Mathematics & Evolution

Proponents of neo-Darwinian evolution (NDE) generally argue that at some point in the universe's history inorganic matter combined in such a way as to create amino acids which in turn created proteins to allow for the development of the universe's first cell. From this original cell, reproduction occurred and over time mutations and natural selection brought about the biological world as we now know it.

Mathematics would suggest, however, that believing in such a chain of events is simply not plausible. In fact, so implausible is such a scenario that if one were to stake their belief in the origins of life on such, it is quite certain that she would also have to believe any assertion put forward throughout history. Let me explain.

The living cell is made up of whole host of parts. Among these are DNA, RNA, amino acids, and proteins. Proteins have very specific functions in the cell and must be made by an exact combination of amino acids. This exact combination is guided by a very specific sequencing of the bases in the DNA, which is then transcribed by the RNA, so that protein development can occur.[1]

The number of amino acids used to build even a simple protein is significant (about 150) and these amino acids must be in a perfect sequence in order for a protein to become functional. In a series of articles published between 1996 and 2004 in the *Journal of Molecular Biology, Biochemistry* and the *Proceedings of the National Academy of Sciences*, Douglas Axe was able to substantiate the odds of such sequencing at 1 in 10^{74}.

Compounding these odds is the unlikelihood of only peptide bonds occurring between the amino acids and of the amino acids all being of the "left handed" variety (all of which is necessary for the process to work). The odds of each of these two factors occurring are each 1 in 10^{45}. All together then the odds of amino acids creating a simple protein are 1 in $10^{45+45+74}$, or 1 in 10^{164}. To give a sense of just how large this number is, consider that there are only 10^{80} elementary particles in the universe. This means that you would have a trillion, trillion, trillion, trillion, trillion, trillion, trillion, trillion greater chance of picking a single lottery-winning atom in the universe than you would of seeing amino acids form a single protein.

Now as fantastic as those odds are, we are only just beginning. The simplest cell needs about 250 different kinds of proteins to carry out its functions. This means that one must take the number 10^{164} and multiply it by itself 250 times in order to calculate the odds of a single cell coming into existence, which when completed amounts to 10^{41000}. Remember there are only 10^{80} elementary particles in the universe, making the odds of 1 in 10^{41000} unfathomable.

It's at this juncture in the argument that proponents of non-directed evolution often argue that given the age of the universe there are so many opportunities for amino acids to combine in just the right order that the odds of 1 in 10^{41000} really aren't that insurmountable. But let's see if that is the case.

According to physicists the transition of physical entities from one state to another can only happen so fast. That is, transitions cannot happen any faster than light can travel through the so-called Planck length of $1/10^{33}$ centimeters. Given the speed of light and the gravitational constant, the shortest time in which any physical effect can occur is a mere $1/10^{43}$ of a second.

Considering that we have a good idea of the number of particles in the universe (10^{80}), the amount of time since the Big Bang (10^{18} seconds) and the number of possible interactions per second (10^{43}), it is easy to

calculate the number of possible interactions that could have taken place since the creation of the universe: $10^{80+18+43}$, or 10^{141}.

So then, let's put our two numbers together. The number of possible interactions in the universe since the universe started is 10^{141} while the odds of a single cell coming into existence are 10^{41000}. That means that even though there have been a huge number of chances for interaction among particles since the universe began, the odds of a single cell coming into existence by chance is still only 1 in $10^{41000-141}$, or 1 in 10^{40859}. These kinds of odds, of course, still make the belief in an unguided evolutionary process rather ridiculous as it calls us to believe in something as "fact" that only has a 1 in 10^{40859} chance of having even started.

But that is not the whole story. In calculating the odds of 1 in 10^{40859} of a single cell coming into existence, we made a lot of assumptions. And these assumptions would stretch the odds even more that NDE is responsible for the biological diversity we have today, as well as the existence of humans. These assumptions include the idea that at every possible expanse of time in the universe in which interaction between elements could have taken place all of the elements in the universe were indeed interacting with one another. They also include the idea that none of the combination of elements produced along the way would be harmful to the single cell that was produced or that chemistry could actually take place at a speed approaching Plank-time.[2] Or consider the assumption that the atmospheric conditions of the universe were even conducive to creating a single amino acid in the first place. Contrary to the much touted, but falsified Miller-Urey experiment, the Earth's early atmosphere simply does not give us confidence that many if any amino acids could have randomly been created in the first place. Furthermore, while the odds of a single cell coming into being are truly absurd, they only account for the development of a single cell. What then are the odds that from that single cell all of today's complex plant, animal, and human life evolve in the relatively short life of the Earth?

I wonder what your reaction is to all this math. For over a century now we have been told that the best explanation (indeed the only "factual" and "scientific" explanation) for the origin of life is one that at best has only less than a 1 in 10^{40859} of being possible. To understand the shortcoming of this sort of education, consider what would happen if every theory and idea we were told to adopt only needed to have a similar probability of being right. No doubt we would be forced to teach our kids that Ronald Reagan was a myth, that grizzly bears once lived on the moon, and that they only imagined you were reading this article.

Please understand that what these numbers imply is not a new finding. Within little more than a decade of the discovery of DNA, the world's best mathematicians, engineers, and physicists recognized the outrageous odds of random chemical activity generating the biological information needed for life. In 1966, many of them met at the Wistar Institute in Philadelphia to discuss the problem. The conference was titled "Mathematical Challenges to Neo-Darwinism" and there it was recognized that because of the sheer number of possible bases and amino acids the random formation of a new gene or protein is not plausible. As the decades have gone by there has been nothing new discovered that would give reasons to throw out their conclusion. In fact, the more we know about the complexity of DNA and cellular activity, the more certain one can be that the odds of life by chance is not plausible.

One might ask, "If the theory of evolution is so extraordinarily tenuous, why does anyone believe it?" I think there are two answers to this question. First, there are those who refuse to consider any other options. To do so would open up the door for the Divine, and this is not acceptable. As atheist Harvard biologist, Richard Lewontin, wrote:

> We take the side of science in spite of the patent absurdity of some of its constructs, in spite of its failure to fulfill many of its extravagant promises of health and life, in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have an *a priori* commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce

material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door.[3]

Secondly, some who have never really thought of the God question, have simply been part of an educational system that has been successful at indoctrinating students from the youngest ages. Thus, they have felt that NDE is a foregone conclusion without any real examination of the evidence.[4] If they were exposed to not only the mathematics presented here, but other evidence as well, public support of NDE would likely fade. For one simply has to look at the fossil record to see a lack of transitional life forms, an explosion of phyla in a very short-period of time, the absence of a conducive "pre-biotic soup," or the existence of human consciousness[5] to recognize that something is seriously amiss with the theory of NDE regardless of the numbers.

Notes:

[1] Much of the scientific information in this article is from Stephen C. Meyers, *Signature in the Cell*, chapters 9 & 10.

[2] Chemistry can't happen faster than atoms can move. Hydrogen is the most massive and fastest of the atoms. Since the vibrational frequency of a hydrogen molecule (which is made up of two hydrogen atoms) is only 1/1014 seconds, it is probably safe to assume that the smallest period of time in which a chemical event could take place is not Planck time ($1/10^{43}$) but $1/10^{14}$ seconds. This means that the number of possible interactions that could have taken place since the creation of the universe should probably only be $10^{80+18+14}$, or 10^{112}, which further decreases the possibility of the NDE process beginning by giving less "rolls of the dice" so to speak. For the sake of simplicity, however, and to give NDE the best chance at happening, I stuck with Plank time in this argument.

[3] Richard C. Lewontin, "Billions and Billions of Demons," *The New York Review of Books* (July 9, 1997).

[4] See, for example, Sarah Chafee, "Evolution in Kindergarten," *Evolution News & Views* (April 16, 2016), http://www.evolutionnews.org/2016/04/evolution_in_ki102776.html.

[5] See Casey Luskin, "Welcome to the Top Ten Problems with Biological and Chemical Evolution, *Evolution News and Views* (January 2, 2015), https://evolutionnews.org/2015/01/the_top_ten_sci/