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The Extraterrestrial Search for the Origin of Homochirality

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Abstract

For many years, naturalistic scientists have assumed that chemical evolution is the pathway by which life first originated. However, chemical evolution has not been able to explain how chemical reactions could have produced homochiral biomolecules outside a laboratory setting using only natural processes. The search for the origin of homochirality has presented itself as a mystery to the evolutionists because in chemistry there is no known chemical procedure or natural process that can generate new homochirality without preexisting homochirality already present. The need for preexisting homochirality to produce new homochirality and the inability of natural processes to explain the formation of new homochirality has caused evolutionists to take their search for the origin of homochirality into outer space. Some evolutionists now propose that amino acids of deep-space origin were deposited on the surface of rock fragments, irradiated, and enantiomerically enriched with circularly polarized ultraviolet light from starlight and that these newly enriched left-handed amino acids were brought to earth on meteorites. However, the evolutionary explanation for the origin of homochirality is not supported by the current scientific literature, and a critique of their proposed explanation is presented. Ultimately, the mystery of the origin of homochirality vanishes when we accept God's creative design on life.

Introduction

In Genesis 2:7, the Bible tells us that God made man from the dust of the ground. God then blew into man's nostrils the breath of life, and man became a living soul. The phrase "dust of the ground" perhaps refers to the chemical elements created on Day 1 of Creation Week. Creationists and evolutionists alike recognize that living organisms are made of chemicals, but the disagreement is on how life originated from those original chemicals. Genesis 2:7 clearly states that God brought man to life from the dust of the ground, but evolutionists claim that life originated from those original chemicals by natural processes. If evolutionists are correct, the formation of every aspect of living organisms should be explainable by chemical (natural) processes; but if

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creationists are correct about a supernatural creation, then we should see evidence for unnatural happenings or occurrences not explainable by chemical or natural processes. The presence of homochirality in living organisms is such an example in favor of supernatural creation. *Chirality* is a term meaning *handedness*. When a carbon has four different attached groups (a chiral carbon), the molecule containing that chiral carbon has two (or more) possible mirror image configurations in which it can exist. The term *homochirality* refers to that molecule, which, when found in living organisms, exists only in one of those mirror image configurations (e.g., DNA, proteins, amino acids, etc.). For a review of homochirality, see Coppedge (1971), Helmick (1976), and Murphy (2013).

Amino acids, proteins, DNA, RNA, and polysaccharides are the major biochemical molecules responsible for maintaining life in plants, animals, and humans. All of these biomolecules (and others) possess unique homochirality. Living organisms cannot exist with mixed or random chirality (Breslow, 2012). The homochirality observed in each of these biomolecules is 100% specific for that molecule without any evidence of racemization or mixed chirality. Although some mutations are known to change the amino acid sequence of a protein or the nucleotide sequence of a DNA strand, these mutations never form chiral mistakes; and even the mutated portion of the protein or the DNA strand maintains the correct homochirality for that protein or DNA sequence.

The fact that chirality is different in every chiral biochemical molecule makes it impossible for evolutionists to establish an origin, because the word "origin" implies a single initial source, cause, or event responsible for all subsequent occurrences. For the evolutionist, there cannot be a single source, cause, or event that explains why these biochemical molecules have different chirality, why some molecules have carbons with the "S" configuration while other carbons have the "R" configuration, or why only one unique configuration of chirality (out of many) is present in these chiral molecules. For these reasons, the "origin" of homochirality in living organisms has been a mystery to scientists searching for a naturalistic (atheistic) explanation. Cairns-Smith (1982) pointed out that the origin of homochirality was what he called the "nub question" because until that date, "there was no generally accepted answer to this question." Cohen (1995) quotes W. A. Bonner, who, at the February 1995 "Physical Origin of Homochirality in Life" conference at Santa Monica, California, argued that there is a "gap between the origin of homochirality and the origin of life," and after 25 years of searching, he could not find any evidence to bridge that gap. Cohen has remarked that "the origin of this handedness is a complete mystery to evolutionists" (Cohen, 1995, pp. 1265–1266). Even recent articles citing Pizzarello (Arizona State University, 2008; Astrobio, 2008) and Fukue and Tamura (2010) still acknowledge the presence of homochirality in biochemical molecules as a mystery. Today scientists have a better understanding of molecular biology and biochemistry, better technology and equipment, and newer research techniques than did Cairns-Smith, Bonner, and Cohen, but the origin of homochirality is still a mystery, and the gap acknowledged by Bonner is as wide and deep as ever.

Although some skeptics wish to equate the chance formation of left-handed amino acids from a chemical reaction with the chance occurrence of heads from a coin toss, the presence or lack of homochirality in a molecule is not a chance happening. All chemical reactions creating a chiral carbon, regardless of mechanism, force the chiral carbon to exist as a symmetrical intermediate or to go through a planar transition state as it forms the fourth bond to carbon. Before the fourth bond is formed, the carbon's molecular structure is deficient in electrons, causing the molecular orbitals to change hybridization, creating a plane of symmetry. Once symmetry is formed, the capability for generating new homochirality at that carbon atom is immediately and permanently lost. If life's biochemical molecules were formed by natural chemical processes, each chiral carbon would be a 50/50 mixture of chiral isomers (Figure 1), but that is not seen.

Equally troubling for the evolutionist is that there is no known chemical reac-

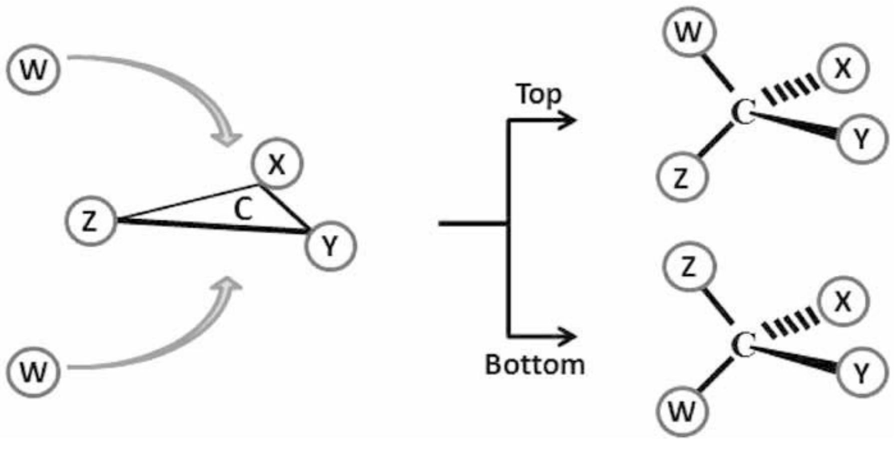

Figure 1. Planar transition state forming racemic mixture. Note that the mirror image products (top and bottom) cannot be superimposed onto each other.

tion capable of forming new homochirality without preexisting homochirality. In all living systems, chiral molecules are formed by specific enzymatic reactions, but enzymes are also molecules containing chirality. Enzymes, like proteins, are polymeric chains of left-handed amino acids, and in all living systems, left-handed amino acids are made from other chiral enzymes. In the laboratory, organic chemists can prepare homochiral organic molecules, but in these processes, the starting materials, the catalyst, or the environment of the chemical reaction must contain preexisting homochirality. When preexisting homochirality is present, the carbon atom never has a plane of symmetry, new homochirality can be generated, and existing homochirality will not be lost at that carbon.

Here is the dilemma for evolutionists: because chirality is a physical property, the factors responsible for a chemical reaction to occur are different than the factors responsible for generating new chirality. In the laboratory, the formation of new chirality in a molecule would require a chemical controller to direct and control the chemical reaction, select reactants that contain preexisting homochirality, and perform the reaction so that the creation of a plane of symmetry is avoided. In a natural setting (the evolutionary hypothesis), there is no chemist, and there is no preexisting homochirality, meaning that life with homochirality cannot ever form by natural processes. By their explanation, first life allegedly came into existence by chemical reactions, but we also know that even the simplest one-celled organisms possess unique homochirality. Being unable to find a naturalistic explanation for the origin of homochirality on earth and unwilling to accept that life was supernaturally created, some scientists have taken their search for the origin of chirality into outer space, apparently hoping that the laws of chemistry are different there.

The Extraterrestrial Search

Daniel Glavin of NASA's Goddard Space Flight Center in Greenbelt, Maryland has reported, "We found more support for the idea that biological molecules, like amino acids, created in space and brought to Earth by meteorite impacts help explain why life is left-handed" (Astrobio, 2009). Ronald Breslow stated that "meteorites delivered the seeds of Earth's left-handed life" (Peplow, 2008). At the 235th National Meeting of the American Chemical Society, Breslow proposed that circularly polarized light is a type of energy that could be found in the radiation emitting from a neutron star; and as this circularly polarized light struck amino acids on the surface of a passing rock fragment, the right-handed amino acids on that rock were partially destroyed, leaving an enantiomerically enriched sample of left-handed amino acids on that rock fragment. According to these claims, the left-handed amino acids present on earth today exist because the right-handed amino acids present on those rock fragments were destroyed by space radiation (McKee, 2005), by circularly polarized light formed from Rydberg matter (Holmlid, 2009), or by a neutron star as they traveled through outer space (Peplow, 2008). Since it is claimed that left-handed amino acids are found in the carbonaceous material of some meteorites, some evolutionists claim that meteorites transported left-handed amino acids to earth.

These claims were based on a report that the amino acid isovaline was found to be enriched in its left-handed isomer in the carbonaceous material of the Murchison meteorite. Pizzarello (2006) and Pizzarello and Cronin (1997) have looked for enantiomerically enriched amino acids in the carbonaceous material of other meteorites, and similar findings were observed in the Orgueil meteorite. The finding of amino acids on a meteorite has led many evolutionists to believe in an extraterrestrial origin of amino acids, and the finding of isovaline enriched in its left-handed isomer in some meteorites supports (according to evolutionists) the claim that some kind of enantiomeric enrichment occurred in outer space. These findings, in addition to a report that circularly polarized light destroyed right-handed amino acids (McKee, 2005), provided the evidence evolutionists wanted for a naturalistic explanation for the existence of the chirality found in all living organisms.

Breslow (cited in Peplow, 2008) and Glavin (cited in Astrobio, 2009) were eager to suggest that amino acids have an extraterrestrial origin, but their explanation only shows how some amino acids could have come to earth. In addition, Glavin showed only that a "landed meteorite" contained amino acids; it is just as possible that those observed amino acids could have been transferred to the meteorite after the meteorite landed on earth. Many scientists are quick to accept Breslow's and Glavin's explanation for the origin of left-handed amino acids, even though the extraterrestrial origin of amino acids has not been fully established or even accepted by all evolutionists (Peplow, 2008). If we assume that the extraterrestrial origin and enrichment are valid explanations, then the scientific literature should be able to validate the following four points of their extraterrestrial hypothesis: (1) Circularly polarized ultraviolet light of the correct wavelength must be present in outer space. (2) This circularly polarized ultraviolet light must be able to destroy or remove right-handed amino acids. (3) The enantiomeric enrichment of meteoritic amino acids is real and extraterrestrial. (4) Meteorites must be a valid mechanism of transport for extraterrestrial amino acids to arrive on earth. These four points will now be examined.

Point 1: Presence of Circularly Polarized Light

Circular polarized light (CPL) has been detected in starlight, and is thought to be formed in outer space as starlight is scattered from elongated interstellar dust grains whose long axes tend to be oriented perpendicular to the galactic magnetic field (Fosalba et al., 2002). From this scattering of starlight as a source of CPL, these authors believe that in a star-forming region such as that found in the Orion Molecular Cloud, low-mass young stars could experience strong CPL of a single handedness when externally irradiated by light from a massive star. Since our sun is a low-mass star and the Orion molecular cloud is the closest star-forming cluster with both low-mass and high-mass stars, it is assumed that amino acids on a meteor passing through Orion or a similar nebulae brought amino acids with enantiomeric excesses to Earth. However, not just any circularly polarized light will provide the necessary enantiomeric enrichment in amino acids.

In the laboratory, enantiomerically enriched amino acids have been isolated after irradiation with circularly polarized ultraviolet light (UV-CPL) (Meierhenrich, 2005). However, UV-CPL has never been detected in outer space. Although Bailey et al. (1998) have discovered circularly polarized infrared radiation in a nebula, they admit that they have not discovered the required circularly polarized ultraviolet light or any evidence that amino acids are produced in nebulae. It is important to understand that the only existing UV-CPL light is a man-made "narrow band" UV light used in the laboratory (wavelength < 200 nm). Scientists have looked for UV-CPL at wavelengths less than 200 nm in outer space, but UV-CPL has never been detected at these wavelengths due to light scattering off of the dust particles (Fosalba et al., 2002). Furthermore, Chown (1999) has reported that light from stars covers a wide range of wavelengths (meaning broadband irradiation), and the overall effect of "broadband" irradiation on the handedness of amino acids (meaning enantiomeric enrichment) should be zero, a conclusion also reached by Bailey et al. (1998). Since the existence of "narrowband" circularly polarized ultraviolet light has not been observed outside the laboratory or in outer space, the requirement for an appropriate source of UV-CPL has not been established

There is another problem. In the laboratory, circularly polarized light is used to measure the optical rotation of a chemical molecule, a measurement accomplished in a polarimeter using a monochromatic sodium vapor lamp (589 nm). The light source in a laboratory polarimeter must be in very close proximity to the sample, but any UV-CPL possibly present and shining on an extraterrestrial rock fragment would not be in close proximity. If CPL is created by scattered light from dust particles in space, and these same dust particles prevent the long distance detection of UV-CPL, how close does a passing rock fragment have to be to the UV-CPL source in order to receive enantiomeric enrichment? The inverse square law of physics would tell us that the intensity and effectiveness of a light source irradiating a passing rock fragment would be inversely proportional to the square of the distance of the rock fragment from the source of irradiation. If there is such a light source capable of irradiating a passing rock fragment and providing enantiomeric enrichment to amino acids, that CPL light source would have to be extremely intense to overcome the large distance separation. However, there is no evidence of such a strong CPL light source. Serkowski, Mathewson and Ford (1975) measured the circular polarization of 180 stars. The maximum fraction of CPL (all wavelengths) found in the light from those 180 stars was 6×10^{-4} (0.0006), and the fraction of CPL from our sun is on the order of 10^{-6} (Kemp et al., 1987). Based on this data, the CPL that is present is weak, and there is no proof that circularly polarized ultraviolet light (UV-CPL) of sufficient intensity is even present in the measured CPL of starlight.

Point 2: Destruction of Right-Handed Chirality by UV-CPL

Meierhenrich (2005) reported that when a solid film of racemic leucine was irradiated with circularly polarized light at a wavelength of 180 nm, the product had a meager 2.6% excess of the left-handed leucine. Meierhenrich then concluded that the circularly polarized ultraviolet light selectively destroyed the right-handed leucine, leaving an excess of left-handed leucine. Chemically, it is interesting that a 2.6% enantiomeric excess of the leucine amino acid exists, but there was no evidence provided to support that (1) right-handed amino acids were physically destroyed or (2) that a chemical reaction created the slight excess of left-handed leucine. Whether any amino acids were physically lost or destroyed in this experiment could have been determined. Labeling studies could have been performed to determine if a portion of the original right-handed amino acids were no longer present. These experiments were not done. When we take into consideration the inverse square law, the anticipated enrichment for amino acids on a rock fragment passing a few million miles from a weak CPL source would be significantly less than the 2.6% enrichment observed in a polarimeter with a strong, monochromatic and proximal CPL light source. Although many scientists have accepted Meierhenrich's work as a general explanation for the origin of homochirality in amino acids, there is another possible explanation.

Circular dichroism can explain the small enantiomeric excess observed in Meierhenrich's experiment (Cerf and Jorisson, 2000). In circular dichroism experiments, it is known that left-handed and right-handed chemical molecules absorb circularly polarized light differently. The claimed 2.6% enrichment in

Meierhenrich's experiment may only represent a 2.6% difference in the ability of the different chiral isomers of leucine to absorb circularly polarized light. If the different chiral isomers of leucine are absorbing CPL differently, the observed 2.6% difference is not from extraterrestrial enantiomeric enrichment but from how the chiral isomers of leucine react to CPL light in the polarimeter. This makes the 2.6% difference a false positive result, putting it in the category of experimental error.

Even if Meierhenrich's conclusion is correct, this is but a small enantiomeric enrichment of one amino acid out of 20 naturally occurring amino acids. However, not all amino acids will respond to wavelength 180 nm CPL in the same manner. Cerf and Jorissen (2000) have shown that the amino acids tryptophan and proline do not show any enantiomeric enrichment when irradiated with right-handed or left-handed CPL. Tryptophan contains an additional aromatic group, and proline contains an extra carbonyl group. Chown (1999) has also reported that some wavelengths of UV-CPL preferentially destroy right-handed amino acids, while other wavelengths destroy left-handed amino acids. Since all naturally occurring left-handed amino acids could not have been formed by the same process or with the same origin, Meierhenrich's work is only an isolated example that works minimally for leucine. Based on all available evidence, the ability of UV-CPL to effectively destroy right-handed amino acids has not been established or proven.

Point 3: Enantiomeric Enrichment of Amino Acids

The evidential basis for the evolutionary origin of homochirality rests on the observation that unequal ratios of d- and l-isovaline were found in the Murchison and Orgueil meteorites. Glavin and Dworkin (2009) analyzed several meteorites and reported that l-isovaline appeared to be enriched over d-isovaline by about 18% in the Murchison meteorite, and about 15% in the Orgueil meteorite. All other analyzed meteorites landed in Antarctica where d- and l-isovaline were found with equal ratios. Although there could be several reasons for the unequal ratios, the authors propose that some kind of extraterrestrial enrichment such as described by Meierhenrich is responsible for the observed unequal ratios of d- and l-isovaline on those meteorites, even though l-isovaline is not a naturally occurring amino acid. The authors did not address the nonuniversal occurrence of unequal ratios of isovaline but instead suggested that enriched isovaline had implications for understanding the origin of life. To evolutionists, these findings confirmed their assumption that amino acids originated in outer space, as, for the first time, there appeared to be evidence for the extraterrestrial generation of new homochirality in those amino acids. However, proposing a universal explanation for the origin of homochirality on questionable results from only two studied meteorites is risky.

The evidence for alleged enrichment in these meteorites is based on a GC-MS chromatogram, where the peaks for d- and l-isovaline (peaks 9 and 11 in Figure 2, after derivatization and fluorescence detection) appear to be present in unequal amounts, unlike the peaks of racemic amino acids that would appear as two peaks of equal ratio. Although the GC-MS peaks for d- and l-isovaline are

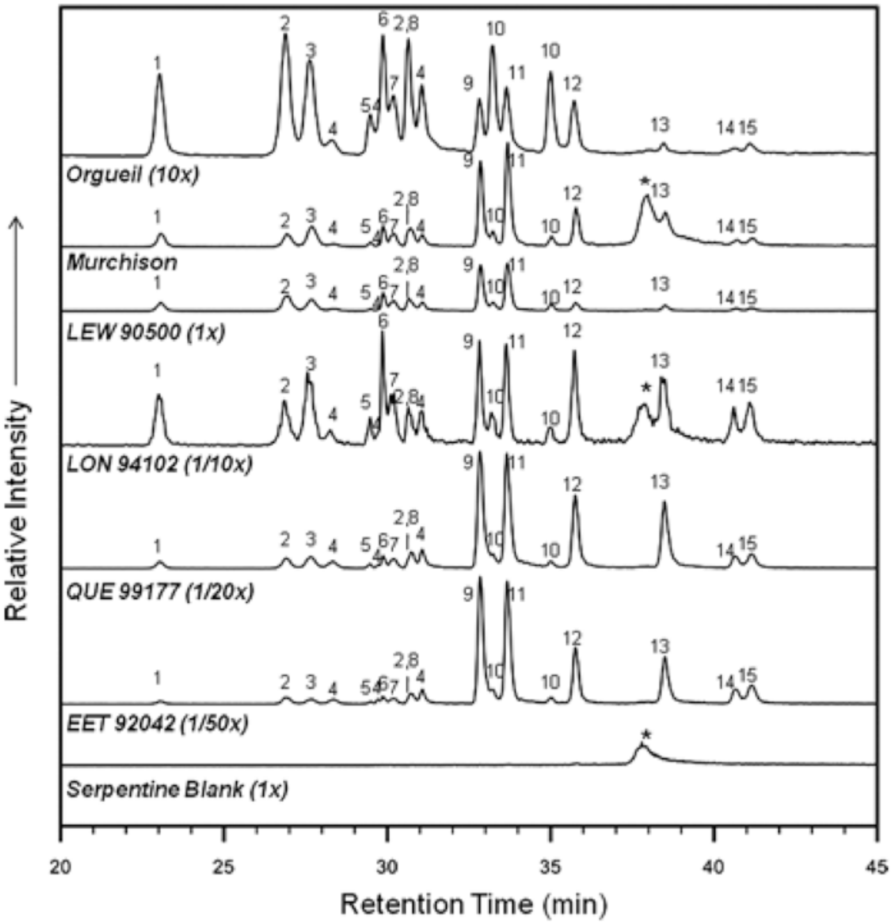

Figure 2. GC-MS Chromatogram of meteoritic C-5 amino acids

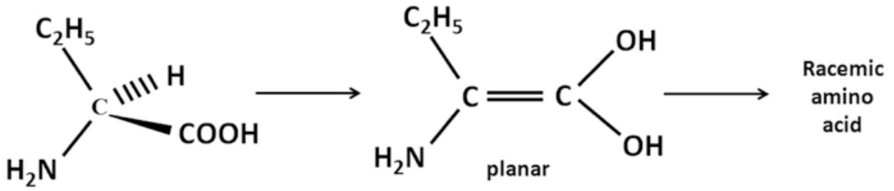

Figure 3. Racemization of amino acids via enolization.

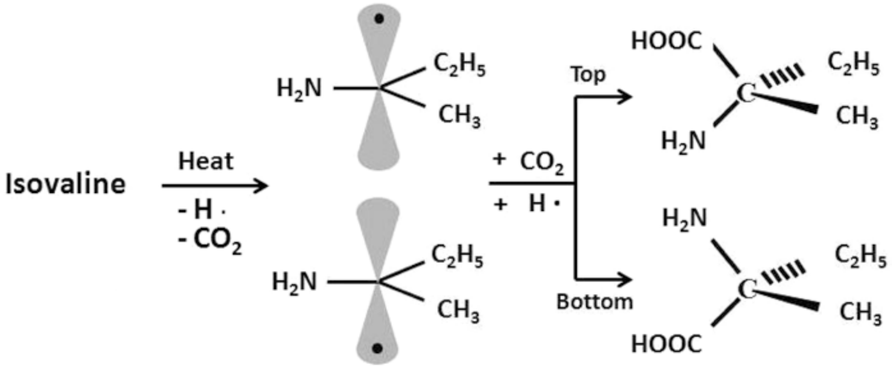

Figure 4. Racemization of isovaline with a planar intermediate indicated.

clearly separated from each other and the GC-MS peaks are identified, the authors could not rule out the possibility of amino acid contamination during collection, storage, or handling of the samples. Since isovaline is present only in parts per billion concentrations (or less), potential contamination of the sample is a major concern. Even if there is an unequal ratio of peaks 9 and 11 in the GC portion of the chromatogram, the presence of unequal ratios for isovaline does not prove an extraterrestrial enrichment of isovaline or for any naturally occurring amino acid. The presence of unequal ratios of isovaline isomers may sound like it supports the evolutionary assumption of extraterrestrial enrichment, but isovaline has a very different structure than all of the other naturally occurring amino acids; l-isovaline is an amino acid that has a methyl group bonded at the alpha carbon, where all natural amino acids have one C-H bond. The authors acknowledge that isovaline is difficult to racemize, but then they use this difficulty to racemize to suggest that the other natural amino acids were enantiomerically enriched prior to entering earth's atmosphere. To claim that isovaline's difficulty to racemize is the rationale for the presence of other enantiomerically enriched amino acids in meteorites is just plain wrong for three reasons: First, extraterrestrial enrichment has not yet been proved. Second, isovaline is not an amino acid found in natural proteins, and its inability to racemize does not automatically mean that enantiomeric enrichment was present in natural amino acids. Third, isovaline does not racemize the same way as other natural amino acids. Natural amino acids racemize at the alpha carbon by enolization of the carbonyl group, starting at temperatures of about 100°C (Figure 3). Isovaline cannot racemize without breaking a bond at the chiral carbon; and once that bond is broken, the chiral carbon atom of isovaline becomes a free radical. These free radicals can only form racemic isovaline, if it reforms at all (Figure 4). Therefore, the discovery of unequal ratios of isovaline does not support the theory that isovaline was racemized from an originally enriched form, which leaves open the possibility that isovaline was racemic and contaminated.

Glavin and Dworkin (2009) tried to dismiss earthly contamination because the d- and l-isovaline in the Murchison meteorite did not display any significant difference in their ^{12}C /^{13}C isotopic ratios (see also Pizzarello, Zolensky, and Turk, 2003). The claim of no earthly contamination is based on the assumption that isovaline was originally extraterrestrial and any earthly contamination would have changed the ^{12}C/^{13}C ratio of the enantiomers. The claim that d- and l-isovaline have the same isotopic ratio only confirms that both enantiomers have the same source, which does not disprove earthly contamination. In order to validate the authors claim, scientists would have to acquire isovaline of provable extraterrestrial origin, and that has not been done! These authors also try to show that very little terrestrial contamination could have occurred because valine, a natural amino acid, is found in many meteorites to be racemic. The presence of racemic valine in a meteorite does not automatically mean that valine had an extraterrestrial origin. The presence of racemic valine could have resulted from earthly contamination if the earth-based l-valine was racemized by the residual heat from the meteorite. Meteorites have been reported to be hot, warm, or cold to the touch after landing. Carter (2002) mentions that meteorites have singed grass and burned people upon contact, but it is not known whether the Murchison and Orgueil meteorites were hot, warm, or cold upon landing. Furthermore, the heat resulting from the kinetic energy of a meteorite impacting earth should cause some racemization of the natural source amino acids hit by the meteorite. These authors may want to believe in an extraterrestrial enrichment of l-isovaline based on this discovery, but all they found were two peaks of unequal ratio. Whether these two peaks were unequally formed by enantiomeric enrichment or by some other process has not yet been established. Even if the claim of enantiomeric enrichment is valid, this only shows that isovaline became enriched, not where or how it became enriched.

Until we understand the true reason for why unequal ratios of isovaline exist, we cannot assume that racemic isovaline was extraterrestrially enriched by any process. Unfortunately, Glavin and Dworkin have assumed the enrichment of l-isovaline to be a fact and have proposed that this extraterrestrial l-isovaline was the source of the original homochirality that sparked life on earth. Because of such claims, there are now publications showing how l-isovaline can induce chirality into left-handed amino acids (Breslow, Levine, and Cheng, 2010) and how left-handed amino acids can induce chirality to make right-handed sugars (Pizzarello and Weber, 2006). Since the extraterrestrial enrichment has not been established, further research is clearly needed to understand the reason for the unequal ratio of isovaline enantiomers in those meteorites.

Point 4: Meteoritic Transport

In order for extraterrestrial amino acids (including isovaline) to come to earth on meteorites, those amino acids must have survived the very high temperature of those rock fragments as they entered Earth's atmosphere. Although the meteorite may start out very cold (being from outer space) and requires only seconds to enter earth's atmosphere and land, we know that the surface of meteorites is burned away during entry. The temperature of meteorites at the time of atmospheric entry has been estimated to be about 1650° C, which is much higher than the temperatures needed to burn amino acids. Whether enriched or not, or whether burned or not, any amino acid present on the surface of an extraterrestrial rock fragment would be stripped away, along with the surface of the meteorite, during its entry into our atmosphere. This fact creates a problem for extraterrestrial thinkers. Amino acids found in a meteorite (assuming no earthly contamination) could have been present only inside the original extraterrestrial rock fragment, not on the surface of the rock fragment, while it was in outer space. If amino acids were inside the rock fragment while traveling through outer space, the question remains how those extraterrestrial amino acids got to the inside of a rock fragment and how circularly polarized ultraviolet light could have irradiated the inside of a rock fragment while it was traveling through outer space. More importantly, how could enriched isovaline have any impact on the origin of life on earth if it is only present inside a meteorite? The known information about meteorites makes it difficult to believe that meteorites are a mode of transportation to bring life to earth.

Biblical Creation Is Affirmed

Although the extraterrestrial existence of racemic isovaline cannot be ruled out from the data in these articles, this information only suggests that racemic (not enriched) isovaline might be present in outer space. However, the presence of amino acids in outer space does not necessarily validate the theory of evolution. It is well known that certain gases and other chemicals are present in outer space (certain comets, the rings of Saturn, planet atmospheres, etc.), and there is no debate on this point. However, the presence of chemicals in space and the formation of life from those chemicals are two totally different statements; only the former is fact. Since the origin of homochirality is directly tied to the origin of life, one origin cannot be known without knowing the other. Evolutionists may claim that amino acids are the precursors to life, but scientists have never scientifically proven that life could have originated from any amino acid from any source! Although the presence of homochirality in chiral biochemical molecules is difficult for evolutionists to explain, homochirality is not the only evidence that rejects the evolutionary hypothesis. There are other laws and facts of chemistry that literally prevent the formation of proteins from l-amino acids (even if they were present on earth) because the chemical reactions needed to accomplish the formation of proteins do not work as evolutionists propose. Amino acids do not exist in solution in a form where they can react to form proteins, and the physical properties of proteins do not allow their formation in a primordial watery soup (McCombs, 2014). Evolutionists may propose gradual changes over millions of years as a mechanism to form life, but these hypothetical changes cannot change the laws and facts of chemistry or allow otherwise impossible chemical reactions to occur. Since the evolutionist explanation cannot satisfactorily explain the presence of homochirality in living organisms, the best explanation for the origin of homochirality and the origin of life is creation *ex nihilo* by the word of our almighty God.

Conclusion

Four points were presented that would have to be true for the evolutionary explanation to be validated, but not one of the discussed four points has any precedent in the chemical literature, and the validity of these four points was never demonstrated or scientifically proved. If space radiation and circularly polarized light can destroy right-handed amino acids—if circularly polarized ultraviolet light is even present in outer space—and if meteorites brought these left-handed amino acids to earth, these articles have done nothing to prove their claims. The authors of these articles have extrapolated well beyond the observed evidence to establish their conclusions, and for this reason, the origin of homochirality has not been shown to be extraterrestrial. The key point to explain the different ratios of isovaline as being the result of extraterrestrial enrichment was never established. The one point that could add validity to the evolutionary model was never proven, only accepted as fact by the authors.

As evidenced by these articles, there is a growing and alarming trend by some scientists to believe that symmetry-breaking processes are permitted and possible concerning the generation of new homochirality. Symmetry is part of the laws of math, chemistry, and physics, and as a law of science, there cannot be exceptions to these laws. Nothing in the scientific literature would suggest that the laws of chemistry and science are different in outer space, and nothing in the scientific literature supports the claim that a symmetry-breaking process is even possible. The need for symmetry-breaking exceptions in order to explain the origin of homochirality should never be part of a "natural process," and any explanation incorporating such exceptions cannot be considered as validated or proven! It is only intellectual stubbornness that prevents evolutionary scientists from evaluating a creation hypothesis (or even any other hypothesis) for the forming of the unequal ratios of isovaline by processes that do not break symmetry.

The Bible tells us that God made man from the dust of the ground. It was God who made the man living, not the dust of the ground. Everything about living organisms—how they are designed and how they function—is truly a miracle of God-sized proportion; and to believe that the creation of all life, along with the homochirality life possesses, could have originated by "natural processes," as suggested by these authors, is only wishful thinking. If life's chiral biochemical molecules truly originated by natural processes as suggested by evolutionists, then every aspect of life, including homochirality, must be explainable by those natural processes; but the scientific evidence does not show that to be true. If natural processes actually formed the chiral carbons of the biomolecules, then every chiral carbon would be a 50/50 mixture of the two possible diastereomers, but the scientific evidence does not show that either. Biblical Creation is the only model of origins that can explain why every chiral biochemical molecule in every living organism contains only one unique configuration of homochirality, even though there are many other possible configurations. Indeed, 100% homochirality is a required property of all living organisms, and life would not exist if these chiral biochemical molecules were formed by purely natural processes.

When all of the facts are considered and the evidence is properly interpreted, there is no mystery concerning the origin of homochirality. The only possible way for unique homochirality to exist in the chiral biochemical molecules found in living organisms is for those biomolecules to have been created with unique homochirality when that organism was first created. Just as a fingerprint identifies its creator, God created all plant, animal, and human life with His fingerprint of homochirality. God intended for His creation to be clearly seen, not explained by natural processes! More than any other evidence, the presence of homochirality in living organisms did more to convince me of the reality of an all-powerful Creator. I hope it will do the same for you.

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