called “life” to build upon itself until something becomes complicated enough to actually be considered life**.
- D. We can prove the Prokaryote made other Prokaryotes, and on and on, until we ended up being the descendents of one of the first Prokaryote. We can see the evidence in the DNA. So we know that complicated biological things like us, can be made by things quite like us, our parents. **A calculator doesn’t make other calculators of course, so it needs to be designed by a non calculator**. We don’t design our

children, we naturally mix the new DNA when we replicate and split that off into a womb. So we trace our amino based DNA back until what? We see it get simpler and simpler and simpler. We watch cells split and copy that simple DNA. Then we ask the question, if we go back far enough, when did the first split happen right? And that first DNA just needs to be a collection of amino acids that formed a pattern that eventually broke into two similar patterns. In those strata we see amino acids. We see the 'designer', the tools. The inorganic ingredients became organic the second they inorganically formed a pattern that split. Crystals form patterns inorganically too, they just don't like to split. So goes the abiogenesis theory. Inorganic, organic. The difference is one we define, but we are made of the same materials that inorganic things are. We are inorganic matter that replicates. So **the only leap to make is to imagine a simple enough situation where something inorganic replicates. That's it.** If that can be imagined without design, then we don't need design.

- E. I can't imagine a calculator forming without help, but I can imagine amino acids chains replicating without help. After all, I'm just the latest model of that 'design' or 'natural process.' That would be like finding a calculator factory next to the calculator. The means for its creation is present. There is a huge difference between me and a calculator, and that is that I replicated here. There is no imagining a simple calculator that formed a better one. There is imagining a simple replicating cell that formed a better one by dividing in two. The amino acids make the difference in the logical deduction between the two cases. Complexity doesn't matter, because evolution shows us that complex things form from simple things. So **we only need to imagine the simplest replicating thing possible, and we can explain a complex Prokaryote, and us, as undesigned.**
- F. I'd say **the production of something similar to extant single-celled life is impossible for non-evolutionary natural processes.** In current theories of abiogenesis, cellular machinery is not expected to come about all at once. I imagine most researchers would agree that they are looking for the chemistry and processes that started evolution. Once evolution begins, **the additional complexity can arise as a consequence of it randomly producing useful features sometimes.** If we eventually found a natural process that could have happened on early Earth that produces DNA-based life, I would consider the design inference, as it applies to life, rebutted as unnecessary.
- G. **The "simpler seemingly designed" objects, at least all the things you mentioned, have never been observed to appear in nature without some designer we can trace back to.** We see things that are a good portion near those objects, like a long stone with a sharp edge can seem like a knife. But every modern object you described I can think of was never seen in nature just lying around without someone who made it.
- H. Because of basic and innate differences. We understand how and why the life evolved as a result of very simple rules. We have no such outcome using these rules for forks. Forks look and appear designed. Life looks and appears not-designed. Why and how could a person think it looked designed is a bit beyond me since it doesn't match, at all, any of the hallmarks of designed objects.
- I. Because **we know of no circumstances under which an object that we know for a fact was designed for our purpose would develop naturally.** We are slowly closing in on the circumstances under which life would develop naturally.

- J. You're wrong: there are a number of objects you can find in the world that would appear to be designed. You can find a particularly sharp stick, a really pretty flat rock, or a cloud that looks like my grandmother's purse.
- K. A clearly recognizable fork which is as old as you mentioned would be a sensation because, as I said in my first answer, we have never seen a fork just appearing without a "fork manufacturer". But we see life developing and procreating everywhere around us. What we don't see are DVD players, pens, scanners and everything else you mentioned appearing in our world just because the materials needed for it lying around in the same spot.
- L. Because we know metals don't arrange themselves in the same way that the organic molecules that life is composed of do.
- M. We can usually tell an object is designed because we know or have history of the designer. If you find a soda can in the forest, you can reason it was designed because we know soda can designers exist and no one has yet been able to simulate a soda can occurring naturally.
- N. One of the primary methods we use to determine if an object is designed is to compare it to the natural world. A large part of this comparison comes when we try to see if the object naturally forms/replicates in nature. So when we find a rock, we see that rocks naturally form out in nature (without outside intervention), so we can safely conclude that the rock is natural. However, when we find a metal fork, we find that metal forks don't naturally form in nature, and so rightfully conclude that the fork is unnatural, and thus likely designed. With regard to life, all of the evidence thus far has pointed toward the conclusion that life forms/replicates in nature without an outside agent. Leave a tree seed in a field, and (assuming preferable conditions) when you come back several years later, there will be a forest. **The only thing about life that can come close to hinting at design is the complexity of many organisms** – however we would be faulty to jump to the conclusion of design based solely on this trait (to do otherwise would be committing an assumption from ignorance along with assumption from incredulity).

Your Answer:

How to Win Dawkins' Challenge: The Rules

If you think that winning the *Challenge* is intimidating, remember this: the above sub-challenges are just a small subset of the issues that are out there regarding the origin of life problem. Many more could be constructed.

My best guess is that no one is going to take on this *Challenge*, but then again, you never know. If someone does want to take on the *Challenge*, then here are the rules of the game. There are two modalities:

1. I'm the Judge
2. You Pick the Judge

Yes, that's right, if you you don't want me to be a judge in my own cause, that's no problem at all; just take the second modality, and then you can pick whatever judge you like to review your *Challenge* entries. In fact, you can even pick yourself! You can be a judge in your own cause! Sounds great, right? How can you lose?

Well, actually, you can. No matter who is the judge, the initial determination made by any judge, you, me, or someone you've picked. must be reviewable by an Arbitrator. If the initial amount is set at \$500, that is the amount that the losing party must pay. If the losing party wishes to appeal, the case will be sent to an arbitrator, and if the arbitrator upholds the decision, the person must now pay 10 times that amount, or \$5000. If the arbitrator reverses the decision, the initial amount of \$500 will be rewarded.

1. NAME DESIGNATION: The party initiating the action shall be known as the "Challenger," the party to respond to the action shall be known as the "Defender." Until further notice, the "Defender" is Barry Krusch.
2. SUBJECT MATTER: See this document.
3. NUMBER OF ACTIONS: The Defender will only respond to one action at a time.
4. RULING AUTHORITY: The judge is Barry Krusch.
5. ACTION TYPE: Documents-only.
6. LOCATION OF ACTION: Because the action is documents-only, the location is virtual, and documents shall be sent to wherever the Virtual Juror resides.
7. AWARD AMOUNT: Provided in the YouTube Description
8. FILING FEES: Filing fees and all costs to be ultimately paid by the losing party after an initial split.
9. COST REIMBURSEMENT: The prevailing party will be reimbursed for all costs by the losing party after the action within 2 weeks of the decision.
10. ESCROW ACCOUNT: All amounts to be awarded, including the award amount and all costs, will be placed into escrow accounts by the parties prior to submitting materials.
11. NOTIFICATION: A party will begin the process by initially notifying Defender through forum notification, later a FedEx to attorney. Challenger to respond in kind.
12. DOCUMENT SET: The document set will consist exclusively of materials written by the parties, referencing other materials as needed.
13. ENFORCEMENT: All clauses required to make the action enforceable will be included by the parties' attorneys.
14. ADDITIONAL RULES: TBD, as parties agree.