Wk 3: Origin of life, polymerization, quantum, chirality, instability, Mars, synthetic, hydrothermal, other planets, Hoyle

Origin of life

An explanation of what is needed for abiogenesis (or biopoiesis)

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Introduction

The origin of life is also known as abiogenesis or sometimes chemical evolution.

Life is based on long information-rich molecules such as DNA and RNA that contain instructions for making proteins, upon which life depends. But the reading of the DNA/RNA to make proteins, and the replication of DNA or RNA to make new cells (reproduction, the mark of ‘life’) both depend on a large suite of proteins that are coded on the DNA/RNA. Both the DNA/RNA and the proteins need to be present at the same time for life to begin—a serious chicken-and-egg conundrum.

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Thus, the origin of life is a vexing problem for those who insist that life arose through purely natural processes (physics and chemistry alone).

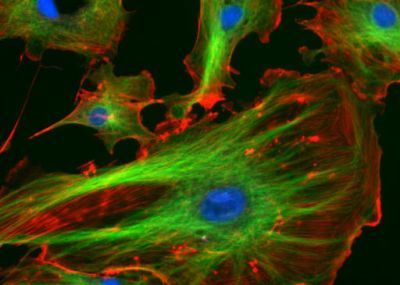
Some evolutionists claim that the origin of life is not a part of evolution. However, probably every evolutionary biology textbook has a section on the origin of life in the chapters on evolution. The University of California, Berkeley, has the origin of life included in their ‘Evolution 101’ course, in a section titled “From Soup to Cells—the Origin of Life”.1 High-profile defenders of ‘all-things-evolutionary’, such as P.Z. Myers and Nick Matzke, agree that the origin of life is part of evolution, as does Richard Dawkins.2

A well-known evolutionist of the past, G.A. Kerkut, did make a distinction between the General Theory of Evolution (GTE), which included the origin of life, and the Special Theory of Evolution (STE) that only dealt with the diversification of life (the supposed topic of Darwin’s 1859 book).3

It is only recently that some defenders of evolution have tried to divorce the origin of life from consideration. It’s probably because the hope of finding an answer is rapidly fading, as one scientific discovery after another of sophisticated machinery in even the simplest living cells makes the problem of a naturalistic origin ever more difficult.

So, what do we need to get life? We can break the problem of the origin of life into a number of topics in an attempt to explain to non-scientists what is involved (although it still might be mind-stretching).

生命的起源 解释自然发生（或生物生成）所需的东西 作者：唐·巴顿 介绍 生命起源也称为自然发生或有时称为化学进化。 生命基于信息丰富的长分子，例如 DNA 和 RNA，它们包含制造生命所依赖的蛋白质的指令。 但是读取 DNA/RNA 来制造蛋白质，以及复制 DNA 或 RNA 来制造新细胞（繁殖，“生命”的标志）都依赖于 DNA/RNA 上编码的一大批蛋白质。 DNA/RNA 和蛋白质需要同时存在才能生命开始——这是一个严重的先有鸡还是先有蛋的难题。 目录 介绍 获取所有正确的成分 A。 氨基酸 b. 糖类 C。 DNA和RNA的成分 d. 脂质 e. 用手性（手性） 细胞生存的最低要求是什么？ 聚合物形成（聚合） 生命的起源是编程问题，而不仅仅是化学问题 生活也需要纠错系统 生活场景的起源 生命起源的概率计算 结论 因此，对于那些坚持认为生命是通过纯粹自然过程（仅物理和化学）产生的人来说，生命的起源是一个令人烦恼的问题。 一些进化论者声称生命的起源不是进化的一部分。 然而，可能每本进化生物学教科书的进化章节中都有关于生命起源的部分。 加州大学伯克利分校将生命起源纳入其“进化 101”课程，标题为“从汤到细胞——生命的起源”的部分。1 “万物进化论”的高调捍卫者 ，例如 P.Z. 迈尔斯和尼克·马茨克同意生命起源是进化的一部分，理查德·道金斯也是如此。2 过去著名的进化论者 G.A. Kerkut 确实区分了包括生命起源的广义进化论 (GTE) 和仅涉及生命多样化的特殊进化论 (STE)（达尔文 1859 年著作的假定主题）。 3 直到最近，一些进化论的捍卫者才试图将生命起源与考虑因素分开。 这可能是因为找到答案的希望正在迅速消失，因为一项又一项的科学发现，即使是最简单的活细胞中也存在复杂的机制，使得自然起源的问题变得更加困难。 那么，我们需要什么才能获得生命呢？ 我们可以将生命起源问题分解为多个主题，试图向非科学家解释所涉及的内容（尽管这仍然可能令人费解）。

Wikimedia commonsHow did life begin? Explaining the origin of life by solely physical and chemical processes is proving to be extremely difficult.

What is it that we have to obtain to produce a **living** cell? A living cell is capable of acquiring all the resources it needs from its surroundings and reproducing itself. The first cell had to be free-living; that is, it could not depend on other cells for its survival because other cells did not exist. Parasites cannot be a model for ‘first life’ because they need existing cells to survive. This also rules out [viruses](https://creation.com/even-a-tiny-virus-has-a-powerful-mini-motor) and the like as the precursors to life as they must have living cells that they can parasitize to reproduce themselves. Prions, misshaped proteins that cause disease, have nothing to do with the origin of life because they can only ‘replicate’ by causing proteins manufactured by a cell to become misshaped.

The first things needed are the right ingredients. It’s bit like baking a cake; you can’t make a banana cake if you have no bananas or flour.

Getting all the right ingredients

Right here there is a major problem for chemical soup approaches to the origin of life: all the components have to be present in the same location for a living cell to have any possibility of being assembled. But necessary components of life have carbonyl (>C=O) chemical groups that react destructively with amino acids and other amino (–NH2) compounds. Such carbonyl-containing molecules include sugars,4 which also form the backbone of DNA and RNA. Living cells have ways of keeping them apart and protecting them to prevent such cross-reactions, or can repair the damage when it occurs, but a chemical soup has no such facility.

Cells are incredibly complex arrangements of simpler chemicals. I am not going to cover every chemical that a first cell would need; it would take a book and some to cover it. I am just going to highlight some of the basic components that have to be present for any origin of life scenario.

a. Amino acids

Living things are loaded with *proteins*; linear strings of *amino acids*. *Enzymes* are special proteins that help chemical reactions to happen (catalysts). For example, the enzyme amylase is secreted in our saliva and causes starch molecules from rice, bread, potatoes, etc., to break up into smaller molecules, which can then be broken down to their constituent glucose molecules. We can’t absorb starch, but we are able to absorb glucose and use it to power our bodies.

Some reactions necessary for life go so slowly without enzymes that they would effectively never produce enough product to be useful, even given billions of years.5

Other proteins form muscles, bone, skin, hair and all manner of the structural parts of cells and bodies. Humans can produce well over 100,000 proteins (possibly millions; nobody really knows exactly how many), whereas a typical bacterium can produce one or two thousand different ones.

生命是如何开始的？ 仅通过物理和化学过程来解释生命起源被证明是极其困难的。 为了产生活细胞，我们必须获得什么？ 活细胞能够从周围环境获取所需的所有资源并自我复制。 第一个细胞必须是自由生活的； 也就是说，它不能依赖其他细胞生存，因为其他细胞不存在。 寄生虫不能成为“第一生命”的模型，因为它们需要现有的细胞才能生存。 这也排除了病毒等作为生命前体的可能性，因为它们必须具有可以寄生的活细胞来繁殖自己。 朊病毒是一种导致疾病的畸形蛋白质，与生命起源无关，因为它们只能通过导致细胞制造的蛋白质变形来进行“复制”。 首先需要的是正确的成分。 这有点像烤蛋糕； 如果没有香蕉或面粉，你就无法制作香蕉蛋糕。 获取所有正确的成分 化学汤法探索生命起源存在一个主要问题：所有成分必须存在于同一位置，活细胞才有可能组装。 但生命的必需成分含有羰基 (>C=O) 化学基团，它们会与氨基酸和其他氨基 (–NH2) 化合物发生破坏性反应。 这种含羰基的分子包括糖4，它们也形成DNA和RNA的主链。 活细胞有办法将它们分开并保护它们以防止此类交叉反应，或者可以在发生损伤时修复损伤，但化学汤没有这样的功能。 细胞是由更简单的化学物质组成的极其复杂的排列。 我不会涵盖第一个细胞所需的所有化学物质； 需要一本书和一些人才能涵盖它。 我只是要强调任何生命起源场景都必须存在的一些基本组件。 A。 氨基酸 生物体内富含蛋白质； 线性氨基酸串。 酶是帮助化学反应发生的特殊蛋白质（催化剂）。 例如，淀粉酶分泌在我们的唾液中，使大米、面包、土豆等中的淀粉分子分解成更小的分子，然后再分解成其组成部分的葡萄糖分子。 我们不能吸收淀粉，但我们能够吸收葡萄糖并用它为我们的身体提供动力。 一些生命所必需的反应在没有酶的情况下进行得非常缓慢，以至于即使经过数十亿年，它们也永远不会产生足够的有用产物。 5 其他蛋白质形成肌肉、骨骼、皮肤、头发以及细胞和身体的各种结构部分。 人类可以产生超过 100,000 种蛋白质（可能有数百万种；没有人真正知道到底有多少），而一个典型的细菌可以产生一两千种不同的蛋白质。

A picture containing diagram, design, origami

Description automatically generated**Figure 1.** Leucine, the most common amino acid, which is a specific arrangement of atoms of carbon (C), hydrogen (H), oxygen (O), and nitrogen (N).

Proteins are made up of 20 different amino acids (some microbes have an extra one or two). Amino acids are not simple chemicals and they are not easy to make in the right way without enzymes (which are themselves composed of amino acids); see Figure 1.

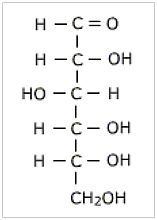
The 1953 Miller–Urey experiment, which almost every biology textbook still presents, managed to make some amino acids without enzymes. It is often portrayed as explaining ‘the origin of life’, but that is either very ignorant or very deceitful.

Although *tiny* amounts of *some* of the right amino acids were made, the conditions set up for the experiment could never have occurred on Earth; for example, any oxygen in the ‘atmosphere’ in the flask would have prevented anything from forming. Furthermore, some of the *wrong types* of amino acids were produced, as well as other chemicals that would ‘cross-react’, preventing anything useful forming.

The amino acids required for functional proteins could never have been made by anything like this experiment in nature.6 When Stanley Miller repeated the experiment in 1983 with a slightly more realistic mixture of gases, he only got trace amounts of glycine, the simplest of the 20 amino acids needed.7

**Update 2021:** There seems to be renewed enthusiasm in some quarters for injecting new life into the Miller-Urey experiment: Ouellette, J., Scientists recreated classic origin-of-life experiment and made a new discovery, arstechnica.com, 29 October 2021. This commentary hypes [a finding](https://www.nature.com/articles/s41598-021-00235-4) of scientists that silica leached from the borosilicate glass flasks used by Urey contributed a catalytic function to the apparatus. They also detected a wider range of organic compounds than Miller-Urey. However, these findings do not change the conclusion that the Miller-Urey experiment is irrelevant to the origin of the first cell, for the reasons stated herein.

The origin of the correct mix of amino acids remains an unsolved problem (and see another major problem under ‘handedness’ below).

**Figure 2.** Glucose, linear form.

b. Sugars

Some sugars can be made just from chemistry without enzymes (which are only made by cells, remember). Sugars are supposed to have formed from naturally occurring formaldehyde in the presence of alkali by the formose (or Butlerov) reaction. However, the very same alkaline conditions that are needed for this reaction also destroy sugars such as ribose and glucose that are essential for life.

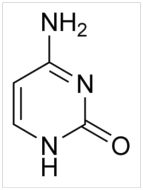
The formose reaction that is proposed for the formation of sugars also needs the *absence of nitrogenous compounds*, such as amino acids, because these react with the formaldehyde, and the sugars, to produce non-biological chemicals.

*Ribose*, the sugar that forms the backbone of *RNA*, and in modified form DNA, an essential part of all living cells, is especially problematic. It is an unstable sugar (it has a short half-life, or breaks down quickly) in the real world at near-neutral pH (neither acid nor alkaline).8

c. The components of DNA and RNA

How can we get the nucleotides that are the chemical ‘letters’ of *DNA* and *RNA* without the help of enzymes from a living cell? The chemical reactions require formaldehyde (H2C=O) to react with hydrogen cyanide (HC≡N). However, formaldehyde and cyanide (especially) are deadly poisons. They would *destroy* critically important proteins that *might* have formed!

图 1. 亮氨酸，最常见的氨基酸，是碳 (C)、氢 (H)、氧 (O) 和氮 (N) 原子的特定排列。 蛋白质由 20 种不同的氨基酸组成（某些微生物还有额外的一到两种氨基酸）。 氨基酸不是简单的化学物质，如果没有酶（酶本身由氨基酸组成），它们不容易以正确的方式制造； 参见图 1。 1953 年的米勒-尤里实验成功地在没有酶的情况下制造了一些氨基酸，几乎每本生物学教科书仍然会提到这一实验。 它经常被描述为解释“生命的起源”，但这要么是非常无知，要么是非常欺骗性的。 尽管制造出了少量的一些正确的氨基酸，但为该实验设置的条件在地球上永远不可能发生； 例如，烧瓶中“大气”中的任何氧气都会阻止任何物质的形成。 此外，还会产生一些错误类型的氨基酸，以及其他会发生“交叉反应”的化学物质，从而阻止任何有用的物质形成。 功能性蛋白质所需的氨基酸在自然界中永远不可能通过像这样的实验来制造。6 当斯坦利·米勒 (Stanley Miller) 在 1983 年用稍微更真实的气体混合物重复该实验时，他只得到了微量的甘氨酸，这是最简单的一种。 需要 20 种氨基酸。7 2021 年更新：某些方面似乎重新燃起了为 Miller-Urey 实验注入新生命的热情：Ouellette, J.，科学家重新创建了经典的生命起源实验并做出了新发现，arstechnica.com，2021 年 10 月 29 日 这篇评论夸大了科学家的一项发现，即从尤里使用的硼硅酸盐玻璃烧瓶中浸出的二氧化硅为该装置提供了催化功能。 他们还检测到比 Miller-Urey 更广泛的有机化合物。 然而，由于本文所述的原因，这些发现并没有改变米勒-尤里实验与第一个细胞的起源无关的结论。 氨基酸正确组合的起源仍然是一个未解决的问题（请参阅下面“用手习惯”下的另一个主要问题）。 图 2. 葡萄糖，线性形式。 b. 糖类 有些糖可以仅通过化学反应而无需酶（记住，酶仅由细胞产生）。 糖被认为是由天然存在的甲醛在碱存在下通过甲糖（或 Butlerov）反应形成的。 然而，该反应所需的碱性条件也会破坏生命所必需的糖，例如核糖和葡萄糖。 为形成糖而提出的甲醛反应也需要不存在含氮化合物，例如氨基酸，因为这些化合物与甲醛和糖反应，产生非生物化学物质。 核糖是构成RNA骨架的糖，其修饰形式的DNA是所有活细胞的重要组成部分，它的问题尤其严重。 在现实世界中，它是一种不稳定的糖（半衰期短，或分解很快），pH 值接近中性（既不是酸性也不是碱性）。8 C。 DNA和RNA的成分 如果不借助活细胞中的酶，我们如何才能获得 DNA 和 RNA 的化学“字母”核苷酸呢？ 化学反应需要甲醛（H2C=O）与氰化氢（HC=N）反应。 然而，甲醛和氰化物（尤其是）是致命的毒物。 它们会破坏可能已经形成的极其重要的蛋白质！

**Figure 3.** Cytosine, one of the simpler of the five nucleotides that make up DNA and RNA. In this form of chemical diagram, each unlabelled bend in the ring has a carbon atom at the bend.

Cytosine (Figure 3), one of the five essential nucleotide bases of DNA and RNA, is very difficult to make in any realistic pre-biotic scenario and is also very unstable.8

DNA and RNA also have backbones of alternating sugars and phosphate groups. The problems with sugars are discussed above. Phosphates would be precipitated by the abundant calcium ions in sea water or cling strongly onto the surfaces of clay particles. Either scenario would prevent phosphate from being used to make DNA.

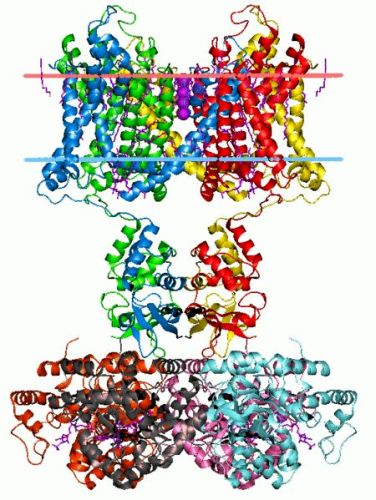
d. Lipids

Lipids (‘fats’) are essential for the formation of a *cell membrane* that contains the cell contents, as well as for other cell functions. The cell membrane, comprised of several different complex lipids, is an essential part of a free-living cell that can reproduce itself.

Lipids have much higher energy density than sugars or amino acids, so their formation in any chemical soup is a problem for origin of life scenarios (high energy compounds are thermodynamically much less likely to form than lower energy compounds).

The fatty acids that are the primary component of all cell membranes have been very difficult to produce, even assuming the absence of oxygen (a ‘reducing’ atmosphere). Even if such molecules were produced, ions such as magnesium and calcium, which are themselves necessary for life and have two charges per atom (++, i.e. divalent), would combine with the fatty acids, and precipitate them, making them unavailable.9 This process likewise hinders soap (essentially a fatty acid salt) from being useful for washing in hard water—the same precipitation reaction forms the ‘scum’.

图 3. 胞嘧啶，构成 DNA 和 RNA 的五种核苷酸中较简单的一种。 在这种形式的化学图中，环中每个未标记的弯曲在弯曲处都有一个碳原子。 胞嘧啶（图 3）是 DNA 和 RNA 的五种必需核苷酸碱基之一，在任何现实的生命前场景中都很难制造，而且非常不稳定。 8 DNA 和 RNA 也具有交替的糖和磷酸基团的主链。 上面讨论了糖的问题。 磷酸盐会被海水中丰富的钙离子沉淀或牢固地附着在粘土颗粒的表面。 无论哪种情况都会阻止磷酸盐被用来制造 DNA。 d. 脂质 脂质（“脂肪”）对于形成包含细胞内容物的细胞膜以及其他细胞功能至关重要。 细胞膜由几种不同的复合脂质组成，是能够自我繁殖的自由生活细胞的重要组成部分。 脂质的能量密度比糖或氨基酸高得多，因此它们在任何化学汤中的形成都是生命起源场景的一个问题（从热力学角度来看，高能化合物比低能化合物形成的可能性要小得多）。 即使假设没有氧气（“还原”气氛），作为所有细胞膜主要成分的脂肪酸也很难产生。 即使产生了此类分子，镁和钙等离子本身也是生命所必需的，并且每个原子具有两个电荷（++，即二价），也会与脂肪酸结合并沉淀它们，从而使它们变得不可用。 9 这个过程同样会阻碍肥皂（本质上是一种脂肪酸盐）在硬水中的洗涤同样的沉淀反应形成“浮渣”。

Wikimedia commons/Andrei Lomize**Figure 4.** A potassium transport channel. The red and blue lines show the position of the lipid membrane and the ribbons represent the transporter, which comprises a number of proteins (different colours). To give some idea of the complexity, each loop in each of the spirals is about 4 amino acids.

Some popularisers of abiogenesis like to draw diagrams showing a simple hollow sphere of lipid (a ‘vesicle’) that can form under certain conditions in a test-tube. However, such a ‘membrane’ could never lead to a living cell because the cell needs to get things through the cell membrane, in both directions. Such transport into and out of the cell entails very complex protein-lipid complexes known as transport channels, which operate like electro-mechanical pumps. They are specific to the various chemicals that must pass into and out of the cell (a pump that is designed to move water will not necessarily be suitable for pumping oil). Many of these pumps use energy compounds such as ATP to actively drive the movement against the natural gradient. Even when movement is with the gradient, from high to low concentration, it is still facilitated by carrier proteins.

The cell membrane also enables a cell to maintain a stable pH, necessary for enzyme activity, and favourable concentrations of various minerals (such as not too much sodium). This requires transport channels (‘pumps’) that specifically move hydrogen ions (protons) under the control of the cell. These pumps are highly selective.10

Transport across membranes is so important that “20–30% of all genes in most genomes encode membrane proteins”.11 The smallest known genome of a free-living organism, that of the parasite *Mycoplasma genitalium,* codes for 26 transporters12 amongst its 482 protein-coding genes.

A pure lipid membrane would not allow even the passive movement of the positively-charged ions of mineral nutrients such as *calcium, potassium, magnesium, iron, manganese*, etc., or the negatively-charged ions such as *phosphate, sulfate*, etc., into the cell, and they are all essential for life. A pure-lipid membrane would repel such charged ions, which dissolve in water, not lipid. Indeed, a simple fat membrane would prevent the movement of water itself (try mixing a lipid like olive oil with water)!

Membrane transporters would appear to be essential for a viable living cell.

In the 1920s the idea that life began with soapy bubbles (fat globules) was popular (Oparin’s ‘coacervate’ hypothesis) but this pre-dated any knowledge of what life entailed in terms of DNA and protein synthesis, or what membranes have to do. The ideas were naïve in the extreme, but they still get an airing today in YouTube videos showing bubbles of lipid, even dividing, as if this were relevant to explaining the origin of life (see: [Self-made cells? Of course not!](https://creation.com/self-made-cells-of-course-not)).

图 4.钾转运通道。 红线和蓝线显示脂质膜的位置，丝带代表转运蛋白，其中包含许多蛋白质（不同颜色）。 为了了解其复杂性，每个螺旋中的每个环大约有 4 个氨基酸。 一些自然发生的普及者喜欢绘制图表，显示可以在试管中的特定条件下形成的简单的脂质空心球（“囊泡”）。 然而，这样的“膜”永远不可能形成活细胞，因为细胞需要使物质在两个方向上穿过细胞膜。 这种进出细胞的运输需要非常复杂的蛋白质-脂质复合物，称为运输通道，其工作原理类似于机电泵。 它们特定于必须进出细胞的各种化学物质（设计用于输送水的泵不一定适合泵送油）。 许多这些泵使用能量化合物（例如 ATP）来主动驱动逆着自然梯度的运动。 即使随着梯度的移动，从高浓度到低浓度，它仍然是由载体蛋白促进的。 细胞膜还使细胞能够维持酶活性所必需的稳定的 pH 值，以及各种矿物质的有利浓度（例如不要过多的钠）。 这需要在细胞控制下专门移动氢离子（质子）的运输通道（“泵”）。 这些泵具有高度选择性。10 跨膜转运非常重要，以至于“大多数基因组中的所有基因中有 20-30% 编码膜蛋白”。11 已知最小的自由生物体基因组，即寄生虫生殖支原体，编码其 482 种蛋白质中的 26 种转运蛋白12 -编码基因。 纯的脂质膜甚至不允许矿物质营养物（例如钙、钾、镁、铁、锰等）的带正电离子或磷酸盐、硫酸盐等带负电的离子被动运动， 进入细胞，它们都是生命所必需的。 纯脂质膜会排斥这些带电离子，这些离子溶解在水中，而不是脂质中。 事实上，简单的脂肪膜会阻止水本身的运动（尝试将橄榄油等脂质与水混合）！ 膜转运蛋白似乎对于活细胞的存活至关重要。 在 20 年代，生命起源于肥皂泡（脂肪球）的观点很流行（奥帕林的“凝聚”假说），但这早于人们对生命涉及 DNA 和蛋白质合成或膜的作用的了解。 这些想法极其幼稚，但今天它们仍然在 YouTube 视频中传播，显示脂质气泡，甚至分裂，好像这与解释生命起源有关（参见：自制细胞？当然不是！） 。

A picture containing cartoon, illustration, art

Description automatically generated**Figure 5.** The chirality of typical amino acids. ‘R’ represents the carbon-hydrogen side-chain of the amino acid, which varies in length. R=CH3 makes alanine, for example.

e. Handedness (chirality)

Amino acids, sugars, and many other biochemicals, being 3-dimensional, can usually be in two forms that are mirror images of one another; like your right and left hand are mirror images of each other. This is called handedness or *chirality* (Figure 5).

Now living things are based on biochemicals that are pure in terms of their chirality (homochiral): left-handed amino acids and right-handed sugars, for example. Here’s the rub: chemistry without enzymes (like the Miller–Urey experiment), when it does anything, produces mixtures of amino acids that are both right-and left-handed. It is likewise with the chemical synthesis of sugars (with the formose reaction, for example).13

Origin-of-life researchers have battled with this problem and all sorts of potential solutions have been suggested but the problem remains unsolved.14 Even getting 99% purity, which would require some totally artificial, unlikely mechanism for ‘nature’ to create, doesn’t cut it. Life needs 100% pure left-handed amino acids. The reason for this is that placing a right-handed amino acid in a protein in place of a left-handed one results in the protein having a different 3-dimensional shape. None can be tolerated to get the type of proteins needed for life.

What are the minimum requirements for a cell to live?

A minimal free-living cell that can manufacture its components using chemicals and energy obtained from its surrounding environment and reproduce itself must have:

1. A cell membrane. This separates the cell from the environment. It must be capable of maintaining a different chemical environment inside the cell compared to outside (as above). Without this, life’s chemical processes are not possible.
2. A way of storing the information or specifications that instructs a cell how to make another cell and how to operate moment by moment. The only known means of doing this is *DNA* and any proposals for it to be something else (such as *RNA*) have not been shown to be viable—and then there has still to be a way of changing from the other system to DNA, which is the basis of all known life.15
3. A way of reading the information in (2) to make the cell’s components and also control the amount produced and the timing of production. The major components are *proteins*, which are strings (polymers) of hundreds to thousands of some 20 different *amino acids*. The only known (or even conceivable) way of making the cell’s proteins from the DNA specifications involves over 100 proteins and other complex *co-factors*. Involved are:
   1. nano-machines such as *RNA polymerase* (smallest known type has ~4,500 amino acids),
   2. *gyrases*, which twist/untwist the DNA spiral to enable it to be ‘read’ (again these are very large proteins),
   3. *ribosomes*, sub-cellular ‘factories’ where proteins are manufactured, and
   4. at least 20 *transfer-RNA* molecules; these select the right amino acid to be placed in the order specified on the DNA (all cells that we know of have at least 61 because most amino acids are specified by more than one DNA three-letter code). The transfer-RNAs have [sophisticated mechanisms for making sure the right amino acid is selected](https://creation.com/decoding-and-editing-design-double-sieve-enzymes) according to the DNA code.
   5. There are also mechanisms to make sure that the proteins made are folded three-dimensionally in the correct way that involve *chaperones* to protect the proteins from mis-folding, plus *chaperonin* folding ‘machines’ in which the proteins are helped to fold correctly). All cells have these.

Whew! And that’s just the basics.

A greatly simplified animation of protein synthesis, which includes the action of RNA polymerase, ribosomes, transfer-RNAs, chaperonins, and chaperones. All living cells have this system of protein synthesis.

1. A means of manufacturing the cell’s biochemical needs from the simpler chemicals in the environment. This includes a way of making *ATP*, the universal energy currency of life. All living cells today have [*ATP synthase*](https://creation.com/atp-synthase), a phenomenally complex and efficient electric rotary motor to make ATP (or in reverse to create electric currents that drive other reactions and movement both inside and outside the cell).
2. A means of copying the information and passing it on to offspring (reproduction). A recent simulation of one cell division of the simplest known free-living bacterium (which ‘only’ has 525 *genes*) required 128 desktop computers working together for 10 hours.16

This gives some indication of what needs to happen for the first living cell to *live.*

图 5. 典型氨基酸的手性。 “R”代表氨基酸的碳氢侧链，其长度各不相同。 例如，R=CH3 生成丙氨酸。 e. 用手性（手性） 氨基酸、糖和许多其他生化物质都是三维的，通常可以有两种互为镜像的形式： 就像你的右手和左手是彼此的镜像一样。 这称为旋手性或手性（图 5）。 现在，生物体基于手性（同手性）纯的生化物质：例如左手氨基酸和右手糖。 问题是：没有酶的化学（如米勒-尤里实验），当它做任何事情时，都会产生右旋和左旋氨基酸的混合物。 糖的化学合成也是如此（例如，通过甲糖反应）13。 生命起源研究人员一直在与这个问题作斗争，并提出了各种可能的解决方案，但问题仍然没有解决。14 即使获得 99% 的纯度（这需要一些完全人为的、不太可能的“自然”机制来创造），也不能实现。 不剪它。 生命需要100%纯左手氨基酸。 其原因是在蛋白质中放置右手氨基酸代替左手氨基酸会导致蛋白质具有不同的 3 维形状。 没有人能够容忍获得生命所需的蛋白质类型。 细胞生存的最低要求是什么？ 一个最小的自由生活细胞，可以使用从周围环境获得的化学物质和能量来制造其组件并自我繁殖，必须具有： 1. 细胞膜。 这将细胞与环境分开。 它必须能够维持细胞内部与外部不同的化学环境（如上所述）。 没有这个，生命的化学过程就不可能发生。 2. 一种存储信息或规范的方法，指导一个单元如何制造另一个单元以及如何随时运行。 唯一已知的实现这一目标的方法是 DNA，任何将其变为其他系统（例如 RNA）的提议尚未被证明是可行的，并且仍然需要有一种方法从其他系统更改为 DNA，这 是所有已知生命的基础。15 3.一种读取(2)中的信息来制造电池组件并控制生产量和生产时间的方法。 主要成分是蛋白质，蛋白质是由数百至数千种约 20 种不同氨基酸组成的链（聚合物）。 根据 DNA 规格制造细胞蛋白质的唯一已知（甚至可以想象）的方法涉及 100 多种蛋白质和其他复杂的辅助因子。 涉及的有： A。 纳米机器，例如 RNA 聚合酶（已知的最小类型有约 4,500 个氨基酸）， b. 旋转酶，它扭转/解开 DNA 螺旋，使其能够被“读取”（同样，这些都是非常大的蛋白质）， C。 核糖体，制造蛋白质的亚细胞“工厂”，以及 d. 至少20个转移RNA分子； 这些选择正确的氨基酸，按照 DNA 上指定的顺序放置（我们知道的所有细胞至少有 61 个，因为大多数氨基酸是由多个 DNA 三字母代码指定的）。 转移 RNA 具有复杂的机制，可确保根据 DNA 密码选择正确的氨基酸。 e. 还有一些机制可以确保所产生的蛋白质以正确的方式进行三维折叠，其中包括保护蛋白质免于错误折叠的伴侣，以及帮助蛋白质正确折叠的伴侣蛋白折叠“机器”。 所有细胞都有这些。 哇！ 这只是基础知识。 大大简化的蛋白质合成动画，包括 RNA 聚合酶、核糖体、转移 RNA、伴侣蛋白和伴侣的作用。 所有活细胞都有这种蛋白质合成系统。 4. 一种利用环境中更简单的化学物质来制造细胞生化需求的方法。 这包括一种制造 ATP（生命通用能量货币）的方法。 如今，所有活细胞都具有 ATP 合酶，这是一种极其复杂且高效的电动旋转马达，用于制造 ATP（或反过来产生电流，驱动细胞内外的其他反应和运动）。 5. 复制信息并将其传递给后代（繁殖）的方法。 最近对已知最简单的自由生活细菌（“仅”有 525 个基因）的一次细胞分裂进行的模拟需要 128 台台式计算机一起工作 10 个小时。 16 这给出了第一个活细胞存活需要发生什么的一些迹象。

An interesting project began some years ago to ascertain what could be the minimal cell that could operate in a free-living manner; that is, not dependent on another living organism. However, it did have available a nutrient-rich medium that provided a wealth of complex organic compounds such that the cell did not have to synthesize many of its needed biochemicals. This *minimal cell* is now known to need over 400 protein and RNA components,17 and of course that means that its DNA needs to be loaded up with the specifications for making these. That is, the DNA needs to have over 400 ‘genes’. We will come back to this later.

Polymer formation (polymerisation)

Life is not just composed of amino acids or sugars but it is loaded with *polymers*, which are strings, or chains, of simpler compounds joined together. A polysaccharide is a polymer of sugars. A protein is a polymer of amino acids and DNA and RNA are polymers of nucleotides. Polysaccharides are the simplest, where the links in the chain are normally the same sugar compound, such as glucose (making starch in plants or glycogen in animals). Proteins are much more complex, being chains of amino acids where each link in the chain can be one of 20 different amino acids. And there are four different links in DNA and RNA.

Now [water](https://creation.com/the-wonders-of-water) is an essential ingredient of living cells; typical bacteria are about 75% water. Being the ‘universal solvent’, water is a necessary carrier for the various components of cells; it is the milieu in which it all happens.

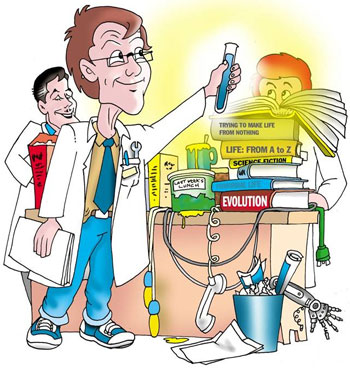
*The origin of life is a matter of programming, not just chemistry.*

Here is a huge problem for origin-of-life scenarios: when amino acids are joined together, for example, a water molecule is released. This means that in the presence of water, the reaction is pushed in the wrong direction, backwards; that is, proteins will fall apart, not build, unless the water is actively removed. A cell overcomes this by protecting the reaction site from water (inside ribosomes) and providing energy to drive this and the polymer formation. Thus, the formation of proteins of more than a few amino acids is a huge problem for all origin-of-life scenarios (and adding more time does not solve the problem; they just fall apart more).

Polymer formation also requires that the ingredients (monomers) that are joined together are *bi-functional.* That simply means that the amino acids for making proteins (or sugars for making polysaccharides) have at least two active sites that will allow another amino acid (or sugar) to be joined to each end. A protein-forming amino acid will have at least one amino group (-NH2) and one carboxyl group (-COOH), with the amino group of one amino acid joining to the carboxyl group of another, thus growing the chain. A compound with only one active site (*mono-functional*) would terminate the formation of the chain. The problem for origin-of-life scenarios is that any proposed chemical reactions that produce some amino acids also produce mono-functional ones that terminate protein formation.18

Nucleic acids such as DNA and RNA are based on a sugar-polymer backbone. Again, the presence of some sugars that are mono-functional would terminate the formation of these and the presence of water also drives this reaction in the wrong direction as well (to fall apart).

几年前开始了一个有趣的项目，以确定什么是能够以自由生活方式运行的最小细胞； 也就是说，不依赖于另一个生物体。 然而，它确实有一种营养丰富的培养基，可以提供大量复杂的有机化合物，因此细胞不必合成许多所需的生化物质。 现在已知这种最小的细胞需要 400 多种蛋白质和 RNA 成分，17 当然，这意味着它的 DNA 需要加载制造这些成分的规格。 也就是说，DNA 需要有 400 多个“基因”。 我们稍后再讨论这一点。 聚合物形成（聚合） 生命不仅由氨基酸或糖组成，而且还含有聚合物，这些聚合物是由更简单的化合物连接在一起的串或链。 多糖是糖的聚合物。 蛋白质是氨基酸的聚合物，DNA和RNA是核苷酸的聚合物。 多糖是最简单的，链中的链接通常是相同的糖化合物，例如葡萄糖（在植物中产生淀粉或在动物中产生糖原）。 蛋白质要复杂得多，是氨基酸链，其中链中的每个链接都可以是 20 种不同氨基酸之一。 DNA和RNA中有四种不同的链接。 现在水是活细胞的重要成分； 典型的细菌大约75%是水。 水作为“万能溶剂”，是细胞各成分的必要载体； 这是一切发生的环境。 生命的起源是一个编程问题，而不仅仅是化学问题。 对于生命起源场景来说，这是一个巨大的问题：例如，当氨基酸连接在一起时，会释放出水分子。 这意味着，在有水存在的情况下，反应会被推向错误的方向，即向后。 也就是说，除非主动除去水，否则蛋白质会分解，而不是堆积。 细胞通过保护反应位点免受水（核糖体内）的影响并提供能量来驱动反应位点和聚合物的形成来克服这一问题。 因此，超过几个氨基酸的蛋白质的形成对于所有生命起源场景来说都是一个巨大的问题（增加更多的时间并不能解决问题；它们只是会分解得更多）。 聚合物的形成还要求连接在一起的成分（单体）具有双功能。 这仅仅意味着用于制造蛋白质的氨基酸（或用于制造多糖的糖）至少有两个活性位点，可以允许另一个氨基酸（或糖）连接到每个末端。 形成蛋白质的氨基酸将具有至少一个氨基（-NH2）和一个羧基（-COOH），一个氨基酸的氨基与另一个氨基酸的羧基连接，从而增长链。 仅具有一个活性位点（单功能）的化合物将终止链的形成。 生命起源情景的问题在于，任何产生某些氨基酸的化学反应也会产生终止蛋白质形成的单功能化学反应。 18 DNA 和 RNA 等核酸基于糖聚合物主链。 同样，一些单官能糖的存在会终止它们的形成，并且水的存在也会使该反应朝错误的方向发展（分解）。

[](https://dl0.creation.com/articles/p083/c08300/creating-life-from-nothing-lge.jpg)Creating life in a test-tube would not demonstrate that life could have made itself without intelligent input.

The origin of life is a matter of programming, not just chemistry

The above information would be sufficient to eliminate notions of the naturalistic origin of life, but we have not covered the most important problem, which is the origin of the programming. Life is not based just on polymers but polymers with specific arrangements of the subunits; specific arrangements of amino acids to make functional proteins/enzymes and specific arrangements of nucleic acid bases to make functional DNA and RNA.

As astrobiologist Paul Davies, now director of the *Beyond Center for Fundamental Concepts in Science* at Arizona State University, said,

“To explain how life began we need to understand how its unique management of information came about.

“The way life manages information involves a logical structure that differs fundamentally from mere complex chemistry. Therefore chemistry alone will not explain life’s origin, any more than a study of silicon, copper and plastic will explain how a computer can execute a program.”19

Davies’ clarity on this point ought not to be a surprise to his fellow evolutionists, given his similarly plain-speaking public utterances for well over a decade previously. E.g. “It is the software of the living cell that is the real mystery, not the hardware.” And: “How did stupid atoms spontaneously write their own software? … Nobody knows …”.20

Any attempt to explain the origin of life without explaining the origin of the information processing system and the information recorded on the DNA of a living cell is avoiding the issue. We just have to look at the simplest free-living cell possible to see how the origin of the information is an insoluble problem for scenarios that rely on physics and chemistry (that is, no intelligent design allowed).

Sir Karl Popper, one of the most prominent philosophers of science of the 20th century, realized that,

“What makes the origin of life and of the genetic code a disturbing riddle is this: the genetic code is without any biological function unless it is translated; that is, unless it leads to the synthesis of the proteins whose structure is laid down by the code. But … the machinery by which the cell (at least the non-primitive cell, which is the only one we know) translates the code consists of at least fifty macromolecular components which are themselves coded in the DNA [ed: we now know that over 100 macromolecular components are needed]. Thus the code cannot be translated except by using certain products of its translation. This constitutes a baffling circle; a really vicious circle, it seems, for any attempt to form a model or theory of the genesis of the genetic code.

“Thus we may be faced with the possibility that the origin of life (like the origin of physics) becomes an impenetrable barrier to science, and a residue to all attempts to reduce biology to chemistry and physics.”21

在试管中创造生命并不能证明生命可以在没有智能输入的情况下自行产生。 生命的起源是编程问题，而不仅仅是化学问题 上述信息足以消除生命自然起源的概念，但我们还没有涵盖最重要的问题，即编程的起源。 生命不仅仅基于聚合物，而且基于具有特定亚基排列的聚合物； 氨基酸的特定排列可产生功能性蛋白质/酶，核酸碱基的特定排列可产生功能性 DNA 和 RNA。 正如亚利桑那州立大学超越科学基本概念中心主任、天体生物学家保罗·戴维斯所说： “为了解释生命是如何开始的，我们需要了解其独特的信息管理是如何产生的。 “生命管理信息的方式涉及一种逻辑结构，它与单纯的复杂化学有根本的不同。 因此，仅靠化学无法解释生命的起源，就像对硅、铜和塑料的研究无法解释计算机如何执行程序一样。”19 戴维斯在这一点上的明确表达不应让他的进化论同行们感到惊讶，因为他在十多年前也曾发表过类似的直言不讳的公开言论。 例如。 “真正的谜团是活细胞的软件，而不是硬件。” 并且：“愚蠢的原子是如何自发地编写自己的软件的？ ……没人知道……”.20 任何试图解释生命起源而不解释信息处理系统和活细胞 DNA 上记录的信息的起源的尝试都是在回避这个问题。 我们只要看看最简单的自由生存的细胞，就会发现信息的来源对于依赖物理和化学的场景（即不允许智能设计）来说是一个无法解决的问题。 20 世纪最杰出的科学哲学家之一卡尔·波普尔爵士意识到， “生命和遗传密码的起源成为一个令人不安的谜团是因为：遗传密码除非被翻译，否则没有任何生物学功能； 也就是说，除非它导致其结构由代码确定的蛋白质的合成。 但是……细胞（至少是非原始细胞，这是我们所知道的唯一细胞）翻译代码的机制由至少 50 个大分子成分组成，这些成分本身在 DNA 中编码 [编辑：我们现在知道超过 需要100种大分子成分]。 因此，除非使用其翻译的某些产品，否则无法翻译代码。 这构成了一个令人费解的循环； 对于任何建立遗传密码起源模型或理论的尝试来说，这似乎都是一个真正的恶性循环。 “因此，我们可能面临着这样一种可能性：生命的起源（就像物理学的起源）成为科学不可逾越的障碍，并且是所有将生物学简化为化学和物理学的尝试的残余。”21

Origin of the DNA code

The *coded* DNA information storage system as described by Popper cannot arise from chemistry, but demands an intelligent cause.22 If we think of other coding systems, such as the Morse code or a written alphabetical language, where symbols were invented to represent the sounds of speech, such coded systems only arise from intelligence. It is an arbitrary convention that ‘a’ is usually pronounced as in ‘cat’ in English; nothing about the shape of the letter indicates how it should be pronounced. Likewise, there is just no conceivable possibility of explaining the DNA coding system from the laws of physics and chemistry because there is no physical or chemical relationship between the code and what is coded.

Furthermore, if the origin of any DNA code were not a big enough problem, the DNA code turns out to be, of the many millions possible, “at or very close to a global optimum for error minimization: the best of all possible codes.”23 This error minimization in the code is possible because there are potentially 64 ‘codons’24 for 20 amino acids, so that nearly all amino acids have more than one codon (a few common amino acids, such as leucine, have six).25 These multiple codons are sometimes called ‘redundant’, often taken to mean ‘extra to needed’ or ‘superfluous’. However, the extra codons are optimized such that the most likely single-letter mistakes (mutations) in the coding are more likely not to change the amino acid, or at least to change it to a chemically similar one (thus being less disruptive to the structure of the protein manufactured).

The extra codons are also involved in sophisticated control of the amount of protein synthesized, through ‘translation level control’. This control system operates in bacteria and higher organisms.26 (See below for more on gene regulation.)

There is no way that a coding system can develop in successive stages to be optimized. If any workable coding system did come into existence by some incredible fluke, no significant change in the basic code could thenceforth occur because the code and the decoding system (reading machinery) would have to change at the same time (there are some very minor variations in the basic code in some bacteria, for example, where one of the three normal ‘stop’ codons codes for an extra amino acid to the normal 20). So the *optimized* code cannot be explained except as another incredible fluke of ‘nature’, right at the supposed beginning of life.

Not just a coding system, but information

Not only does the origin of the coded information storing system need to be explained, the information or specifications for proteins, etc., stored on the DNA has also to be explained. Revisiting the *simplest* cell, derived by knocking out genes from a viable free-living microbe to see which ones were ‘essential’, this minimal cell needs over 400 protein and RNA components. Specifications for all these have to be encoded on the DNA, otherwise this hypothetical cell cannot manufacture them or reproduce itself to make another cell. It would take a large book to print this information coded in the four ‘letters’ of the DNA.

As per the Paul Davies analogy, the problem is similar to a computer program. How do we explain the existence of a program? There is first the programming language (Python, Fortran, C++, Basic, Java, etc.) but then there is the actual set of instructions written in that language. The DNA problem is likewise two-fold; the origin of the programming language and the origin of the program.

Proposals for something simpler that ‘evolved’ into this simplest cell need to demonstrate the route from their hypothetical simpler start to the first living cell. Enthusiasts for abiogenesis often appeal to ‘billions of years’ as a hand-waving approach to solving the problems, but this provides no *mechanism*. Reactions that are going in the wrong direction are not going to reverse and go in the correct direction by adding more time.

DNA密码的起源 波普尔所描述的编码 DNA 信息存储系统不可能源自化学，而是需要一个智能原因。22 如果我们考虑其他编码系统，例如莫尔斯电码或书面字母语言，其中发明了符号来表示声音 语音，这种编码系统只能产生于智能。 在英语中，“a”通常发音为“cat”，这是一种任意约定； 字母的形状并没有表明它应该如何发音。 同样，从物理和化学定律解释 DNA 编码系统也是不可能的，因为代码和编码内容之间不存在物理或化学关系。 此外，如果任何 DNA 代码的起源不是一个足够大的问题，那么 DNA 代码就会在数百万个可能的代码中“达到或非常接近错误最小化的全局最佳值：所有可能的代码中最好的。” ”23 代码中的这种错误最小化是可能的，因为 20 个氨基酸可能有 64 个“密码子”24，因此几乎所有氨基酸都具有多个密码子（一些常见氨基酸，例如亮氨酸，有 6 个）。 25 这些多重密码子有时被称为“冗余”，通常意味着“超出需要”或“多余”。 然而，额外的密码子经过优化，使得编码中最可能的单字母错误（突变）更有可能不会改变氨基酸，或者至少将其改变为化学上相似的氨基酸（因此对氨基酸的破坏性较小） 所制造的蛋白质的结构）。 额外的密码子还通过“翻译水平控制”参与对合成蛋白质数量的复杂控制。 该控制系统在细菌和高等生物体中运行。26（有关基因调控的更多信息，请参见下文。） 编码系统不可能通过连续阶段的开发来进行优化。 如果任何可行的编码系统确实因某种令人难以置信的侥幸而存在，那么此后基本代码就不会发生重大变化，因为代码和解码系统（读取机器）必须同时改变（有一些非常小的变化） 例如，在某些细菌的基本密码中，三个正常“终止”密码子之一编码了正常 20 个额外的氨基酸。 因此，优化的代码无法被解释，除非是另一个令人难以置信的“自然”侥幸，就在所谓的生命之初。 不仅仅是编码系统，还有信息 不仅需要解释编码信息存储系统的起源，还需要解释DNA上存储的蛋白质等的信息或规格。 重新审视最简单的细胞，通过敲除活的自由生活微生物的基因来观察哪些基因是“必需的”，这种最小的细胞需要 400 多种蛋白质和 RNA 成分。 所有这些的规格都必须编码在 DNA 上，否则这个假设的细胞无法制造它们或自我复制以形成另一个细胞。 需要一本大书才能打印这些用 DNA 的四个“字母”编码的信息。 根据保罗·戴维斯的类比，这个问题类似于计算机程序。 我们如何解释程序的存在？ 首先是编程语言（Python、Fortran、C++、Basic、Java 等），然后是用该语言编写的实际指令集。 DNA 问题同样有两个方面： 编程语言的起源和程序的起源。 对于更简单的东西“进化”成最简单的细胞的提议需要证明从假设的更简单的开始到第一个活细胞的路线。 自然发生的爱好者经常呼吁“数十亿年”作为解决问题的一种挥手的方法，但这并没有提供任何机制。 朝错误方向发展的反应不会通过增加时间而逆转并朝正确方向发展。

Gene regulation is necessary

Genes in viable living cells are regulated; the cell controls the activity of each gene to match the cell’s needs.

Production of proteins, such as enzymes to digest food, requires energy as well as the raw ingredients (amino acids). If a gene is unregulated, the protein it codes for will be produced up to the limit of the energy and/or amino acid supply; whichever is exhausted first. Multiply this by the 400+ genes in the minimal viable free-living cell and you have ultra-chaos and non-viability. A lack of gene regulation would obviously be unworkable.

Furthermore, many products of enzyme-catalysed reactions are toxic if manufactured in too great a quantity (‘the dose makes the poison’). For example, Down Syndrome problems are caused by overexpression of genes on the tripled chromosome 21.

It seems that all processes in cells are regulated and in very precise ways. Not surprisingly, failure of individual gene regulation causes many diseases in humans (doi: 10.1016/j.cell.2013.02.014).

Gene regulation involves sensing a need and producing the right amounts of proteins to meet that need.

A major form of gene regulation involves proteins that bind to a gene or a DNA sequence that activates a gene or suite of genes. Binding of the protein can stop the production of the protein(s) or promote it. Binding or not-binding can be determined by the presence of a substrate or a product of the reactions that are catalysed by the protein/enzyme(s) produced. Thus, the amount of enzyme produced matches the need.

Another form of gene regulation involves methylation. This entails the addition of methyl (-CH3) groups to some of the nucleic acid bases that make up a gene. This then influences the activity of the gene (whether it is transcribed to mRNA and produces a protein or not). When the [J. Craig Venter Institute produced their ‘synthetic’ cell, Syntia, in 2010](https://creation.com/synthetic-life-by-venter), they found that it was not viable unless they copied the DNA methylation pattern of the bacterium that they were copying (*Mycoplasma mycoides*).

There are many types of gene regulation, even in the simplest living single cells. How could gene regulation arise, as it would need to be present when a new gene came into existence? Without regulation a new gene would create chaos. The origin of any new gene is difficult enough, but the need to add its regulatory network at the same time adds further to the impossibility of abiogenesis.

基因调控是必要的 活细胞中的基因受到调节； 细胞控制每个基因的活性以满足细胞的需求。 蛋白质的生产，例如消化食物的酶，需要能量和原材料（氨基酸）。 如果一个基因不受调控，它所编码的蛋白质的产生将达到能量和/或氨基酸供应的极限； 以先耗尽者为准。 将此乘以最小的可存活自由生活细胞中的 400 多个基因，你就会得到极度混乱且无法生存的情况。 缺乏基因调控显然是行不通的。 此外，许多酶催化反应的产物如果生产量太大就会有毒（“剂量即有毒”）。 例如，唐氏综合症问题是由 21 号染色体上的基因过度表达引起的。 细胞中的所有过程似乎都受到非常精确的调节。 毫不奇怪，个体基因调控的失败会导致人类许多疾病（doi：10.1016/j.cell.2013.02.014）。 基因调控涉及感知需求并产生适量的蛋白质来满足该需求。 基因调控的主要形式涉及与基因或 DNA 序列结合的蛋白质，从而激活一个基因或一组基因。 蛋白质的结合可以停止或促进蛋白质的产生。 结合或不结合可以通过由所产生的蛋白质/酶催化的反应的底物或产物的存在来确定。 因此，产生的酶量符合需要。 另一种形式的基因调控涉及甲基化。 这需要向构成基因的一些核酸碱基添加甲基（-CH3）。 这会影响基因的活性（是否转录为 mRNA 并产生蛋白质）。 当 J. Craig Venter 研究所在 2010 年生产出他们的“合成”细胞 Syntia 时，他们发现除非复制他们正在复制的细菌（蕈状支原体）的 DNA 甲基化模式，否则该细胞无法存活。 即使在最简单的活单细胞中，基因调控也有多种类型。 当新基因出现时，基因调控就需要存在，那么基因调控是如何出现的呢？ 如果没有监管，新基因就会造成混乱。 任何新基因的起源都已经足够困难了，但同时添加其调控网络的需要进一步增加了自然发生的可能性。

Life also needs error-correcting systems

Molecular biology has revealed that cells are phenomenally complex and sophisticated, even the simplest ones. The information, as stated, is stored on the DNA. However, DNA is a very unstable molecule. One report says:

There is a general belief that DNA is ‘rock solid’—extremely stable,” says Brandt Eichman, associate professor of biological sciences at Vanderbilt, who directed the project. “Actually DNA is highly reactive. On a good day about one million bases in the DNA in a human cell are damaged.27

Therefore all cells must have systems for correcting faults that develop in the structure of the DNA or in the coded information. Without these error-correcting systems, the number of errors in the DNA sequence accumulate and result in the demise of the cell (‘error catastrophe’). This feature of all living cells adds *yet another* ‘impossible’ to origin of life scenarios.

Any information that happened to arise on a theoretical DNA molecule in a primordial soup would have to be reproduced accurately or the information would be lost due to copying errors and chemical damage. Without an already functioning repair mechanism, the information would be degraded quickly. However, the instructions to build this repair machinery are encoded on the very molecule it repairs, another vicious circle for origin of life scenarios.28

When scientists discovered bacteria that live in extreme conditions, such as around hydrothermal vents in the sea, they were heralded as ‘primitive life’ because some origin-of-life researchers had proposed that life might have started in such places. However, these ‘extremophiles’, as they have been called (‘liking extremes’), have quite sophisticated error-correcting systems for their DNA. For example, *Deinococcus radiodurans* is a bacterium that can withstand extreme doses of ionizing radiation that would kill you or me, or other bacteria. It does sustain DNA damage where the DNA is fractured into many pieces. However, about 60 genes are activated to repair the breaks and reconstruct the genome in the hours following the damage.29

Hydrothermal vents are hot, inhospitable places and the DNA of microbes that live there is continually being damaged, such that the microbes must have sophisticated error-protecting and correcting systems to survive. They are not at all simple and do not provide any sort of viable model for explaining the origin of life.30

Moreover, all bacteria, not just the ‘extremophiles’, must have sophisticated error-correcting systems that involve many genes, and when the error correction is inactivated by mutations the bacteria become non-viable. This provides yet another problem for the origin of life.

生活也需要纠错系统 分子生物学表明，细胞极其复杂和复杂，即使是最简单的细胞也是如此。 如上所述，信息存储在 DNA 中。 然而，DNA是一种非常不稳定的分子。 一份报告称： 人们普遍认为 DNA 是‘坚如磐石’——极其稳定，”该项目的负责人、范德比尔特大学生物科学副教授布兰特·艾希曼 (Brandt Eichman) 说道。 “实际上 DNA 具有高度反应性。 天气好的时候，人体细胞 DNA 中大约有 100 万个碱基受损。27 因此，所有细胞都必须具有纠正 DNA 结构或编码信息中出现的错误的系统。 如果没有这些纠错系统，DNA 序列中的错误数量就会积累并导致细胞死亡（“错误灾难”）。 所有活细胞的这一特征为生命起源场景增添了另一个“不可能”。 原始汤中理论上的 DNA 分子上出现的任何信息都必须准确地复制，否则信息将因复制错误和化学损坏而丢失。 如果没有已经发挥作用的修复机制，信息将很快退化。 然而，构建这种修复机制的指令是在它所修复的分子上编码的，这是生命起源场景的另一个恶性循环。 28 当科学家发现生活在极端条件下（例如海洋热液喷口周围）的细菌时，它们被称为“原始生命”，因为一些生命起源研究人员提出生命可能始于这些地方。 然而，这些被称为“极端微生物”（“喜欢极端”）的 DNA 拥有相当复杂的纠错系统。 例如，耐辐射奇球菌是一种可以承受极高剂量电离辐射的细菌，这种辐射会杀死你我或其他细菌。 它确实会造成 DNA 损伤，DNA 会断裂成许多碎片。 然而，大约 60 个基因在损伤后数小时内被激活以修复断裂并重建基因组。 29 热液喷口是炎热、荒凉的地方，生活在那里的微生物的 DNA 不断受到破坏，因此微生物必须拥有复杂的错误保护和纠正系统才能生存。 它们一点也不简单，也没有提供任何可行的模型来解释生命的起源。 30 此外，所有细菌，而不仅仅是“极端微生物”，都必须具有涉及许多基因的复杂纠错系统，当纠错因突变而失活时，细菌就会变得无法生存。 这给生命起源提出了另一个问题。

Origin of life scenarios

Did life originate in a warm pond (as speculated by Darwin), near a deep sea vent, on clay particles, or somehow/somewhere else? The number of scenarios proposed, with no winner, suggests that they all have major deficiencies.

A major problem with warm pond and deep sea vent ideas is the presence of water, which prevents many of the reactions needed; to get polymers, for example. Furthermore, the heat in deep sea vents would speed up the *breakdown* of any lucky chemical formation.

Because of these problems with the presence of water, physical chemist and origin-of-life researcher, Graham Cairns-Smith proposed that clay surfaces were involved in facilitating some of the needed reactions.

However, experiments in warm volcanic ponds have shown that clay particles bind amino acids, DNA and phosphate, essential components of life, so strongly that the clay prevents any necessary reactions from occurring.31

The origin of a whole cell including the DNA, proteins and RNA needed for it to reproduce will never happen by an accident in a chemical soup, as demonstrated above. So advocates of abiogenesis have tried to imagine scenarios whereby life began with simpler requirements and then progressed to life as we know it today.

Proteins first?

Most effort has gone into a ‘proteins first’ approach, whereby proteins supposedly formed first and the DNA sequences to make the needed proteins and the RNAs necessary to make proteins from the sequences of DNA came later. However, other than the problem of getting the correct set of optically pure amino acids and the problem of polymerisation to make the protein chains of amino acids, few proteins can act as templates to make copies of themselves.32 Also, a fundamental problem is that there is no mechanism for creating the DNA sequence for a protein from the protein itself, as pointed out by information theorist Hubert Yockey.33

RNA first?

In the 1980s, some RNA molecules were discovered that have the ability to catalyse some chemical reactions; these were dubbed ‘ribozymes’ (from *ribo*nucleic acid en*zymes*). This finding stimulated a lot of excitement and so a lot of effort has gone into RNA-first scenarios, or the ‘RNA world’. At least there are enzymes that can generate DNA code from RNA code; that is, if you could get the RNA you might be able to imagine a scenario for getting the DNA. However, the enzyme complexes that can make a DNA copy of an RNA sequence are phenomenally complex and themselves would never arise by natural processes. And there are many other seemingly insurmountable problems with the RNA-first scenarios, 19 of which have been enumerated by Cairns-Smith.34 Furthermore, RNA is much less stable than DNA, which itself is very unstable, as documented above.

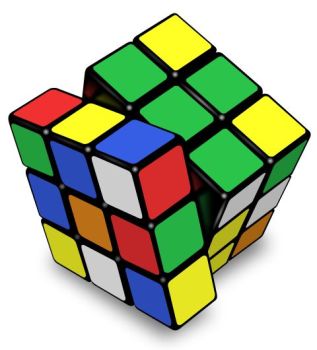
The multiplicity of scenarios proposed reinforces the conclusion that researchers really have little idea how life could have ‘made itself’. There is no viable hypothesis as to how life could start off simpler and, step-wise, progress to become an actual living cell. Neo-Darwinism (mutations and natural selection) is often invoked to try to ‘climb mount impossible’ but this cannot help, even hypothetically, until there is a viable self-reproducing entity, aka a *cell*, the minimum requirements for which I set out earlier (‘What are the minimum requirements for a cell to live?’).

生活场景的起源 生命是否起源于温暖的池塘（如达尔文推测的）、深海喷口附近、粘土颗粒或其他地方？ 提出的情景数量之多，但没有获胜者，这表明它们都存在重大缺陷。 温暖的池塘和深海喷口想法的一个主要问题是水的存在，它阻止了许多所需的反应； 例如，获得聚合物。 此外，深海喷口的热量会加速任何幸运化学物质的分解。 由于水的存在存在这些问题，物理化学家和生命起源研究人员格雷厄姆·凯恩斯·史密斯提出，粘土表面有助于促进一些所需的反应。 然而，在温暖的火山池中进行的实验表明，粘土颗粒与生命必需成分氨基酸、DNA 和磷酸盐的结合力如此之强，以至于粘土阻止了任何必要反应的发生。 31 正如上面所证明的，整个细胞（包括其繁殖所需的 DNA、蛋白质和 RNA）的起源绝不会在化学汤中偶然发生。 因此，自然发生论的倡导者试图想象这样的场景：生命以更简单的要求开始，然后发展为我们今天所知道的生命。 先吃蛋白质？ 大多数努力都集中在“蛋白质优先”的方法上，即蛋白质被认为首先形成，然后是制造所需蛋白质的 DNA 序列，以及从 DNA 序列制造蛋白质所需的 RNA。 然而，除了获得正确的光学纯氨基酸组的问题以及制造氨基酸蛋白质链的聚合问题之外，很少有蛋白质可以充当模板来复制自身。 32 此外，一个基本问题是 正如信息理论家 Hubert Yockey 所指出的，没有任何机制可以从蛋白质本身创建蛋白质的 DNA 序列。 33 先RNA？ 20世纪80年代，一些RNA分子被发现具有催化某些化学反应的能力； 这些被称为“核酶”（来自核糖核酸酶）。 这一发现激发了人们的极大兴趣，因此人们在 RNA 优先场景或“RNA 世界”方面投入了大量精力。 至少有一些酶可以从RNA代码生成DNA代码； 也就是说，如果你能得到 RNA，你也许就能想象得到 DNA 的场景。 然而，能够制作 RNA 序列 DNA 副本的酶复合物非常复杂，而且它们本身永远不会通过自然过程产生。 RNA 优先的方案还存在许多其他看似无法克服的问题，其中 19 个已被 Cairns-Smith 列举。34 此外，RNA 的稳定性远不如 DNA，DNA 本身非常不稳定，如上所述。 提出的多种情景强化了这样一个结论：研究人员实际上对生命如何“自我创造”知之甚少。 关于生命如何从更简单的开始并逐步发展成为真正的活细胞，目前还没有可行的假设。 新达尔文主义（突变和自然选择）经常被用来试图“攀登不可能的山”，但这无济于事，即使是假设的，直到有一个可行的自我复制实体，又名细胞，这是我设定的最低要求 更早（“细胞生存的最低要求是什么？”）。

Life from outer space?

Francis Crick, co-discoverer of the DNA double helix structure, is a well-known proponent of ‘life from space’.35 He proposed that aliens sent life to earth, known as ‘*directed* panspermia’. Another form of this idea, simply ‘panspermia’, is that life arose somewhere else in the universe and came to earth as microbes on meteorites or comets; Earth was ‘seeded’ with life in this manner. Either version of panspermia effectively puts the matter beyond the reach of science. About the only element of panspermia that is testable is the ability of microbes to survive riding on/in a meteorite to earth. And this has been tested and found wanting; microbes don’t survive.36

A lot of the impetus for the search for extra-terrestrial intelligence ([SETI](https://creation.com/seti-coming-in-from-the-cold-of-space)) and [extra-solar planets](https://creation.com/extrasolar-planets-problems-for-evolution) comes from a desire to find evidence that life might have formed ‘out there’. But even allowing the whole universe as a laboratory does not solve the problem; life would never form, as the following section reinforces.

Wikimedia commons/Booyabazooka

Probability calculations for the origin of life

Many attempts have been made to calculate the probability of the formation of life from chemicals, but all of them involve making simplifying assumptions that make the origin of life even possible (i.e. probability > 0).

Mathematician Sir Fred Hoyle stated in various ways the extreme improbability of life forming, or even getting a single functional biopolymer such as a protein. Hoyle said, “Now imagine 1050blind persons [ed: standing shoulder to shoulder, they would more than fill our entire planetary system] each with a scrambled Rubik cube and try to conceive of the chance of them all simultaneously arriving at the solved form. You then have the chance of arriving by random shuffling of just one of the many biopolymers on which life depends. The notion that not only the biopolymers but the operating program of a living cell could be arrived at by chance in a primordial soup here on earth is evidently nonsense of a high order. Life must plainly be a cosmic phenomenon.”37

Indeed, we can calculate the probability of getting just one small protein of 150 amino acids in length, assuming that only the correct amino acids are present, and assuming that they will join together in the right manner (polymerize). The number of possible arrangements of 150 amino acids, given 20 different ones, is (20)150. Or the probability of getting it right with one try is about 1 in 10195. Lest someone protest that not every amino acid has to be in the exact order, this is only a small protein, and only one of several hundred proteins needed, many of which are much larger, and the DNA sequence has to arise as well, seriously compounding the problem. Indeed there are proteins that will not function at all with even a small alteration to their sequence.38

At that time Hoyle argued that life must therefore have come from outer space. Later he realized that even given the universe as a laboratory, life would not form anywhere by the unguided (non-intelligent) processes of physics and chemistry:

“The likelihood of the formation of life from inanimate matter is one to a number with 40,000 naughts after it … It is big enough to bury Darwin and the whole theory of evolution. There was no primeval soup, neither on this planet nor any other, and if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence.”39

Does a figure of 1 in 1040,000 make the origin of life somewhere in the universe impossible without purposeful intelligence? Can we say that?

The total number of *events* (or ‘elementary logical operations’) that could have occurred in the universe since the [supposed big bang](https://creation.com/exploding-the-big-bang) (13.7 billion years) has been calculated at no more than 10120 by MIT researcher Seth Lloyd.40 This sets an upper limit on the number of experiments that are theoretically possible. This limit means that an event with a probability of 1 in 1040,000 would *never happen.* Not even our one small protein of 150 amino acids would form.

However, biophysicist Harold Morowitz41 came up with a much lower probability of 1 in 1010,000,000,000. This was the chance of a minimalist bacterium being assembled from a broth of all the basic building blocks (e.g. theoretically obtained by heating a brew of living bacteria to kill them and break them down to their basic constituents).

As an atheist, Morowitz argued that therefore life was not a result of chance and posited that there must be some property of available energy that drives the formation of entities that can use it (aka ‘life’). This sounds much like the idea of Gaia, which attributes pantheistic mystical properties to the universe.

More recently the atheist philosopher Thomas Nagel proposed something similar to account for the origin of life and mind.42

来自外太空的生命？ 弗朗西斯·克里克 (Francis Crick) 是 DNA 双螺旋结构的共同发现者，也是“太空生命论”的著名支持者。 35 他提出外星人将生命送到地球，被称为“定向有源论”。 这个想法的另一种形式，简称为“有生源说”，是指生命起源于宇宙的其他地方，并以陨石或彗星上的微生物形式来到地球。 地球就以这种方式“播种”了生命。 这两种说法都有效地使这个问题超出了科学的范围。 关于有生源论唯一可测试的因素是微生物在到达地球的陨石上/内生存的能力。 这已经被测试并发现有缺陷； 微生物无法生存。36 寻找地外智慧生物（SETI）和太阳系外行星的大部分动力来自于寻找生命可能在“外星”形成的证据的愿望。 但即使把整个宇宙当作实验室也不能解决问题； 正如下一节所强调的，生命永远不会形成。 维基共享资源/Booyabazooka 生命起源的概率计算 人们已经进行了许多尝试来计算化学物质形成生命的概率，但所有这些都涉及做出简化的假设，使生命起源成为可能（即概率> 0）。 数学家弗雷德·霍伊尔爵士以各种方式指出生命形成的可能性极小，甚至获得单一功能性生物聚合物（例如蛋白质）也是极其不可能的。 霍伊尔说：“现在想象一下 1050 个盲人[编：肩并肩站着，他们将不仅仅是填满我们的整个行星系统]，每个人都有一个打乱的魔方，并尝试设想他们所有人同时达到解决形式的机会。 然后，你就有机会通过随机重组生命所依赖的众多生物聚合物中的一种来到达。 不仅生物聚合物而且活细胞的操作程序都可以在地球上的原始汤中偶然获得的想法显然是高级的无稽之谈。 生命显然是一种宇宙现象。”37 事实上，我们可以计算得到一种长度为 150 个氨基酸的小蛋白质的概率，假设只存在正确的氨基酸，并假设它们将以正确的方式连接在一起（聚合）。 给定 20 个不同的氨基酸，150 个氨基酸的可能排列数为 (20)150。 或者，一次尝试正确的概率约为 10195 分之一。为了避免有人抗议，并非每个氨基酸都必须按准确的顺序排列，这只是一种很小的蛋白质，而且只是所需的数百种蛋白质中的一种。 它们要大得多，而且 DNA 序列也必须出现，这使问题变得更加复杂。 事实上，有些蛋白质即使对其序列进行很小的改变也根本无法发挥作用。 38 当时霍伊尔认为生命必定来自外太空。 后来他意识到，即使将宇宙作为一个实验室，生命也不会通过物理和化学的无引导（非智能）过程在任何地方形成： “无生命物质形成生命的可能性是一比四，后面有 40,000 个零……它大到足以埋葬达尔文和整个进化论。 无论是在这个星球上，还是在任何其他星球上，都不存在原始汤，如果生命的起源不是随机的，那么它们一定是有目的的智慧的产物。”39 如果没有有目的的智慧，104万分之一的数字是否就意味着宇宙中某个地方的生命起源是不可能的？ 我们可以这么说吗？ 麻省理工学院研究员 Seth Lloyd 计算出，自假定的大爆炸（137 亿年）以来，宇宙中可能发生的事件（或“基本逻辑运算”）总数不超过 10120 个。40 这设定了一个上限 理论上可能的实验数量。 这个限制意味着概率为 1040,000 分之一的事件永远不会发生。 甚至我们的一小块由 150 个氨基酸组成的蛋白质也不会形成。 然而，生物物理学家 Harold Morowitz41 得出的概率要低得多，为 1010,000,000,000 分之一。 这是从所有基本构建块的肉汤中组装出极简细菌的机会（例如，理论上通过加热活细菌的混合物来杀死它们并将它们分解为基本成分而获得）。 作为一名无神论者，莫洛维茨认为生命不是偶然的结果，并假设可用能量必须具有某种属性来驱动可以使用它的实体（又称“生命”）的形成。 这听起来很像盖亚的想法，它将泛神论的神秘属性赋予宇宙。 最近，无神论哲学家托马斯·内格尔提出了类似的观点来解释生命和心灵的起源。 42

Anything but believe in a supernatural Creator, it would appear.

The different probabilities calculated arise from the difficulty of calculating such probabilities and the differing assumptions that are made. If we make calculations using assumptions that are most favourable to abiogenesis and the result is still ridiculously improbable, then it is a more powerful argument than using more realistic assumptions that result in an even more improbable result for the materialist (because the materialist can try to argue against some of the assumptions with the latter approach).

However, all calculations of the probability of the chemical origin of life make unrealistic assumptions in favour of it happening, otherwise the probability would be zero. For example, Morowitz’s broth of all the ingredients of a living cell cannot exist because the chemical components will react with each other in ways that will render them unavailable for forming the complex polymers of a living cell, as explained above.

*The origin of life is about as good as it gets in terms of scientific ‘proof’ for the existence of God.*

High profile information theorist Hubert Yockey (UC Berkeley) realized this problem:

“The origin of life by chance in a primeval soup is impossible in probability in the same way that a perpetual motion machine is in probability. The extremely small probabilities calculated in this chapter are not discouraging to true believers … [however] A practical person must conclude that life didn’t happen by chance.”43

Note that in his calculations, Yockey generously granted that the raw materials were available in a primeval soup. But in the previous chapter of his book, Yockey showed that a primeval soup could never have existed, so belief in it is an act of ‘faith’. He later concluded, “the primeval soup paradigm is self-deception based on the ideology of its champions.”44

除了相信超自然的造物主以外，任何其他事物都会出现。 计算出的不同概率是由于计算此类概率的难度以及所做出的不同假设而产生的。 如果我们使用最有利于自然发生的假设进行计算，而结果仍然是不可能的，那么它是一个比使用更现实的假设更有力的论据，而这些假设会导致唯物主义者更不可能的结果（因为唯物主义者可以尝试 反对后一种方法的一些假设）。 然而，所有对生命化学起源概率的计算都做出了不切实际的假设，有利于它的发生，否则概率将为零。 例如，莫洛维茨的活细胞所有成分的肉汤不可能存在，因为化学成分会相互反应，使它们无法形成活细胞的复杂聚合物，如上所述。 就上帝存在的科学“证据”而言，生命的起源几乎是最好的。 知名信息理论家 Hubert Yockey（加州大学伯克利分校）意识到了这个问题： “生命在原始汤中偶然起源在概率上是不可能的，就像永动机在概率上是不可能的一样。 本章中计算出的极小概率不会让真正的信徒感到沮丧……[但是]一个务实的人必须得出结论，生命不是偶然发生的。”43 请注意，约基在他的计算中慷慨地承认原材料可以在原始汤中获得。 但约基在他的书的前一章中表明，原始汤永远不可能存在，因此相信它是一种“信仰”行为。 他后来得出结论，“原始汤范式是基于其拥护者意识形态的自欺欺人。”44

More admissions

Note that Yockey is not the only high-profile academic to speak plainly on this issue:

“Anyone who tells you that he or she knows how life started on earth some 3.4 billion years ago is a fool or a knave. Nobody knows.”—Professor Stuart Kauffman, origin of life researcher, University of Calgary, Canada.45

“…we must concede that there are presently no detailed Darwinian accounts of the evolution of any biochemical or cellular system, only a variety of wishful speculations.” —Franklin M. Harold, Emeritus Professor of Biochemistry and Molecular Biology Colorado State University.46

“We are almost as much in the dark today about the pathway from nonlife to life as Charles Darwin was when he wrote, ‘It is mere rubbish thinking at present of the origin of life; one might as well think of the origin of matter.’”—Paul Davies, director of BEYOND: Center for Fundamental Concepts in Science at Arizona State University.47

“The novelty and complexity of the cell is so far beyond anything inanimate in the world today that we are left baffled by how it was achieved.”— Kirschner, M.W. (professor and chair, department of systems biology, Harvard Medical School, USA.), and Gerhart, J.C. (professor in the Graduate School, University of California, USA).48

“Conclusion: The scientific problem of the origin of life can be characterized as the problem of finding the chemical mechanism that led all the way from the inception of the first autocatalytic reproduction cycle to the last common ancestor. All present theories fall far short of this task. While we still do not understand this mechanism, we now have a grasp of the magnitude of the problem.”49

“The biggest gap in evolutionary theory remains the origin of life itself… the gap between such a collection of molecules [amino acids and RNA] and even the most primitive cell remains enormous.”—Chris Wills, professor of biology at the University of California, USA.50

Even the doctrinaire materialist Richard Dawkins admitted to Ben Stein ([*Expelled*](https://creation.com/expelled-digging-deeper), the movie documentary) that no one knows how life began:

Richard Dawkins: “We know the sort of event that must have happened for the origin of life—it was the origin of the first self-replicating molecule.”

Ben Stein: “How did that happen?”

Richard Dawkins: “I’ve told you, we don’t know.”

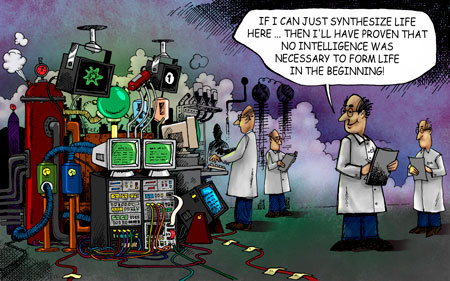
Ben Stein: “So you have no idea how it started?”

Richard Dawkins: “No, nor has anybody.”51

“*We will never know how life first appeared.* However, the study of the appearance of life is a mature, well-established field of scientific inquiry. As in other areas of evolutionary biology, answers to questions on the origin and nature of the first life forms can only be regarded as inquiring and explanatory rather than definitive and conclusive.”52 [*emphasis* added]

更多坦白

请注意，约基并不是唯一一位公开谈论这个问题的知名学者： “如果有人告诉你他或她知道大约 34 亿年前地球上生命是如何开始的，那么他或她就是傻瓜或无赖。 没有人知道。”——斯图尔特·考夫曼教授，加拿大卡尔加里大学生命起源研究员45 “……我们必须承认，目前还没有关于任何生化或细胞系统进化的详细达尔文主义描述，只有各种一厢情愿的猜测。” — Franklin M. Harold，科罗拉多州立大学生物化学和分子生物学名誉教授46 今天，我们对从非生命到生命的途径几乎一无所知，就像查尔斯·达尔文（Charles Darwin）写道：“目前对生命起源的思考只是垃圾；” 人们不妨思考一下物质的起源。”——亚利桑那州立大学超越科学基本概念中心主任保罗·戴维斯 (Paul Davies) 47 “细胞的新颖性和复杂性远远超过了当今世界上任何无生命的东西，以至于我们对它是如何实现的感到困惑。”——Kirschner, M.W.（美国哈佛医学院系统生物学系教授兼系主任） ）和 Gerhart, J.C.（美国加州大学研究生院教授）48 结论：生命起源的科学问题可以被描述为寻找从第一个自催化繁殖周期开始一直到最后一个共同祖先的化学机制的问题。 目前所有的理论都远远不能完成这项任务。 虽然我们仍然不了解这种机制，但我们现在已经了解了问题的严重性。”49 “进化论中最大的差距仍然是生命本身的起源……这样的分子集合（氨基酸和RNA）甚至最原始的细胞之间的差距仍然是巨大的。”——克里斯·威尔斯，加州大学生物学教授 , 美国.50 就连教条唯物主义者理查德·道金斯也向本·斯坦（纪录片《驱逐》）承认，没有人知道生命是如何开始的： 理查德·道金斯：“我们知道生命起源必须发生的那种事件——它是第一个自我复制分子的起源。” 本·斯坦：“这是怎么发生的？” 理查德·道金斯：“我告诉过你，我们不知道。” 本·斯坦：“所以你不知道事情是如何开始的？” 理查德·道金斯：“没有，也没有人。”51 “我们永远不会知道生命最初是如何出现的。 然而，对生命外观的研究是一个成熟、完善的科学探究领域。 与进化生物学的其他领域一样，对第一个生命形式的起源和性质问题的回答只能被视为询问和解释性的，而不是明确的和结论性的。”52 [强调]

If a scientist managed to create a machine that could make life, it would only go to show how much intelligence was needed to create life!

Conclusion

Life did not arise by physics and chemistry without intelligence. The intelligence needed to create life, even the simplest life, is far greater than that of humans; we are still scratching around trying to understand fully how the simplest life forms work. There is much yet to be learned of even the simplest bacterium. Indeed, as we learn more the ‘problem’ of the origin of life gets more difficult; a solution does not get nearer, it gets further away. But the real problem is this: the origin of life screams at us that there is a *super-intelligent* Creator of life and that is just not acceptable to the secular mind of today.

The origin of life is about as good as it gets in terms of scientific ‘proof’ for the existence of God.

如果科学家成功地制造出了一台可以创造生命的机器，那只能说明创造生命需要多少智力！ 结论 如果没有智慧，生命就不会由物理和化学产生。 创造生命所需的智慧，即使是最简单的生命，也远远高于人类； 我们仍在努力尝试充分理解最简单的生命形式是如何运作的。 即使是最简单的细菌，还有很多东西有待了解。 事实上，随着我们了解得越多，生命起源的“问题”就会变得更加困难。 解决方案不会变得更近，而是会变得更远。 但真正的问题是：生命的起源向我们尖叫，有一个超级智慧的生命创造者，而这对于今天的世俗思想来说是无法接受的。 就上帝存在的科学“证据”而言，生命的起源几乎是最好的。

Origin of life: the polymerization problem

***by***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-d-sarfati)

A well-publicised paper by Claudia Huber and Günter Wächtershäuser in *Science* proposed a scenario for a materialistic origin of life from non-living matter.1 They correctly state:

The activation of amino acids and the formation of peptides under primordial conditions is one of the great riddles of the origin of life.

Indeed it is. The reaction to form a peptide bond between two amino acids to form a dipeptide is:

Amino acid 1 + amino acid 2 → dipeptide + water

H₂NCHRCOOH + H₂NCHR′COOH → H₂NCHRCONHCHR′COOH + H₂O (1)

The free energy change(ΔG₁) is about 20–33 kJ/mol, depending on the amino acids. The equilibrium constant for any reaction (K) is the equilibrium ratio of the concentration of products to reactants. The relationship between these quantities at any Kelvin temperature (T) is given by the standard equation:

K = exp (–ΔG*/*RT)

where R is the universal gas constant (= Avogadro’s number × Boltzmann’s constant k) = 8.314 J/K.mol

For reaction (1),

K₁ = [H₂NCHRCONHCHR′COOH][H₂O]/[H₂NCHRCOOH][H₂NCHR′COOH]

= 0.007 at 298 K

where a compound in square brackets symbolises the concentration of that compound.

This means that if we start with a concentrated solution of 1 M (mol/l) of each amino acid, the equilibrium dipeptide concentration would be only 0.007 M. Since tripeptides have two peptide bonds, the equilibrium tripeptide concentration would be 0.007² M or 5 × 10⁻⁵ M. For a non-specific polypeptide with 100 peptide bonds (101 amino acids), the equilibrium concentration would be 3.2 × 10⁻²¹⁶ M. NB: the problem for evolutionists is even worse, because life requires not just any polymers, but highly specified ones.

Since the equilibrium concentration of polymers is so low, their thermodynamic tendency is to **break down** in water, not to be built up. The long ages postulated by evolutionists simply make the problem worse, because there is more time for water’s destructive effects to occur. High temperatures, as many researchers advocate, would accelerate the breakdown. The famous pioneer of evolutionary origin-of-life experiments, Stanley Miller, points out that polymers are ‘too unstable to exist in a hot prebiotic environment’.2,3 A recent article in *New Scientist* also described the instability of polymers in water as a ‘headache’ for researchers working on evolutionary ideas on the origin of life.4 It also showed its materialistic bias by saying this was not ‘good news’. But the real bad news is the faith in evolution which overrides objective science.

生命起源：聚合问题 作者：乔纳森·萨法蒂 Claudia Huber 和 Günter Wächtershäuser 在《科学》杂志上发表的一篇广为人知的论文提出了生命从非生命物质中唯物主义起源的设想。1 他们正确地指出： 原始条件下氨基酸的活化和肽的形成是生命起源的重大谜团之一。 它的确是。 两个氨基酸之间形成肽键形成二肽的反应是： 氨基酸1+氨基酸2→二肽+水 H2NCHRCOOH + H2NCHR′COOH → H2NCHRCONHCHR′COOH + H2O (1) 自由能变化 (ΔG₁) 约为 20–33 kJ/mol，具体取决于氨基酸。 任何反应的平衡常数 (K) 是产物与反应物浓度的平衡比。 在任何开尔文温度 (T) 下这些量之间的关系由标准方程给出： K = exp (–ΔG/RT) 其中 R 是通用气体常数（= 阿伏加德罗常数 × 玻尔兹曼常数 k）= 8.314 J/K.mol 对于反应（1）， K₁ = [H2NCHRCONHCHR′COOH][H2O]/[H2NCHRCOOH][H2NCHR′COOH] = 298 K 时 0.007 其中方括号中的化合物表示该化合物的浓度。 这意味着，如果我们从每种氨基酸的 1 M (mol/l) 浓溶液开始，则平衡二肽浓度仅为 0.007 M。由于三肽有两个肽键，因此平衡三肽浓度将为 0.007² M 或 5 × 10⁻⁵ M。对于具有 100 个肽键（101 个氨基酸）的非特异性多肽，平衡浓度将为 3.2 × 10⁻21⁵ M。注意：进化论者的问题更糟，因为生命不仅需要 任何聚合物，但高度指定的聚合物。 由于聚合物的平衡浓度如此之低，它们的热力学趋势是在水中分解，而不是聚集。 进化论者假设的漫长年龄只会让问题变得更糟，因为水的破坏作用有更多的时间发生。 正如许多研究人员所主张的那样，高温会加速分解。 进化生命起源实验的著名先驱斯坦利·米勒 (Stanley Miller) 指出，聚合物“太不稳定，无法在炎热的生命起源环境中存在”。2,3 《新科学家》最近的一篇文章也将聚合物在水中的不稳定性描述为 对于研究生命起源进化论的研究人员来说，这是一个“头痛”的问题。4 它还说这不是“好消息”，这也表明了其唯物主义偏见。 但真正的坏消息是对进化论的信仰凌驾于客观科学之上。

Some evolutionary scenarios

The analysis above doesn’t mean it’s impossible to make polypeptides. Consider the expression for the equilibrium constant K: if [H₂O] is lowered, then [polypeptide] must increase. One approach is to drive off the water with heat, as proposed by Sydney Fox.5 However, his experiments required a large excess of the trifunctional amino acids (i.e. they can combine with three other molecules), but these are produced very sparingly in typical simulation experiments.6 The heat also destroys some vital amino acids and results in highly randomized polymers. Another problem is that all the chiral amino acids are racemized, that is, a 50/50 mixture of left and right handed molecules is produced, which is unsuitable for life.7 The large excess of trifunctional amino acids results in extensive branching, unlike biological polymers. The required heating and cooling conditions are geologically unrealistic—there is no known place on earth where amino acids could be dumped and polypeptides would result. Finally, Fox’s experiments required very concentrated and pure amino acids, while any hypothetical primordial soup would be impure and grossly contaminated with other organic chemicals that would destroy them.8

Another way to remove water is with certain high-energy chemicals that absorb water, called *condensing agents.* If the reaction between condensing agent C and water is:

C + H₂O → D (2)

and if ΔG₂ of reaction (2) is negative and large enough, it can couple with reaction (1):

H₂NCHRCOOH + H₂NCHR′COOH + C → H₂NCHRCONHCHR′COOH + D (3)

ΔG₃ = ΔG₁ + ΔG₂. If ΔG₃ is large and negative, the equilibrium constant for reaction 3, K₃, will be large, and this could conceivably produce reasonable quantities of polymers.

Some researchers used the condensing agent dicyanamide (N=CNHC=N) to produce some peptides from glycine, even claiming, ‘dicyanamide mediated polypeptide synthesis may have been a key process by which polypeptides were produced in the primitive hydrosphere.’9

However, the biggest problem is that condensing agents would readily react with any water available. Therefore it is a chemical impossibility for the primordial soup to accumulate large quantities of condensing agents, especially if there were millions of years for water to react with them. Yet the above experiment used a 30-fold excess of dicyanamide. And even with these unrealistic conditions, 95% of the glycine remained unreacted, and the highest polymer formed was a tetrapeptide.10

Organic chemists can certainly make polypeptides, using intelligent planning of a complex multi-stage synthesis, designed to prevent wrong reactions occurring.11 Living cells also use an elegant process to make polypeptides. This involves the use of enzymes to activate amino acids (and nucleotides) by combining them with the high-energy compound ATP (**a**denosine **t**ri**p**hosphate), to overcome the energy barrier. Such high-energy compounds are not formed in prebiotic simulation experiments, and are very unstable.

一些进化场景 上述分析并不意味着不可能制造多肽。 考虑平衡常数 K 的表达式：如果 [H2O] 降低，则 [多肽] 必须增加。 一种方法是用热量驱走水分，如 Sydney Fox 所提出的。5 然而，他的实验需要大量过量的三官能氨基酸（即它们可以与其他三个分子结合），但这些在典型的条件下产生得非常少。 模拟实验。6 热量还会破坏一些重要的氨基酸并产生高度随机的聚合物。 另一个问题是所有手性氨基酸都被外消旋化，即产生了左旋分子和右旋分子 50/50 的混合物，这不适合生命。 7 大量过量的三官能氨基酸会导致广泛的支化，这与生物分子不同。 聚合物。 所需的加热和冷却条件在地质学上是不现实的——地球上没有已知的地方可以倾倒氨基酸并产生多肽。 最后，福克斯的实验需要非常浓缩和纯净的氨基酸，而任何假设的原始汤都将是不纯净的，并且受到其他会破坏它们的有机化学物质的严重污染。 8 另一种去除水的方法是使用某些吸收水的高能化学物质，称为冷凝剂。 设缩合剂C与水的反应为： C + H2O → D (2) 如果反应(2)的ΔG2为负且足够大，则可以与反应(1)耦合： H2NCHRCOOH + H2NCHR′COOH + C → H2NCHRCONHCHR′COOH + D (3) ΔG₃ = ΔG₁ + ΔG2。 如果 ΔG₃ 很大且为负，则反应 3 的平衡常数 K₃ 将会很大，并且这可能会产生合理数量的聚合物。 一些研究人员使用缩合剂二氰胺（N=CNHC=N）从甘氨酸生产一些肽，甚至声称，“二氰胺介导的多肽合成可能是原始水圈中产生多肽的关键过程。”9 然而，最大的问题是冷凝剂很容易与任何可用的水发生反应。 因此，原始汤在化学上不可能积聚大量的凝结剂，特别是如果水需要数百万年才能与它们发生反应。 然而上述实验使用了过量30倍的二氰胺。 即使在这些不切实际的条件下，95% 的甘氨酸仍未反应，形成的最高聚合物是四肽。 10 有机化学家当然可以通过复杂的多阶段合成的智能规划来制造多肽，旨在防止错误反应的发生。11 活细胞也使用一种优雅的过程来制造多肽。 这涉及使用酶通过将氨基酸（和核苷酸）与高能化合物 ATP（三磷酸腺苷）结合来激活氨基酸（和核苷酸），以克服能量障碍。 这种高能化合物不是在生命起源模拟实验中形成的，而且非常不稳定。

Chain termination

To form a chain, it is necessary to react *bifunctional* monomers, that is, molecules with two functional groups so they combine with two others. If a *unifunctional* monomer (with only one functional group) reacts with the end of the chain, the chain can grow no further at this end.12 If only a small fraction of unifunctional molecules were present, long polymers could not form. But all ‘prebiotic simulation’ experiments produce **at least three times more** unifunctional molecules than bifunctional molecules.13 Formic acid (HCOOH) is by far the commonest organic product of Miller-type simulations. Indeed, if it weren’t for evolutionary bias, the abstracts of the experimental reports would probably state nothing more than: ‘An inefficient method for production of formic acid is here described …’ Formic acid has little biological significance except that it is a major component of ant (Latin *formica*) stings.

A realistic prebiotic polymerisation simulation experiment should begin with the organic compounds produced by Miller-type experiments, but the reported ones always exclude unifunctional contaminants.

[**Update, 2014:** [Dr Dudley Eirich](https://creation.com/manipulating-life-dr-eirich-interview) comments:

I work in Biotech producing a bifunctional monomer for the polymer industry. I can attest to the fact that the final purified material for sale has to be essentially free of the monofunctional monomer. The final product generally has to be greater than 99.5% pure and for some applications the final product has to be greater than 99.9% pure. We have to use a lot of scientific knowledge and expensive equipment to attain those purity levels. Realistic ‘natural’ polymerization reactions could never produce long chains of polymers because there would always be overly high concentrations of monofunctional monomer components around to terminate growing chains.]

Wächtershäuser’s theory

Günter Wächtershäuser is a German patent attorney with a doctorate in organic chemistry. He is highly critical of the usual primordial soup ideas of the origin of life. As the quote at the beginning of this article shows, he recognises that polymerization is a big problem. However, not willing to abandon his evolutionary faith, he proposes that life began as a cyclic chemical reaction on the surface of pyrite (FeS₂). The energy to drive this cycle is said to come from the continued production of pyrite from iron and sulfur. However, he admits that this proposal is for the most part, ‘pure speculation’.14 Fellow origin-of-life researcher Gerald Joyce claims that the acceptance of Wächtershäuser’s theory owes more to his legal skills than to its merit.14 Stanley Miller calls it ‘paper chemistry’.15

In their latest well-publicised experiment, Huber and Wächtershäuser activated amino acids with carbon monoxide (CO) and reacted them in an aqueous slurry of co-precipitated (Ni,Fe)S using either hydrogen sulfide (H₂S) or methanethiol (CH₃SH) at 100° C at a pH of 7–10.

We should also note that Huber and Wächtershäuser started off with very favourable conditions for chemical evolution. Although ‘the researchers have not yet shown that this recipe can produce amino acids’,16  they used a strong solution (0.05 M) of left-handed amino acids (or the achiral glycine), with no other organic material. Of course, any ‘primordial soup’ would have been dilute, impure and racemic. It would have contained many unifunctional molecules and other organic compounds that would have destroyed amino acids. Stanley Miller also points out that Huber and Wächtershäuser used concentrations of CO far higher than are realistic in nature.16

Even under their favourable conditions (due to intelligent design!), all they produced was a small percentage of dipeptides (0.4–12.4%) and an even tinier amount of tripeptides (0.003%)—calculated from reported quantities. Huber and Wächtershäuser also reported that ‘under these same conditions dipeptides hydrolysed rapidly’!

链条终止 为了形成链，必须使双官能单体（即具有两个官能团的分子）发生反应，以便它们与另外两个官能团结合。 如果单官能单体（仅具有一个官能团）与链末端发生反应，则链在此末端无法进一步生长。12 如果仅存在一小部分单官能分子，则无法形成长聚合物。 但所有“生命起源前模拟”实验产生的单功能分子至少是双功能分子的三倍。13 甲酸 (HCOOH) 是迄今为止米勒式模拟中最常见的有机产物。 事实上，如果不是因为进化偏差，实验报告的摘要可能只会说：“这里描述了一种低效的甲酸生产方法……”除了它是一种主要的甲酸外，甲酸没有什么生物学意义。 蚂蚁（拉丁福米卡）蜇伤的成分。 现实的益生元聚合模拟实验应该从米勒型实验产生的有机化合物开始，但报道的实验总是排除单功能污染物。 [2014 年更新：Dudley Eirich 博士评论： 我在生物技术公司工作，为聚合物行业生产双功能单体。 我可以证明，最终出售的纯化材料必须基本上不含单官能单体。 最终产品的纯度通常必须高于 99.5%，对于某些应用，最终产品的纯度必须高于 99.9%。 我们必须使用大量的科学知识和昂贵的设备来达到这些纯度水平。 现实的“自然”聚合反应永远不会产生长链聚合物，因为周围总是存在浓度过高的单官能单体成分来终止不断增长的链。] 瓦希特肖瑟的理论 Günter Wächtershäuser 是一位德国专利律师，拥有有机化学博士学位。 他对生命起源的原始汤观念持高度批评态度。 正如本文开头的引文所示，他认识到聚合是一个大问题。 然而，他不愿意放弃自己的进化论信念，提出生命起源于黄铁矿 (FeS2) 表面的循环化学反应。 据说驱动这一循环的能量来自于铁和硫持续生产黄铁矿。 然而，他承认这一提议在很大程度上是“纯粹的猜测”。 14 生命起源研究员杰拉尔德·乔伊斯 (Gerald Joyce) 声称，瓦希特肖瑟理论的接受更多地归功于他的法律技能，而不是其优点。 14 斯坦利·米勒 (Stanley Miller) 呼吁 它是“造纸化学”.15 在他们最新广为人知的实验中，Huber 和 Wächtershäuser 用一氧化碳 (CO) 活化氨基酸，并在共沉淀 (Ni,Fe)S 的水浆中使用硫化氢 (H2S) 或甲硫醇 (CH₃SH) 在 100°C，pH 7-10。 我们还应该注意到，Huber 和 Wächtershäuser 一开始就为化学演化提供了非常有利的条件。 尽管“研究人员尚未证明该配方可以产生氨基酸”16，但他们使用了左手氨基酸（或非手性甘氨酸）的浓溶液（0.05 M），不含其他有机材料。 当然，任何“原始汤”都是稀释的、不纯的和外消旋的。 它可能含有许多单功能分子和其他会破坏氨基酸的有机化合物。 Stanley Miller 还指出 Huber 和 Wächtershäuser 使用的 CO 浓度远高于自然界的实际浓度。 16 即使在有利的条件下（由于智能设计！），它们产生的也只是一小部分二肽（0.4-12.4%）和更少量的三肽（0.003%）——根据报告的数量计算。 Huber 和 Wächtershäuser 还报告说，“在这些相同的条件下，二肽迅速水解”！

The exclusive ‘left-handedness’ required for life7 was destroyed in the process. They excuse this by pointing out that some cell wall peptides have right-handed amino acids. But this misses the point—enzymes that break down cell walls are designed for exclusively left-handed amino acids, so an occasional right-handed amino acid is the perfect defence in a left-handed world.

A final irony is that one of their previous experiments converted CO into acetic acid (CH₃COOH) under similar conditions with CH₃SH and a (Ni,Fe)S slurry.17 Since acetic acid is unifunctional, this would **prevent** long polymers from forming under the conditions Huber and Wächtershäuser propose!

Did scientists create life, or did the media create hype?

Newspapers around the world reported this experiment. Some went as far as claiming: ‘German chemists have produced living cells from a combination of amino acids …’18

If true, then this would be remarkable. Even the simplest decoded free-living organism, *Mycoplasma genitalium*, has 482 genes coding for all the necessary proteins, including enzymes. These proteins are composed of about 400 amino acids each on average, in precise sequences, and all in the ‘left-handed’ form.19 Of course, these genes are only functional with pre-existing translational and replicating machinery, a cell membrane, etc. But *Mycoplasma* can only survive by parasitizing more complex organisms, which provide many of the nutrients it cannot manufacture for itself. So evolutionists must postulate an even more complex first living organism with even more genes.

However, as shown above, all Huber and Wächtershäuser produced were a few dipeptides and even fewer tripeptides. While they didn’t make the deceitful claim quoted above, their evolutionary faith means that they see far more significance in their experiment than it deserves.

The next day, the same newspaper wrote ‘WA Museum evolutionary biologist Ken McNamara said if life could be created artificially, it could emerge naturally given the right conditions.’20 How absurd—does this mean that because we can create cars artificially (with loads of intelligent input), it proves they could emerge naturally (without intelligence!)?

People should not be surprised by such biased reporting. We should compare the hype about ‘Martian life’ with the near silence about the fact that this claim has been thoroughly discredited, even according to most secular scientists.21,22,23,24

The cynical media disdain for truth was well illustrated at a symposium sponsored by the Smithsonian Institution. Ben Bradlee, editor of *The Washington Post*, said:

‘To hell with the news! I’m no longer interested in news. I’m interested in causes. We don’t print the truth. We don’t pretend to print the truth. We print what people tell us. It’s up to the public to decide what’s true.’25

A detailed survey of the political and social beliefs of producers, editors, writers, and staff in the television industry26 shows that they are biased against Christian morality. Two-thirds of them believe the structure of American society is faulty and must be changed. 97% say women should have the right to decide whether they want to have an abortion, 80% believe there’s nothing wrong with homosexual relations, and 51% see nothing wrong with adultery. And they openly admit that they push their ideas into the programs they create for their audiences. The media’s willingness to push evolutionary hype is consistent with their anti-Christian stance.

生命所需的独特的“左撇子”在这个过程中被摧毁了。 他们通过指出某些细胞壁肽具有右手氨基酸来对此进行辩解。 但这没有抓住重点——分解细胞壁的酶是专为左手氨基酸设计的，因此偶尔的右手氨基酸是左手世界的完美防御。 最后一个具有讽刺意味的是，他们之前的一项实验在类似条件下用 CH₃SH 和 (Ni,Fe)S 浆料将 CO 转化为乙酸 (CH₃COOH)。 17 由于乙酸是单官能的，这将阻止在该条件下形成长聚合物 Huber 和 Wächtershäuser 求婚了！ 是科学家创造了生命，还是媒体炒作？ 世界各地的报纸都报道了这一实验。 有些人甚至声称：“德国化学家已经用氨基酸组合产生了活细胞……”18 如果这是真的，那么这将是了不起的。 即使是最简单的解码的自由生物体，生殖支原体，也有 482 个基因编码所有必需的蛋白质，包括酶。 这些蛋白质平均每个由约 400 个氨基酸组成，序列精确，并且全部呈“左手”形式。 19 当然，这些基因仅在预先存在的翻译和复制机制（细胞膜）下发挥作用。 但支原体只能通过寄生更复杂的生物体才能生存，这些生物体提供了它自身无法制造的许多营养物质。 因此，进化论者必须假设第一个生物体更加复杂，具有更多的基因。 然而，如上所示，Huber 和 Wächtershäuser 生产的所有都是一些二肽，甚至更少的三肽。 虽然他们没有做出上面引用的欺骗性主张，但他们的进化论信念意味着他们在实验中看到的意义远远超出了应有的意义。 第二天，同一份报纸写道：“西澳博物馆进化生物学家肯·麦克纳马拉说，如果生命可以人工创造，那么在适当的条件下它就可以自然出现。”20 多么荒谬——这是否意味着因为我们可以人工制造汽车（带有负载） 智能输入），这证明它们可以自然出现（无需智能！）？ 人们不应该对这种带有偏见的报道感到惊讶。 我们应该将关于“火星生命”的炒作与几乎沉默的事实进行比较，即这一说法已被彻底怀疑，即使根据大多数世俗科学家的说法也是如此。21,22,23,24 愤世嫉俗的媒体对真相的蔑视在史密森学会主办的一次研讨会上得到了很好的体现。 《华盛顿邮报》编辑本·布拉德利说： ‘让这个消息见鬼去吧！ 我对新闻不再感兴趣了。 我对原因感兴趣。 我们不打印真相。 我们不会假装印刷真相。 我们打印人们告诉我们的内容。 由公众来决定什么是真实的。’25 对电视行业制片人、编辑、作家和工作人员的政治和社会信仰的详细调查26表明，他们对基督教道德存在偏见。 三分之二的人认为美国社会结构有缺陷，必须改变。 97% 的人认为女性应该有权决定是否堕胎，80% 的人认为同性恋关系没有问题，51% 的人认为通奸没有问题。 他们公开承认他们将自己的想法融入到为观众制作的节目中。 媒体大肆宣扬进化论的意愿与他们的反基督教立场是一致的。

Conclusion

Despite over-optimistic science reports and very biased and hyped-up media reports, scientists have not even come close to ‘creating life in the test-tube’. Even if they do manage this feat, it will be the result of intelligent design. Ordinary undirected chemistry moves in the wrong direction—for example, as shown in this article, biological polymers tend to break apart, not form.

结论 尽管科学报告过于乐观，媒体报道也非常偏颇和炒作，但科学家们甚至还没有接近“在试管中创造生命”。 即使他们确实实现了这一壮举，这也将是智能设计的结果。 普通的无向化学会朝着错误的方向发展——例如，如本文所示，生物聚合物往往会分解，而不是形成。

Quantum Biology and the Origin of Life

***by***[***Mary Beth De Repentigny***](https://creation.com/mary-beth-de-repentigny)***and***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-sarfati)

Johnjoe McFadden

Could quantum mechanics have played a role in the origin of life? Two academics at the University of Surrey are at the forefront of researching this question. They are Johnjoe McFadden, professor of molecular genetics, and Jim Al-Khalili, theoretical physicist. Together they direct the world’s first doctoral training center dedicated to developing interdisciplinary scientists in the field of quantum biology. To these scientists, the answer to the question of how [abiogenesis (chemical evolution)](https://creation.com/ns-origin-of-life) occurred lies in the notion that evolution needs a self-replicator. They propose that quantum mechanics helped mediate the search for a [self-replicating proto-enzyme molecule](https://creation.com/self-replicating-enzymes) in the alleged primordial soup.1 McFadden and Al-Khalili realize the shaky foundation their musings are built upon when they make the following concession: “Of course, any scenario involving quantum mechanics in the origin of life three billion years ago remains highly speculative.”2

Invoking quantum mechanics to explain the unexplainable

At times, the authors’ objective scientific reasoning gives way to faith in quantum mechanics as the naturalism-of-the gaps for evolutionary theory.

It behooves those considering quantum biology’s function in the origin of life to keep this admonition in mind. There are currently several competing interpretations for quantum mechanics (QM). Thus, using one debatable postulation like quantum coherence to explain another, like abiogenesis, only leads to more ambiguity.

McFadden and Al-Khalili collaborated on the popular 2014 book *Life on the Edge*, *The Coming of Age of Quantum Biology.* At times, the authors’ objective scientific reasoning gives way to faith in quantum mechanics as the naturalism-of-the gaps for evolutionary theory. This is clearly evidenced when McFadden and Al-Khalili make a statement of unshakable faith in their theory by saying that even when contemplating what a challenging job self-replication is without a living cell to achieve the feat, it must have been done billions of years ago, or we would not be here contemplating the problem today.3

量子生物学和生命起源 作者：玛丽·贝丝·德·雷彭蒂尼和乔纳森·萨法蒂 约翰乔·麦克法登 量子力学能否在生命起源中发挥作用？ 萨里大学的两位学者处于研究这个问题的前沿。 他们是分子遗传学教授约翰乔·麦克法登和理论物理学家吉姆·阿尔哈利利。 他们共同领导了世界上第一个博士培训中心，致力于培养量子生物学领域的跨学科科学家。 对于这些科学家来说，自然发生（化学进化）如何发生的问题的答案在于进化需要自我复制的概念。 他们提出，量子力学有助于在所谓的原始汤中寻找自我复制的原酶分子。1麦克法登和阿尔哈利利在做出以下让步时意识到他们的思考所建立的基础是不稳定的：“当然， 三十亿年前生命起源中涉及量子力学的任何场景仍然高度推测。”2 援引量子力学来解释无法解释的事情 有时，作者的客观科学推理让位于对量子力学作为进化论间隙的自然主义的信仰。 那些考虑量子生物学在生命起源中的作用的人应该牢记这一警告。 目前对量子力学（QM）有几种相互竞争的解释。 因此，使用一种有争议的假设（如量子相干性）来解释另一种假设（如自然发生）只会导致更多的歧义。 McFadden 和 Al-Khalili 合作出版了 2014 年畅销书《边缘的生命，量子生物学时代的到来》。 有时，作者的客观科学推理让位于对量子力学作为进化论间隙的自然主义的信仰。 麦克法登和阿尔哈利利对他们的理论坚定不移地发表了声明，他们说，即使考虑到没有活细胞来实现这一壮举的自我复制是一项多么具有挑战性的工作，这也清楚地证明了这一点，它一定已经完成了数十亿年 以前，否则我们今天就不会在这里思考这个问题。3

Theoretical physicist David Griffiths expresses a well-founded cynicism toward invoking quantum mechanics to explain the unexplainable when he says, “In general, when you hear a physicist invoke the uncertainty principle, keep a hand on your wallet.”4

Jim Al-Khalili

The book’s main thesis is that quantum coherence once played the kind of role in the origin of life as it currently does in living cells. In building their case, McFadden and Al-Khalili first cue the reader in on what quantum coherence is. One of the central ideas of quantum mechanics (QM) is wave-particle duality by which a particle can be described as a matter-wave. As such, quantum coherence refers to a situation in which the wave-like nature of a matter particle splits in two. These two waves then coherently interfere, such that their peaks and troughs coincide.

Mathematically, quantum coherence refers to a property of solutions to the Schrödinger wave equation. With this, we can describe a particle’s wave property as being in many different places or states at the same time, with different probabilities. As soon as the wave comes into contact with something else, it experiences decoherence by collapsing into a single particle at one location. Decoherence is thus the process whereby coherence is lost and the quantum becomes classical.

McFadden and Al-Khalili give a thorough and fascinating account of [photosynthesis](https://creation.com/gods-solar-power-plants-amaze-chemists) and catalysis, as well as avian navigation, as life processes in which quantum mechanics may play a role. As interesting and well-founded as these examples may be, they have nothing to do with producing life from nonlife. These researchers extrapolate the evidence for quantum effects in living organisms to wrongly infer that such effects could have been in play in the prebiotic world. This overreach is the main problem with their whole premise.

RNA and even its building blocks are very unstable. In fact, even DNA has been shown to be very unstable. Living creatures need many repair machines to overcome the damage. But RNA is 100× less stable than DNA.

In their effort to overcome the impossible hurdles of obtaining life from non-living materials, McFadden and Al-Khalili favor the [RNA world hypothesis](https://creation.com/cairns-smith-detailed-criticisms-of-the-rna-world-hypothesis). This is basically the idea that primordial chemical synthesis resulted in an RNA molecule that could act as both a gene for encoding, and as an enzyme for making copies of itself. RNA world advocates point out that there are different classes of particular RNA molecules known as *ribozymes* which can do one of these jobs or the other. So they propose that life on earth could have begun in an RNA world, without DNA and enzymes present at first. Those RNA molecules would presumably have eventually used proteins to improve their replication efficiency, leading to DNA and the first living cell over the course of time.5

But ribozymes have limited catalytic activity. In particular, they can’t couple energetically favourable and unfavourable reactions as protein enzymes can. Also, a given RNA molecule can’t both perform enzyme work and replicate. An enzyme needs a 3D structure produced by internal bonds between the RNA units. But then the units are blocked from bonding to new units, needed for replication.

理论物理学家戴维·格里菲斯 (David Griffiths) 对援引量子力学来解释无法解释的事物表达了一种有充分根据的愤世嫉俗，他说：“一般来说，当你听到物理学家援引不确定性原理时，请保管好你的钱包。”4 吉姆·哈利利 这本书的主要论点是，量子相干性曾经在生命起源中发挥过与目前在活细胞中一样的作用。 在构建他们的案例时，麦克法登和阿尔哈利利首先提示读者什么是量子相干性。 量子力学（QM）的中心思想之一是波粒二象性，通过这种二象性，粒子可以被描述为物质波。 因此，量子相干性是指物质粒子的波状性质一分为二的情况。 然后，这两个波相干地干涉，使得它们的波峰和波谷重合。 在数学上，量子相干性是指薛定谔波动方程的解的性质。 由此，我们可以将粒子的波动特性描述为同时以不同的概率处于许多不同的位置或状态。 一旦波与其他物体接触，它就会在一个位置塌缩成单个粒子，从而经历退相干。 因此，退相干是失去相干性并且量子变得经典的过程。 麦克法登和阿尔哈利利对光合作用和催化以及鸟类导航等生命过程（量子力学可能在其中发挥作用）进行了全面而引人入胜的描述。 尽管这些例子可能很有趣且有理有据，但它们与从非生命中产生生命无关。 这些研究人员推断出生物体中量子效应的证据，错误地推断出这种效应可能在生命起源之前的世界中发挥过作用。 这种过度扩张是他们整个前提的主要问题。 RNA 甚至它的构建模块都非常不稳定。 事实上，甚至 DNA 也被证明非常不稳定。 生物需要许多修复机器来克服损伤。 但 RNA 的稳定性比 DNA 低 100 倍。 在努力克服从非生命材料中获取生命的不可能的障碍时，麦克法登和阿尔哈利利支持 RNA 世界假说。 这基本上是这样的想法：原始化学合成产生了一种 RNA 分子，它既可以充当编码基因，也可以充当复制自身的酶。 RNA 世界的倡导者指出，有不同类别的特定 RNA 分子（称为核酶）可以完成其中一项工作或另一项工作。 因此他们提出，地球上的生命可能起源于 RNA 世界，最初并不存在 DNA 和酶。 这些 RNA 分子可能最终会利用蛋白质来提高其复制效率，随着时间的推移产生 DNA 和第一个活细胞。 5 但核酶的催化活性有限。 特别是，它们不能像蛋白酶那样耦合能量上有利和不利的反应。 此外，给定的 RNA 分子不能同时执行酶工作和复制。 酶需要由 RNA 单元之间的内部键产生的 3D 结构。 但随后这些单元就无法与复制所需的新单元结合。

Also, RNA and even its building blocks are very unstable.6 In fact, even DNA has been shown to be very unstable. Living creatures need many repair machines to overcome the damage. The 2015 Nobel Prize for Chemistry was awarded for this discovery.7 But RNA is 100× less stable than DNA. So if DNA is too unstable to support life without repair machines, *a fortiori,* a living RNA world in a primordial soup is chemically preposterous.

The futility of achieving abiogenesis by chance alone

However, those who consider the first self-replicator to be a ribozyme need to understand the odds against one of these molecules forming by chance alone. The well-known chemist Graham Cairns-Smith calculates an estimated probability of 1 in 10109 that a starting molecule would convert into RNA. McFadden and Al-Khalili acknowledge that there would need to be at least this number of starting molecules in the primordial soup. But the estimated number of fundamental particles in the entire universe is only about 1080. They thus make this remarkable admission:

“Clearly, we cannot rely on pure chance alone.”8

Here is where quantum mechanics comes to the rescue, as McFadden and Al-Khalili propose it to provide the search engine that could locate the correct configuration of nucleotide bases for a self-replicating proto-enzyme in the early earth.

A look at quantum computing “qubits” contributes to an understanding of this quantum search engine. In a classical computer, information is stored in a binary digit, or bit, which has a value of 0 or 1. The quantum computing equivalent of the bit is a *qubit.* Qubits can be in a quantum coherent superposition of both 1 and 0 at the same time, enabling them to carry out two calculations at once. Whereas the state of one classical bit has no influence on its neighbors, qubits may be quantum entangled, meaning that what happens to one affects them all, instantaneously. This means that the computational ability of entangled qubits increases exponentially with how many there are. In comparison, a classical computer’s calculating power increases only linearly with the number of bits. Though it would take a regular computer millions of years to crack the code of a high security encryption, a quantum computer can find the right answer in mere minutes.

McFadden and Al-Khalili’s origin of life scenario reads like a game of make-believe in their book *Life on the Edge*. They give a succession of “imagine” imperatives that goes like this:

此外，RNA 甚至它的组成部分都非常不稳定。6 事实上，甚至 DNA 也已被证明非常不稳定。 生物需要许多修复机器来克服损伤。 这一发现荣获 2015 年诺贝尔化学奖。7 但 RNA 的稳定性比 DNA 低 100 倍。 因此，如果 DNA 太不稳定，没有修复机器就无法维持生命，更不用说，原始汤中的活 RNA 世界在化学上是荒谬的。 仅凭偶然实现自然发生是徒劳的 然而，那些认为第一个自我复制因子是核酶的人需要了解其中一个分子仅偶然形成的可能性。 著名化学家 Graham Cairns-Smith 计算出起始分子转化为 RNA 的估计概率为 10109 分之一。 麦克法登和阿尔哈利利承认，原始汤中至少需要有这个数量的起始分子。 但整个宇宙中基本粒子的估计数量大约只有 1080 个。因此，他们做出了这一引人注目的承认： “显然，我们不能仅仅依靠纯粹的机会。”8 这就是量子力学发挥作用的地方，麦克法登和阿尔哈利利提出量子力学可以提供搜索引擎，可以为早期地球中自我复制的原酶找到正确的核苷酸碱基配置。 了解量子计算“量子位”有助于理解这个量子搜索引擎。 在经典计算机中，信息存储在二进制数字或位中，其值为 0 或 1。该位的量子计算等价物是量子位。 量子位可以同时处于 1 和 0 的量子相干叠加态，使它们能够同时进行两种计算。 虽然一个经典位的状态对其邻居没有影响，但量子位可能是量子纠缠的，这意味着一个发生的事情会立即影响所有量子位。 这意味着纠缠量子位的计算能力随着数量的增加而呈指数级增长。 相比之下，经典计算机的计算能力仅随着位数线性增加。 虽然普通计算机需要数百万年才能破解高安全性加密的代码，但量子计算机可以在短短几分钟内找到正确的答案。 麦克法登和阿尔哈利利的生命起源场景在他们的书《边缘的生命》中读起来就像一场虚构游戏。 他们给出了一系列“想象”命令，如下所示：

**Imagine …**

A warm little pond in which an RNA molecule might have formed within the pore of a rock billions of years ago.

**Imagine …**

The RNA molecule is a ribozyme with enzymatic activity but not yet self-replicating.

**Imagine …**

Classical energy barriers prevent some particles in this enzyme from moving to different positions.

**Imagine …**

There are 64 protons and electrons in the ribozyme that can quantum tunnel into one of two positions, giving 264 possible configurations.

**Imagine …**

Only one of these configurations can become a self-replicating enzyme.9

[](https://dl0.creation.com/articles/p163/c16378/quantum-computer.jpg)Quantum computer: IBM Quantum System One

Then if the state of quantum coherence survived long enough (and that’s a big if, as we shall see), it allegedly could have acted as a 64-qubit quantum computer, existing in all its possible configurations simultaneously. The configuration will collapse in decoherence quickly into one state or the other. There is an estimated 264 (1 in 1019) chance of the collapse hitting a self-replicator configuration. If this good fortune does not occur, as the story goes, the cycle of quantum coherence and decoherence continues. If the collapse does happen to hit a self-replicator, against all odds, then the act of replication will force the system into an irreversible transition into the classical world. Thus the quantum coin is said to be continually tossed by the processes of coherence and decoherence, processes that are far more rapid than the classical making and breaking of chemical bonds. With this the problem of searching for a self-replicator molecule is potentially solved. Quantum biology needs its proto-ribozyme to be in a state of coherence of its trillions of different configurations to make the emergence of life from nonlife a lot more likely than by pure chance alone.10

想象 … 一个温暖的小池塘，数十亿年前，RNA 分子可能在岩石的孔隙中形成。 想象 … RNA分子是一种具有酶活性但尚未自我复制的核酶。 想象 … 经典的能量屏障阻止这种酶中的一些粒子移动到不同的位置。 想象 … 核酶中有 64 个质子和电子，可以量子隧道进入两个位置之一，从而提供 264 种可能的配置。 想象 … 这些构型中只有一种可以成为自我复制酶。9 量子计算机：IBM 量子系统一号 然后，如果量子相干状态存在足够长的时间（正如我们将看到的，这是一个很大的假设），据称它可以充当 64 量子位量子计算机，同时以所有可能的配置存在。 该构型将在退相干中快速塌缩成一种状态或另一种状态。 据估计，自我复制配置发生崩溃的可能性为 264（1019 分之一）。 如果这种好运没有发生，正如故事所言，量子相干和退相干的循环将继续下去。 如果崩溃确实碰巧击中了自我复制器，尽管困难重重，那么复制行为将迫使系统不可逆转地过渡到经典世界。 因此，据说量子硬币会不断地受到相干和退相干过程的抛掷，这些过程比化学键的经典形成和断裂要快得多。 这样，寻找自我复制分子的问题就有可能得到解决。 量子生物学需要其原核酶处于数万亿种不同构型的连贯状态，以使生命从非生命中出现的可能性比纯粹偶然的可能性要大得多。 10

The overreach of using quantum mechanics to breach the gap

But the road to abiogenesis via quantum mechanics is scattered with many difficult bumps for its travelers. The key factor in quantum mechanics is that if you want to retain the quantum features of particles, you’ve got to keep the wave-like nature undisturbed. Physicists must work in very specific conditions when dealing with quantum mechanical effects.

For example, to maintain qubit coherence for computing with only a handful of atoms, they must cool the system to within a fraction of a degree above absolute zero. Then the apparatus must be surrounded with extensive lagging to shut out environmental influence. We must understand that the warmer the environment is, the quicker the quantum effects disappear.

The uniqueness of life poses another problem that McFadden’s and Al-Khalili’s quantum-enhanced RNA world hypothesis does not address at all. In all living things, proteins are made of only left-handed amino acids, while only right-handed sugars make up the backbone of the DNA/RNA molecule.

On this point, McFadden and Al-Khalili remark that within living systems that have been subject to 3.5 billion years of optimizing evolution, it is likely that life has learned to manipulate quantum systems to its advantage in ways we do not yet fully understand. In their minds, since there is strong evidence that in certain phenomena quantum coherence persists in cells, then biological systems must be doing something special to stave off decoherence.11

And yet there is an obvious overreach in the implications of this claim. The prebiotic soup would not have had any life to keep decoherence at bay. This observation makes all the evidence that McFadden and Al-Khalili give for quantum effects in living cells moot to help explain the origin of life.

The uniqueness of life poses another problem that McFadden’s and Al-Khalili’s quantum-enhanced RNA world hypothesis does not address at all. In all living things, proteins are made of only left-handed amino acids, while only right-handed sugars make up the backbone of the DNA/RNA molecule. This vital property of life is called *homochirality*. Suppose that quantum coherence did locate an isolated self-replicating enzyme in the primordial soup, against all odds. It would not be able to replicate by itself. There must be activated12 homochiral building blocks around with which to replicate itself. But this does not happen in nature. Biologically unaided chemistry produces a 50:50 mix of left and right-handed forms. Thus, the origin of homochirality in living organisms is a complete mystery to evolutionists.13

In the end, when it comes to rescuing abiogenesis from impossible odds, we are faced with a choice. We can wave our magic wand and say that quantum coherence was present in non-living matter to mediate the search for a self-replicating ribozyme in the alleged primordial soup. Or we can trust the Creator when He tells us in the first chapter of Genesis that it was He who created every living thing on the earth and in the sea.

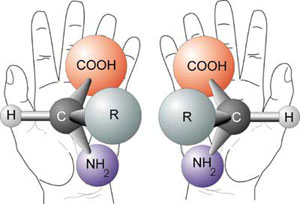
使用量子力学来突破差距的过度行为 但通过量子力学实现自然发生的道路对旅行者来说充满了许多困难的坎坷。 量子力学的关键因素是，如果你想保留粒子的量子特征，你就必须保持波状性质不受干扰。 物理学家在处理量子力学效应时必须在非常特定的条件下工作。 例如，为了保持仅用少数原子进行计算的量子位相干性，他们必须将系统冷却到绝对零以上零点几度的范围内。 然后，必须用大量的绝缘材料包围设备，以排除环境影响。 我们必须明白，环境越温暖，量子效应消失得越快。 生命的独特性提出了麦克法登和阿尔哈利利的量子增强 RNA 世界假说根本没有解决的另一个问题。 在所有生物中，蛋白质仅由左旋氨基酸组成，而 DNA/RNA 分子的主干仅由右旋糖组成。 关于这一点，McFadden 和 Al-Khalili 指出，在经历了 35 亿年优化进化的生命系统中，生命很可能已经学会了以我们尚未完全理解的方式操纵量子系统以使其发挥优势。 在他们看来，既然有强有力的证据表明在某些现象中量子相干性在细胞中持续存在，那么生物系统必须采取一些特殊的措施来避免退相干。 11 然而，这一说法的含义显然有些过分了。 益生元汤不会有任何生命来阻止退相干。 这一观察使得麦克法登和阿尔哈利利给出的活细胞量子效应的所有证据都毫无意义，无法帮助解释生命的起源。 生命的独特性提出了麦克法登和阿尔哈利利的量子增强 RNA 世界假说根本没有解决的另一个问题。 在所有生物中，蛋白质仅由左旋氨基酸组成，而 DNA/RNA 分子的主干仅由右旋糖组成。 生命的这一重要特性称为同手性。 假设量子相干性确实在原始汤中找到了一种孤立的自我复制酶，尽管困难重重。 它无法自行复制。 必须有 12 个被激活的同手性构建块，围绕它们进行自我复制。 但这在自然界中不会发生。 生物学上的无辅助化学反应产生了 50:50 的左手和右手形式的混合。 因此，生物体中同手性的起源对进化论者来说完全是个谜。 13 最后，当谈到从不可能的可能性中拯救自然发生时，我们面临着一个选择。 我们可以挥舞魔杖，说非生命物质中存在量子相干性，以调解在所谓的原始汤中寻找自我复制核酶的过程。 或者，我们可以相信造物主，他在创世记第一章告诉我们，是他创造了地球上和海洋中的一切生物。

Origin of life: the chirality problem

***by***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-d-sarfati)

Many important molecules required for life exist in two forms. These two forms are non-superimposable mirror images of each other, i.e.: they are related like our left and right hands. Hence this property is called **chirality**, from the Greek word for hand. The two forms are called **enantiomers** (from the Greek word for opposite) or **optical isomers**, because they rotate plane-polarised light either to the right or to the left.

生命起源：手性问题 作者：乔纳森·萨法蒂 生命所需的许多重要分子以两种形式存在。 这两种形式是彼此不可叠加的镜像，即：它们像我们的左手和右手一样相关。 因此，这种性质被称为手性，源自希腊语，意为“手”。 这两种形式被称为对映异构体（来自希腊语，意为相反）或旋光异构体，因为它们使平面偏振光向右或向左旋转。

Diagram of chirality.

Whether or not a molecule or crystal is chiral is determined by its *symmetry*. A molecule is *achiral* (non-chiral) if and only if it has an *axis of improper rotation*, that is, an n-fold rotation (rotation by 360°/n) followed by a reflection in the plane perpendicular to this axis maps the molecule on to itself. Thus a molecule is chiral if and only if it *lacks* such an axis. Because chiral molecules lack this type of symmetry, they are called **dissymmetric**. They are not necessarily **asymmetric** (i.e. without symmetry), because they can have other types of symmetry.1 However, all amino acids (except glycine) and many sugars are indeed asymmetric as well as dissymmetric.

Chirality and life

Nearly all biological polymers must be *homochiral* (all its component monomers having the same handedness. Another term used is optically pure or 100% optically active) to function. All amino acids in proteins are ‘left-handed’, while all sugars in DNA and RNA, and in the metabolic pathways, are ‘right-handed’.

A 50/50 mixture of left- and right-handed forms is called a **racemate** or **racemic mixture**. Racemic polypeptides could not form the specific shapes required for enzymes, because they would have the side chains sticking out randomly. Also, a wrong-handed amino acid disrupts the stabilizing α-helix in proteins. DNA could not be stabilised in a helix if even a single wrong-handed monomer were present, so it could not form long chains. This means it could not store much information, so it could not support life.2

手性图。 分子或晶体是否具有手性取决于其对称性。 一个分子是非手性的（非手性）当且仅当它有一个不正确的旋转轴，即 n 倍旋转（旋转 360°/n），然后在垂直于该轴的平面中进行反射映射 分子自身。 因此，当且仅当一个分子缺乏这样的轴时，它才是手性的。 由于手性分子缺乏这种对称性，因此被称为不对称。 它们不一定是不对称的（即没有对称性），因为它们可以具有其他类型的对称性。1然而，所有氨基酸（甘氨酸除外）和许多糖确实是不对称的和不对称的。 手性与生命 几乎所有生物聚合物都必须是纯手性的（其所有组成单体都具有相同的旋向性。使用的另一个术语是光学纯或 100% 光学活性）才能发挥作用。 蛋白质中的所有氨基酸都是“左旋”的，而DNA和RNA以及代谢途径中的所有糖都是“右旋”的。 左旋和右旋形式的 50/50 混合物称为外消旋体或外消旋混合物。 外消旋多肽无法形成酶所需的特定形状，因为它们的侧链会随机伸出。 此外，错误的氨基酸会破坏蛋白质中稳定的 α 螺旋。 即使存在一个错误的单体，DNA 也无法稳定在螺旋中，因此它无法形成长链。 这意味着它无法存储太多信息，因此无法支持生命。2

Ordinary chemistry produces racemates

A well-regarded organic chemistry textbook states a universal chemical rule in bold type:

**‘Synthesis of chiral compounds from achiral reagents always yields the racemic modification.’** and**‘Optically inactive reagents yield optically inactive products.**’3

This is a consequence of the Laws of Thermodynamics. The left and right handed forms have identical free energy (G), so the free energy difference (ΔG) is zero. The equilibrium constant for any reaction (K) is the equilibrium ratio of the concentration of products to reactants. The relationship between these quantities at any Kelvin temperature (T) is given by the standard equation:

K = exp (–ΔG*/*RT)

where R is the universal gas constant (= Avogadro’s number x Boltzmann’s constant k) = 8.314 J/K.mol.

For the reaction of changing left-handed to right-handed amino acids (L → R), or the reverse (R → L), ΔG = 0, so K = 1. That is, the reaction reaches equilibrium when the concentrations of R and L are equal; that is, a racemate is produced. This explains the textbook rule above.

Separating the left hand from the right

To resolve a racemate (i.e. separate the two enantiomers), another homochiral substance must be introduced. The procedure is explained in any organic chemistry textbook. The idea is that right-handed and left-handed substances have identical properties, *except when interacting with other chiral phenomena*. The analogy is that our left and right hands grip an achiral (non-chiral) object like a baseball bat equally, but they fit differently into a chiral object like a left-handed glove. Thus to resolve a racemate, an organic chemist will usually use a ready-made homochiral substance from a living organism. The reaction products of the R and L enantiomers with an exclusively right handed substance R′, that is R-R′ and L-R′ (called **diastereomers**), are not mirror images. So they have different physical properties, e.g. solubility in water, thus they can be separated.

However, this does not solve the mystery of where the optical activity in living organisms came from in the first place. A recent world conference on ‘The Origin of Homochirality and Life’ made it clear that the origin of this handedness is a complete mystery to evolutionists.4 The probability of forming one homochiral polymer of n monomers by chance = 2⁻ⁿ. For a small protein of 100 amino acids, this probability = 2⁻¹⁰⁰ = 10⁻³⁰. Note, this is the probability of *any* homochiral polypeptide. The probability of forming a *functional* homochiral polymer is much lower, since a precise amino acid sequence is required in many places. Of course, many homochiral polymers are required for life, so the probabilities must be compounded. Chance is thus not an option.

普通化学会产生外消旋体 一本备受推崇的有机化学教科书用粗体字陈述了一条普遍的化学规则： “从非手性试剂合成手性化合物总是会产生外消旋修饰。”和“光学非活性试剂产生光学非活性产物。”3 这是热力学定律的结果。 左手和右手形式具有相同的自由能（G），因此自由能差（ΔG）为零。 任何反应的平衡常数 (K) 是产物与反应物浓度的平衡比。 在任何开尔文温度 (T) 下这些量之间的关系由标准方程给出： K = exp (–ΔG/RT) 其中 R 是通用气体常数（= 阿伏加德罗常数 x 玻尔兹曼常数 k）= 8.314 J/K.mol。 对于将左旋氨基酸变为右旋氨基酸（L → R）或相反（R → L）的反应，ΔG = 0，因此 K = 1。即当 R 的浓度达到平衡时，反应达到平衡 和 L 相等； 即，产生外消旋物。 这解释了上面的教科书规则。 将左手与右手分开 为了解析外消旋体（即分离两种对映体），必须引入另一种同手性物质。 任何有机化学教科书都解释了该过程。 这个想法是，右手和左手物质具有相同的性质，除非与其他手性现象相互作用。 类比是，我们的左手和右手同等地握住棒球棒等非手性物体，但它们与左手手套等手性物体的配合方式不同。 因此，为了解析外消旋物，有机化学家通常会使用来自活生物体的现成的同手性物质。 R和L对映体与完全右旋物质R'的反应产物，即R-R'和L-R'（称为非对映体），不是镜像。 因此它们具有不同的物理特性，例如 溶于水，因此可以将它们分离。 然而，这并没有解决生物体中的光学活性从何而来的谜团。 最近举行的“同手性与生命的起源”世界会议明确表示，这种旋手性的起源对于进化论者来说是一个完全谜团。4 n 个单体偶然形成一个同手性聚合物的概率 = 2⁻ⁿ。 对于含有 100 个氨基酸的小蛋白质，该概率 = 2⁻10⁰ = 10⁻3⁰。 注意，这是任何纯手性多肽的概率。 形成功能性纯手性聚合物的可能性要低得多，因为许多地方都需要精确的氨基酸序列。 当然，生命需要许多纯手性聚合物，因此必须对概率进行复合。 因此，机会不是一个选择。

A further problem is that homochiral biological substances racemize in time. This is the basis of the amino acid racemization dating method. Its main proponent is Jeffrey Bada of the Scripps Institution of Oceanography in La Jolla, California.5 As a dating method, it is not very reliable, since the racemization rate is strongly dependent on temperature and pH, and depends on the particular amino acid.6 Racemization is also a big problem during peptide synthesis and hydrolysis.7 It shows that the tendency of undirected chemistry is towards death, not life.

A tragic reminder of the importance of chirality is thalidomide. In the early 1960s, this drug was prescribed to pregnant women suffering from morning sickness. However, while the left-handed form is a powerful tranquilliser, the right handed form can disrupt fetal development, resulting in severe birth defects. Unfortunately, the synthesis of the drug produced a racemate, as would be expected, and the wrong enantiomer was not removed before the drug was marketed.8

In my own undergraduate chemistry education, one of the required experiments demonstrated these concepts. We synthesized the dissymmetric complex ion, [Co(H₂NC₂H₄NH₂)₃]³⁺,9 from achiral reagents, so a racemate was produced. We resolved it by reacting it with a homochiral acid from a plant source, forming diastereomers that could be resolved by fractional crystallisation. When the resultant homochiral crystals were dissolved, and activated charcoal (a catalyst) added, the substance quickly racemized, because a catalyst accelerates approach to equilibrium.

Origin-of-life researchers have tried to think of other means of producing the required homochirality. There have been unsuccessful attempts to resolve racemates by other means.

另一个问题是同手性生物物质会及时外消旋。 这是氨基酸外消旋测年方法的基础。 它的主要支持者是加利福尼亚州拉霍亚斯克里普斯海洋学研究所的 Jeffrey Bada。5 作为一种测年方法，它不是很可靠，因为外消旋率强烈依赖于温度和 pH 值，并且取决于特定的氨基酸。 6 外消旋化也是肽合成和水解过程中的一个大问题。7 它表明无向化学的趋势是走向死亡，而不是走向生命。 沙利度胺悲剧性地提醒人们手性的重要性。 20 世纪 60 年代初，这种药被开给患有孕吐的孕妇。 然而，虽然左手形式是一种强大的镇定剂，但右手形式会扰乱胎儿发育，导致严重的出生缺陷。 不幸的是，正如预期的那样，该药物的合成产生了外消旋体，并且在该药物上市之前没有去除错误的对映体。 8 在我自己的本科化学教育中，所需的实验之一证明了这些概念。 我们从非手性试剂合成了不对称络离子[Co(H2NC2H4NH2)3]3+,9，从而产生了外消旋体。 我们通过将其与植物来源的纯手性酸反应来解决这个问题，形成可以通过分级结晶来解决的非对映异构体。 当所得纯手性晶体溶解并添加活性炭（催化剂）时，该物质很快外消旋化，因为催化剂加速了接近平衡的速度。 生命起源研究人员试图寻找其他方法来产生所需的同手性。 曾尝试通过其他方式解决外消旋体，但未成功。

Circularly polarized ultraviolet light

With circularly polarized light, the electric field direction rotates along the beam, so it is a chiral phenomenon. Homochiral substances have different absorption intensities for left and right CP light—this is called **circular dichroism**(CD).10 Similarly, CP light is absorbed differently by left and right enantiomers. Since photolysis (destruction by light) occurs only when light photons are absorbed, CP light destroys one enantiomer more readily than the other. However, because CP light also destroys the ‘correct’ form to some extent, this method would not produce the necessary 100% homochirality required for life. One of the best results has been 20 % optically pure camphor, but this occurred after 99% of the starting material had been destroyed. 35.5% optical purity would have resulted after 99.99% destruction.11 ‘A practically optically pure compound (99.99 per cent) … is obtained at an asymptotic point where absolutely no material remains.’12

Another problem is that magnitude and sign (i.e. right-favouring or left-favouring) of CD depends on the frequency of the CP light.10 This means that resolution can occur only with CP light over a narrow frequency band. Over a broad band, enantioselective effects would cancel.

Circularly polarised light has recently been revived as a solution in a paper by the Australian astronomer Jeremy Bailey in *Science*,13 and widely reported in the media. His team has discovered circularly polarised infrared radiation in a nebula. They admit in the paper that they have not discovered the required circularly polarised *ultraviolet* light nor any evidence that amino acids are produced in nebulae. They are also aware of the very limited enantioselectivity of CP light, and the fact that the effect averages to zero over a whole spectrum (the Kuhn-Condon rule). However, their faith in chemical evolution colours the way they interpret the evidence.

Not all evolutionists are convinced by the proposal of Bailey’s team. For example, Jeffrey Bada said, ‘It’s just a series of maybe steps. To me, that makes the whole thing a big maybe.’14

Another proposed source of circularly polarised light is synchrotron radiation from a neutron star,15 but this is speculative and doesn’t solve the chemical problems.

**Update:** see the thorough analysis, Truman, R., The origin of L-amino acid enantiomeric excess: part 1—by preferential photo-destruction using circularly polarized light? *J. Creation* **36**(3):67–73, 2022.

圆偏振紫外光 对于圆偏振光，电场方向沿着光束旋转，因此是一种手性现象。 同手性物质对左右 CP 光有不同的吸收强度，这称为圆二色性 (CD)。10 同样，左右对映体对 CP 光的吸收也不同。 由于光解（光破坏）仅在光子被吸收时发生，因此 CP 光比另一种对映体更容易破坏一种对映体。 然而，由于CP光也在一定程度上破坏了“正确”的形式，因此这种方法不会产生生命所需的100%同手性。 最好的结果之一是 20% 的光学纯樟脑，但这是在 99% 的起始材料被破坏之后发生的。 99.99% 的破坏后，光学纯度将达到 35.5%。11 “一种几乎光学纯的化合物（99.99%）......是在绝对没有任何物质残留的渐近点获得的。”12 另一个问题是 CD 的大小和符号（即偏右或偏左）取决于 CP 光的频率。10 这意味着只有在窄频带上使用 CP 光才能实现分辨率。 在较宽的范围内，对映选择性效应将会抵消。 最近，澳大利亚天文学家杰里米·贝利 (Jeremy Bailey) 在《科学》杂志上发表的一篇论文中，圆偏振光作为一种解决方案得到了复兴，13 并在媒体上广泛报道。 他的团队在星云中发现了圆偏振红外辐射。 他们在论文中承认，他们没有发现所需的圆偏振紫外线，也没有发现星云中产生氨基酸的任何证据。 他们还意识到 CP 光的对映选择性非常有限，并且该效应在整个光谱上平均为零（库恩-康登规则）。 然而，他们对化学进化论的信仰影响了他们解释证据的方式。 并非所有进化论者都相信贝利团队的提议。 例如，杰弗里·巴达（Jeffrey Bada）说：“这只是一系列可能的步骤。” 对我来说，这也许让整件事变得很重要。’14 另一种提出的圆偏振光来源是来自中子星的同步加速器辐射，15 但这是推测性的，并不能解决化学问题。 更新：请参阅 Truman, R. 的全面分析，L-氨基酸对映体过量的起源：第 1 部分 - 通过使用圆偏振光进行优先光破坏？ J. 创造 36(3):67–73, 2022。

Beta decay and the weak force

β-decay is one form of radioactive decay, and it is governed by one of the four fundamental forces of nature, the *weak force*. This force has a slight handedness, called *parity violation*, so some theorists thought β-decay could account for the chirality in living organisms.16 However, the weak force is aptly named—the effect is minuscule—a long way from producing the required 100% homochirality. One specialist in the chirality problem, organic chemist William Bonner, professor emeritus at Stanford University, said, ‘none of this work has yielded convincing conclusions’.17 Another researcher concluded:

‘the exceptional prebiotic conditions required do not favour asymmetric β-radiolysis as the selector of the exclusive signature of optical activity in living nature.’18

Another aspect of parity violation is that the L-amino acids and D-sugars have a theoretically slightly lower energy than their enantiomers so are slightly more stable. But the energy difference is immeasurable—only about 10⁻¹⁷ kT, meaning that there would be only one excess L-enantiomer for every 6 × 10⁻¹⁷ molecules of a racemic mixture of amino acids!19

贝塔衰变和弱力 β衰变是放射性衰变的一种形式，它受到自然界四种基本力之一弱力的控制。 这种力具有轻微的旋向性，称为宇称破坏，因此一些理论家认为 β 衰变可以解释生物体中的手性。 16 然而，弱力的命名恰如其分 - 效果微乎其微 - 距离产生所需的 100 还很远。 ％同手性。 手性问题专家、斯坦福大学名誉教授、有机化学家威廉·邦纳 (William Bonner) 表示，“这项工作都没有得出令人信服的结论”。 17 另一位研究人员得出结论： “所需的特殊的益生元条件不利于不对称β-放射解作为生物自然界中光学活性的独特特征的选择者。”18 宇称不守恒的另一个方面是，L-氨基酸和D-糖理论上比其对映体具有略低的能量，因此稍微更稳定。 但能量差异是无法测量的——只有大约 10⁻17 kT，这意味着每 6 × 10⁻17 氨基酸外消旋混合物分子中只有一个过量的 L-对映异构体！19

Optically active quartz powders

Quartz is a widespread mineral—the commonest form of silica (SiO₂) on Earth. Its crystals are hexagonal and dissymmetric.20 So some investigators tried to use optically active quartz powders to adsorb one enantiomer more than the other. But they had no success. Besides, there are equal amounts of left and right-handed quartz crystals on Earth.21

Clay minerals

Some investigators have reported a very small chiral selection effect by clay minerals, but the effects may have been an artefact of the technique used. Selective adsorption and binding have now been rejected.22 Even if modern clays did have a chiral bias, this could be due to previous absorption of optically active biomolecules (which are, of course produced by living things). Prebiotic clays would then have had no chiral bias.

Self-selection

There are two ways that chiral compounds can crystallize: most crystallize into racemic crystals, while a small minority (about 10%) of chiral substances crystallize as conglomerates, i.e. they separate into homochiral crystals. Louis Pasteur was not only the founder of the germ theory of disease, the destroyer of ‘spontaneous generation’ ideas, and a creationist, he was also the first person in history to resolve a racemate. He used tweezers to separate the left and right-handed crystals of such a substance, sodium ammonium tartrate.23

This separation only happened because of outside interference by an intelligent investigator, who could recognise the different patterns. On the supposed primitive earth, there was no such investigator. Therefore the two forms, even if they could be separated by chance, would have re-dissolved together and re-formed a racemic solution.

Also, Pasteur was fortunate to choose one of the minority of substances that self-resolve in crystalline form. Only two of the 19 chiral amino acids do so (glycine is achiral). And even Pasteur’s substance has this property only below 23°C, so it’s perhaps fortunate that 19th century laboratories were not well heated!

光学活性石英粉 石英是一种分布广泛的矿物，是地球上最常见的二氧化硅 (SiO2) 形式。 它的晶体是六角形且不对称的。20 因此，一些研究人员尝试使用光学活性石英粉来吸附一种对映体，而不是另一种。 但他们没有成功。 此外，地球上还有等量的左旋石英晶体和右旋石英晶体。21 粘土矿物 一些研究人员报告称，粘土矿物的手性选择效应非常小，但这种效应可能是所用技术的人为因素。 选择性吸附和结合现已被拒绝。22 即使现代粘土确实具有手性偏差，这也可能是由于先前吸收了光学活性生物分子（当然，这些分子是由生物产生的）。 那么，生命起源之前的粘土就不会具有手性偏差。 自选 手性化合物有两种结晶方式：大多数结晶为外消旋晶体，而一小部分（约10%）手性物质结晶为团聚物，即它们分离成纯手性晶体。 路易·巴斯德不仅是疾病细菌学说的创始人、“自然发生”思想的破坏者、神创论者，他还是历史上第一个解析出外消旋物的人。 他用镊子将酒石酸铵钠这种物质的左旋晶体和右旋晶体分开。23 这种分离的发生只是因为一位聪明的调查员的外部干扰，他可以识别不同的模式。 在所谓的原始地球上，并没有这样的调查员。 因此，这两种形式，即使它们可以偶然分离，也会重新溶解在一起并重新形成外消旋溶液。 此外，巴斯德很幸运地选择了少数能够以晶体形式自分解的物质之一。 19 种手性氨基酸中只有两种具有这种性质（甘氨酸是非手性的）。 甚至巴斯德的物质也只能在低于 23°C 的温度下具有这种特性，所以也许幸运的是 19 世纪的实验室没有很好的加热！

Fluke seeding

Some theorists have proposed that a fluke seeding of a supersaturated solution with a homochiral crystal would crystallise out the same enantiomer. However, the primordial soup, if it existed,24 would have been extremely dilute and grossly contaminated, as shown by many writers.25 Also, nothing could be done with the growing homochiral crystal, because it would be immersed in a solution of the remaining wrong enantiomer. Concentrating the solution would crystallise out this wrong enantiomer. Diluting the solution would dissolve the crystal, so the alleged process would have to keep starting from scratch.

Homochiral template

Some have proposed that a homochiral polymer arose by chance and acted as a template. However, this ran into severe problems. A template of 100% right-handed poly-C (RNA containing only cytosine monomers) was made (by intelligent chemists!). This could direct the oligomerisation (formation of small chains) of (activated) G (guanine) nucleotides. Indeed, pure right-handed G was oligomerised much more efficiently than pure left-handed G. But racemic G did not oligomerise, because:

‘monomers of opposite handedness to the template are incorporated as chain terminators … This inhibition raises an important problem for many theories of the origin of life.’26

吸虫播种 一些理论家提出，用纯手性晶体对过饱和溶液进行吸晶接种会结晶出相同的对映体。 然而，正如许多作家所表明的那样，如果存在原始汤，24 就会被极度稀释并严重污染。 25 此外，对生长中的纯手性晶体无能为力，因为它将浸入剩余的溶液中。 错误的对映体。 浓缩溶液会结晶出这种错误的对映体。 稀释溶液会溶解晶体，因此所谓的过程必须从头开始。 同手性模板 一些人提出纯手性聚合物是偶然出现的并充当模板。 然而，这遇到了严重的问题。 制作了 100% 右手性聚 C（仅含有胞嘧啶单体的 RNA）模板（由聪明的化学家！）。 这可以指导（激活的）G（鸟嘌呤）核苷酸的寡聚化（形成小链）。 事实上，纯右旋 G 的低聚效率比纯左旋 G 的低聚效率高得多。但外消旋 G 不会低聚，因为： “与模板相反旋向的单体被纳入作为链终止剂......这种抑制给许多生命起源理论带来了一个重要问题。”26

Transfer RNAs selected the right enantiomer

One attempt to solve the chirality problem was proposed by Russell Doolittle, a professor of biochemistry at the University of California at San Diego, and an atheist. He claimed: ‘From the start of their [Transfer RNA synthetases’] existence, they probably bound only L-amino acids.’27 He never explains how such complicated enzymes could have functioned unless they were themselves homochiral, or how they would operate before RNA was composed of homochiral ribose. Doolittle’s ‘solution’ is mere hand-waving. It is hardly worth refuting except that it appeared in a well-known anti-creationist book, which says something about the quality of its editing, or the quality of anti-creationist arguments.

It seems like Doolittle was trying to explain away his prior televised evolution/creation debate with biochemist Duane Gish held before 5,000 people at Liberty University on 13 Oct 1981. The pro-evolution journal *Science* described the debate as a ‘rout’ in favour of Gish.28 The next day, the debate was reported by the pro-evolution *Washington Post* under the headline ‘Science Loses One to Creationism’. The sub-headline cited Doolittle’s anguished remark: ‘How am I going to face my wife?’ showing that Doolittle himself knew he was defeated.

转移 RNA 选择正确的对映体 解决手性问题的一项尝试是由加州大学圣地亚哥分校的生物化学教授、无神论者拉塞尔·杜利特尔（Russell Doolittle）提出的。 他声称：“从[转移 RNA 合成酶”存在之初，它们可能只结合 L-氨基酸。”27 他从未解释过，除非它们本身是纯手性的，否则如此复杂的酶如何发挥作用，或者它们之前如何运作。 RNA由同手性核糖组成。 杜立特的“解决方案”只是挥手。 它几乎不值得反驳，除非它出现在一本著名的反神创论书中，这本书说明了其编辑的质量，或者反神创论论证的质量。 杜立特似乎试图解释他之前于 1981 年 10 月 13 日在自由大学与生物化学家杜安·吉什 (Duane Gish) 在 5,000 名观众面前进行的电视进化论/创造论辩论。支持进化论的杂志《科学》将这场辩论描述为有利于吉什的“溃败” .28 第二天，支持进化论的《华盛顿邮报》以“科学因神创论而失去一员”的标题报道了这场辩论。 小标题引用了杜立特痛苦的言论：“我该如何面对我的妻子？”这表明杜立特本人知道自己被击败了。

Magnetic fields

Some German chemists, led by Eberhard Breitmaier of the Institute for Organic Chemistry and Biochemistry at the University Gerhard-Domagk-Strasse in Bonn, announced that a very strong magnetic field (1.2–2.1 T) produced 98% homochiral products from achiral reagents.29So organic chemists like Philip Kocienski, of the University of Southampton, speculated that the earth’s magnetic field could have caused life’s homochirality. Although the earth’s magnetic field is about 10,000 times weaker than that of the experiment, Kocienski thought that vast time spans would result in the homochirality we see today.29 He may have forgotten about palaeogeomagnetic field reversals!

Yet other chemists like Tony Barrett, of London’s Imperial College, thought that the German experiment ‘seems just too good to be true.’29 This caution was vindicated about six weeks later. No-one else could reproduce the German team’s results. It turned out that one of the team, Guido Zadel, the post-doctoral fellow on whose thesis the original work was based, had adulterated the reagents with a homochiral additive.30

[Magnetochiral dichroism—post script]

See my subsequent article, [Origin of life and the chirality problem: Is magnetochiral dichroism the solution?](https://creation.com/origin-of-life-and-the-homochirality-problem-is-magnetochiral-dichroism-the-solution)

Update, 2010: Selective crystallization of saturated solutions

An atheopathic website claims:

Studies have shown that, once an initial excess of one enantiomer in a mixture of amino acids exists, even if it is just very slight, it can have an enormous effect. This effect can occur when solid and dissolved amino acids from such a mixture coexist in equilibrium, i.e. when crystals form upon, for example, limited evaporation of a solution. …

A smaller study,[[32]](https://creation.com/origin-of-life-the-chirality-problem" \l "r32) independently conducted around the same time, reports similar findings. Slow evaporation of an aqueous solution of phenylalanine at just 1 % ee [enantioneric excess] of the L-enantiomer led to a solution of this amino acid with 40 % ee of the L-enantiomer above solid material. If, in turn, such a solution was allowed to evaporate, the resulting solution in equilibrium with the solid material had a 90 % ee.

Yet once again, these are unrealistic conditions for prebiotic synthesis. They start off with a saturated solution of phenylalanine, which is at best produced in tiny amounts, with an initial ee from *somewhere*, then allowed to evaporate undisturbed. Also, there is a problem similar to that of circularly polarized light: that the necessary purity seems to be reached asymptotically as the amount of material decreased. In the first stage, the high chiral excess is in a very small amount of solution after >80% of the material had crystallized, and the solution had ‘a few mg’ out of the initial 500 mg ‘with a 40% ee of the L component, a 70/30 ratio of L to D.’ The next stage wasn’t taking that liquid, but a large amount of solution with the same concentration. It wasn’t stated how a small amount of enriched solution would be naturally decanted into a convenient evaporating pond, but the next stage left a solution of ‘≈100 mg that had a 90% ee in the L enantiomer, a 95/5 ratio of L to D.’ It’s also not clear whether this is the limit, because this is close to the [88% enantiomeric excess of the eutectic composition](http://cshperspectives.cshlp.org/content/2/5/a002147/T1.expansion.html).

Furthermore, it means that the crystals must be slightly enriched in the wrong enantiomer, so any splash of water would dissolve it and mix the enantiomers together, so they are back to square one, just as explained above in the section ‘Fluke seeding’.

磁场 由波恩 Gerhard-Domagk-Strasse 大学有机化学和生物化学研究所的 Eberhard Breitmaier 领导的一些德国化学家宣布，非常强的磁场（1.2-2.1 T）可以从非手性试剂中产生 98% 的纯手性产物。 29 因此，南安普顿大学的菲利普·科辛斯基等有机化学家推测，地球磁场可能导致了生命的同手性。 虽然地球磁场比实验时弱约 10,000 倍，但科钦斯基认为，巨大的时间跨度会导致我们今天看到的同手性。29 他可能忘记了古地磁场反转！ 然而，伦敦帝国理工学院的托尼·巴雷特等其他化学家认为，德国的实验“看起来好得令人难以置信”。29这种谨慎大约六周后得到了证实。 没有其他人能够复制德国队的成绩。 事实证明，该团队的一名博士后研究员 Guido Zadel 在试剂中掺入了纯手性添加剂。 30 [磁手性二色性——后脚本] 请参阅我的后续文章《生命起源和手性问题：磁手性二色性是解决方案吗？》 2010 年更新：饱和溶液的选择性结晶 一个无神论网站声称： 研究表明，一旦氨基酸混合物中的一种对映异构体最初过量，即使只是非常轻微，也会产生巨大的影响。 当来自这种混合物的固体和溶解的氨基酸平衡共存时，即当例如在溶液的有限蒸发时形成晶体时，会发生这种效应。 …… 大约在同一时间独立进行的一项规模较小的研究[32]报告了类似的发现。 缓慢蒸发仅 1% ee [对映体过量] L-对映体的苯丙氨酸水溶液，得到该氨基酸的溶液，其中 L-对映体的 ee 为 40%，高于固体材料。 如果反过来，使这种溶液蒸发，则所得与固体材料平衡的溶液具有90％ee。 然而，这些对于益生元合成来说又是不现实的条件。 他们从苯丙氨酸的饱和溶液开始，该溶液最多只能少量生产，初始 ee 来自某处，然后不受干扰地蒸发。 此外，还存在与圆偏振光类似的问题：随着材料量的减少，似乎会渐近地达到所需的纯度。 在第一阶段，在 >80% 的材料结晶后，高手性过量存在于非常少量的溶液中，并且该溶液在最初的 500 mg 中含有“几毫克”，其中 40% ee L 组分，L 与 D 的比例为 70/30。’下一阶段不再采用该液体，而是采用大量相同浓度的溶液。 没有说明如何将少量富集溶液自然倾析到方便的蒸发池中，但下一阶段留下约 100 mg 的溶液，其 L 对映体中的 ee 为 90%，比率为 95/5 L 到 D。”也不清楚这是否是极限，因为这接近共晶组合物的 88% 对映体过量。 此外，这意味着晶体必须稍微富集错误的对映体，因此任何水溅都会溶解它并将对映体混合在一起，因此它们又回到了原点，正如上面“福禄克播种”部分中所解释的那样。

The atheopathic article continues:

In a more recent study, the Blackmond group expanded the concept to mixtures of amino acids with other compounds, which can co-crystallize with the amino acids.[[33]](https://creation.com/origin-of-life-the-chirality-problem" \l "r33) They showed that, by influencing solubility, in some cases these compounds strongly influenced the ee in solution under solid-liquid equilibrium conditions. For example, under those conditions the ee of valine was raised from 47 % to up to 99 % in the presence of fumaric acid. Note that prebiotic plausibility is enhanced in this scenario, since it employs compound mixtures rather than pure components.

The difference with this experiment was trying to increase the limit noted above, by introducing other compounds:

We demonstrate that the eutectic composition of aqueous mixtures of l and d amino acids may be tuned by the addition of achiral dicarboxylic acids that cocrystallize with chiral amino acids. We find that, in several cases, these systems yield new eutectic compositions of 98% ee or higher.33

However, this is at a cost of lowering solubility of the racemate crystals, meaning that still less solution would be available.34 Further, where would these additional compounds come from? According to an evolutionary paper, ‘Apart from the detection of succinic acid [refs.] no other dicarboxylic acids have been reported in chemical evolution experiments.’35,36

Update, 2021: Chiral-induced spin selectivity (CISS)

Electrons have quantum mechanical “spin” that provides a magnetic moment. The spin can be either “up” or “down”. It turns out that chiral molecules exert a strong preference on the spin of electrons transmitting through them. A spin-up electron prefers travelling in one direction, and a spin-down electron prefers the opposite direction. The electron spin can determine which of two possible chemical reactions is preferred. This could further explain the almost perfect efficiency (99.99%) of biological reactions, compared to chemical synthesis labs where 80% is considered very good. Another effect is that electrons in the ‘right’ spin traverse the molecule with little heat loss. That's because the electron can’t transfer energy to most quantum vibrational modes because that would need a change of spin and linear momentum. This prevents leaves from overheating during electron transfers resulting from photosynthesis, and allows our brains to work with enormously less power than an equivalent microprocessor would need.37,38

Conclusion

The textbook cited earlier states:

‘We eat optically active bread & meat, live in houses, wear clothes, and read books made of optically active cellulose. The proteins that make up our muscles, the glycogen in our liver and blood, the enzymes and hormones … are all optically active. Naturally occurring substances are optically active because the enzymes which bring about their formation … are optically active. As to the origin of the optically active enzymes, we can only speculate’31

If we can only ‘speculate’ on the origin of life, why do so many people state that evolution is a ‘fact’? Repeat a rumour often enough and people will swallow it.

无神论文章继续说道： 在最近的一项研究中，Blackmond 小组将这一概念扩展到氨基酸与其他化合物的混合物，这些化合物可以与氨基酸共结晶。 [33] 他们表明，在某些情况下，这些化合物通过影响溶解度，强烈影响固液平衡条件下溶液中的ee。 例如，在富马酸存在的情况下，缬氨酸的 ee 从 47% 提高到 99%。 请注意，在这种情况下，益生元的合理性得到了增强，因为它使用的是复合混合物而不是纯成分。 该实验的不同之处在于试图通过引入其他化合物来增加上述限制： 我们证明，l 和 d 氨基酸的水性混合物的低共熔组成可以通过添加与手性氨基酸共结晶的非手性二羧酸来调节。 我们发现，在某些情况下，这些系统会产生 98% ee 或更高的新共晶成分。 33 然而，这是以降低外消旋体晶体的溶解度为代价的，这意味着可用的溶液仍然更少。34此外，这些额外的化合物从何而来？ 根据一篇进化论文，“除了检测到琥珀酸[参考]，在化学进化实验中没有报道其他二羧酸。”35,36 2021 年更新：手性诱导自旋选择性 (CISS) 电子具有提供磁矩的量子力学“自旋”。 旋转可以是“向上”或“向下”。 事实证明，手性分子对通过它们传输的电子自旋具有强烈的偏好。 自旋向上的电子倾向于沿一个方向运动，而自旋向下的电子则倾向于相反的方向。 电子自旋可以确定两种可能的化学反应中的哪一种是优选的。 这可以进一步解释生物反应几乎完美的效率 (99.99%)，而化学合成实验室的效率 80% 就被认为非常好。 另一个效应是，“正确”自旋的电子穿过分子时几乎没有热量损失。 这是因为电子无法将能量转移到大多数量子振动模式，因为这需要改变自旋和线性动量。 这可以防止叶子在光合作用产生的电子转移过程中过热，并允许我们的大脑以比同等微处理器所需的功率少得多的功率工作。 37,38 结论 前面引用的教科书指出： “我们吃光学活性面包和肉，住在房子里，穿衣服，阅读由光学活性纤维素制成的书籍。 构成我们肌肉的蛋白质、肝脏和血液中的糖原、酶和激素……都具有光学活性。 天然存在的物质具有光学活性，因为形成它们的酶......具有光学活性。 至于光学活性酶的起源，我们只能推测’31 如果我们只能“推测”生命的起源，为什么那么多人说进化论是“事实”呢？ 谣言重复得次数多了，人们就会接受它。

Origin of life: instability of building blocks

***by***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-d-sarfati)

Evolutionary propaganda often understates the difficulty of a naturalistic origin of life. Production of traces of ‘building blocks’ is commonly equated with proving that they could have built up the required complicated molecules under natural conditions. The instability of ‘building blocks’ in non-biotic environments is usually glossed over.

The RNA/DNA base cytosine is not produced in spark discharge experiments. The proposed prebiotic productions are chemically unrealistic because the alleged precursors are unlikely to be concentrated enough, and they would undergo side reactions with other organic compounds, or hydrolyse. Cytosine itself is too unstable to accumulate over alleged geological ‘deep time’, as its half life for deamination is 340 years at 25°C.

生命起源：积木的不稳定性 作者：乔纳森·萨法蒂 进化论的宣传常常低估自然主义生命起源的困难。 痕迹“构建块”的产生通常等同于证明它们可以在自然条件下构建所需的复杂分子。 非生物环境中“构件”的不稳定性通常被掩盖。 RNA/DNA碱基胞嘧啶在火花放电实验中不产生。 所提出的益生元生产在化学上是不现实的，因为所谓的前体不太可能足够浓缩，并且它们会与其他有机化合物发生副反应或水解。 胞嘧啶本身太不稳定，无法在所谓的地质“深层时间”内积累，因为它的脱氨半衰期在 25°C 时为 340 年。

Populist RNA-world propaganda

A pro-evolution booklet called *Science and Creationism,* recently released on the Internet by the National Academy of Sciences (NAS),1 summarized the origin of life section as follows:

‘For those who are studying the origin of life, the question is no longer whether life could have originated by chemical processes involving nonbiological components. The question instead has become which of many pathways might have been followed to produce the first cells.’ 2

No one disputes the existence of living organisms on earth, and that cells indeed are capable of using simple building blocks to generate the required complex biochemicals at the necessary time, location and concentration. The question is whether the massive co-ordination of the metabolic processes which perform such feats could have arisen without intelligent guidance and driven by only statistical and thermodynamic constraints.

The NAS book glosses over the enormous chemical and informational hurdles which must be jumped to go from non-living matter to even the simplest living cells (see also [Q&A: Origin of Life](https://creation.com/origin-of-life-questions-and-answers)).3,4,5 It’s not too surprising, considering the heavy atheistic bias of the NAS, which was documented in the journal *Nature*,6 and which was probably partly responsible for their demonstrable scientific unreliability in the area of origins.7 It is even less excusable to ignore the difficulties documented in their own journal—*Proceedings of the National Academy of Sciences*(PNAS), USA, as will be shown here.

民粹主义 RNA 世界宣传 美国国家科学院（NAS）最近在互联网上发布了一本名为《科学与神创论》的支持进化论的小册子，1将生命起源部分总结如下： “对于那些研究生命起源的人来说，问题不再是生命是否可能起源于涉及非生物成分的化学过程。 相反，问题变成了可能遵循多种途径中的哪一种来产生第一批细胞。”2 没有人质疑地球上生物体的存在，细胞确实能够使用简单的构建模块在必要的时间、地点和浓度下产生所需的复杂生化物质。 问题是，执行此类壮举的代谢过程的大规模协调是否可能在没有智能指导且仅由统计和热力学约束驱动的情况下出现。 NAS 的书掩盖了从非生命物质到最简单的活细胞必须跨越的巨大化学和信息障碍（另见问答：生命起源）。3,4,5 考虑到 NAS 严重的无神论偏见，记录在《自然》杂志上，6，这可能是他们在起源领域明显的科学不可靠性的部分原因。7 忽视他们自己的杂志上记录的困难就更不可原谅了——《会议记录》 美国国家科学院（PNAS）的，如下所示。

Production of ‘building blocks of life’

*Science and Creationism* argued:

‘Experiments conducted under conditions intended to resemble those present on primitive Earth have resulted in the production of some of the chemical components of proteins, DNA, and RNA. Some of these molecules also have been detected in meteorites from outer space and in interstellar space by astronomers using radiotelescopes. Scientists have concluded that the “building blocks of life” could have been available early in Earth’s history.’2

Even if we granted that the ‘building blocks’ were available, it does **not** follow that they could actually build anything. For example, under plausible prebiotic conditions, the tendency is for biological macromolecules to **break apart** into the ‘building blocks’, not the other way round.8 Also, the ‘building blocks’ are likely to react in the wrong ways with other ‘building blocks’, for example, sugars and other carbonyl (>C=O) compounds react destructively with amino acids and other amino (–NH₂) compounds, to form imines (>C=N), a common cause of browning in foods.9 Also, the proposed formation of sugars in a primordial soup involves the *formose* (or *Butlerov*) reaction, which involves formaldehyde under alkaline conditions. But the very same alkaline conditions destroy aldose sugars via the *Cannizzaro reaction*, a disproportionation reaction that converts two molecules of an aldehyde to an alcohol and an acid

Furthermore, some of the building blocks are very unstable. A good example is ribose, which is obviously essential for RNA, and hence for the RNA-world hypothesis of the origin of life.10 A team including the famous evolutionary origin-of-life pioneer Stanley Miller, in PNAS, found that the half life (t½) of ribose is only 44 years at pH 7.0 (neutral) and 0°C. It’s even worse at high temperatures—73 minutes at pH 7.0 and 100°C.11 This is a major hurdle for hydrothermal theories of the origin of life. Miller, in another PNAS paper, has also pointed out that the RNA bases are destroyed very quickly in water at 100°C—adenine and guanine have half lives of about a year, uracil about 12 years, and cytosine only 19 days.12

生产“生命的基石” 科学和神创论认为： “在类似于原始地球条件下进行的实验已经产生了蛋白质、DNA 和 RNA 的一些化学成分。 天文学家使用射电望远镜在外太空和星际空间的陨石中也检测到了其中一些分子。 科学家们得出的结论是，“生命的组成部分”可能在地球历史的早期就已经存在。’2 即使我们承认“构建块”是可用的，但这并不意味着它们实际上可以构建任何东西。 例如，在合理的生命起源条件下，生物大分子倾向于分解成“构件”，而不是相反。8 此外，“构件”可能会与其他“构件”发生错误的反应。 例如，糖和其他羰基 (>C=O) 化合物与氨基酸和其他氨基 (–NH2) 化合物发生破坏性反应，形成亚胺 (>C=N)，这是食品褐变的常见原因。 9 此外，在原始汤中糖的形成涉及甲糖（或巴特罗夫）反应，该反应涉及碱性条件下的甲醛。 但同样的碱性条件会通过坎尼扎罗反应破坏醛糖，坎尼扎罗反应是一种歧化反应，可将两个醛分子转化为醇和酸 此外，一些构建块非常不稳定。 核糖就是一个很好的例子，它显然对于 RNA 至关重要，因此对于生命起源的 RNA 世界假说也至关重要。 10 包括著名的生命进化起源先驱 Stanley Miller 在内的一个团队在 PNAS 上发现， 在 pH 7.0（中性）和 0°C 下，核糖的寿命 (t½) 仅 44 年。 在高温下情况更糟——在 pH 7.0 和 100°C 下需要 73 分钟。11这是生命起源热液理论的主要障碍。 Miller 在另一篇 PNAS 论文中也指出，RNA 碱基在 100°C 的水中很快就会被破坏——腺嘌呤和鸟嘌呤的半衰期约为一年，尿嘧啶约为 12 年，胞嘧啶只有 19 天。 12

Most researchers avoid such hurdles with the following methodology: find a trace of compound X in a spark discharge experiment, claim ‘see, X can be produced under realistic primitive-earth conditions’. Then they obtain pure, [homochiral](https://creation.com/origin-of-life-the-chirality-problem-journal-of-creation-tj), concentrated X from an industrial synthetic chemicals company, react it to form traces of the more complex compound Y. Typically, the process is repeated to form traces of Z from purified Y, and so on.13 In short, the evolutionists’ simulations have an unacceptable level of intelligent interference.14

Much of the populist evolutionary propaganda resembles the following hypothetical theory for the origin of a car:

‘Design is an unscientific explanation, so we must find a naturalistic explanation instead. Now, experiments have shown that one of the important building blocks of the car—iron—can be produced by heating naturally occurring minerals like hematite to temperatures which are found in some locations on earth. What’s more, iron can be shown to form thin sheets under pressures which are known to occur in certain geological formations ….’

If this seems far-fetched, then note that even the simplest self-reproducing cell, which has 482 genes,15 has a vastly higher information content than a car, yet self-reproduction is a pre-requisite for neo-Darwinian evolution.

大多数研究人员通过以下方法来避免此类障碍：在火花放电实验中找到微量化合物 X，声称“看，X 可以在现实的原始地球条件下产生”。 然后，他们从一家工业合成化学品公司获得纯的、纯手性的、浓缩的 X，使其发生反应，形成痕量的更复杂的化合物 Y。通常，重复该过程，从纯化的 Y 中形成痕量的 Z，等等。 13 简而言之 ，进化论者的模拟具有不可接受的智能干扰水平。14 许多民粹主义进化论宣传都类似于以下关于汽车起源的假设理论： “设计是一种不科学的解释，所以我们必须找到一种自然主义的解释。” 现在，实验表明，汽车的重要组成部分之一——铁——可以通过将赤铁矿等天然矿物加热到地球上某些地方的温度来生产。 更重要的是，铁可以在压力下形成薄片，而这种压力已知发生在某些地质构造中……” 如果这看起来有些牵强，那么请注意，即使是最简单的自我复制细胞（拥有 482 个基因）15 也比汽车拥有更高的信息内容，但自我复制是新达尔文进化论的先决条件。

Essential building block missing—cytosine

The evolutionary biochemist, Robert Shapiro, published a detailed study of the ‘prebiotic’ synthesis of cytosine in the *Proceedings of the NAS*.16 Previous studies of his had noted that neither adenine17 nor ribose18 were plausible prebiotic components of any self-replicating molecule, but the problems with cytosine are even worse. Together, these studies raise serious doubts about whether a prebiotic replicator with any Watson-Crick base pairing could have arisen abiotically.

Shapiro noted that not the slightest trace of cytosine has been produced in gas discharge experiments, and nor has it been found in meteorites. Thus, he notes, either it is extremely hard to synthesise, or it breaks down before detection. So ‘prebiotic’ productions of cytosine have always been indirect, and involve the methodology alluded to above. That is, cyanoacetylene (HC≡CC≡N) and cyanoacetaldehyde (H₃CCOC≡N) have been found in some spark discharge experiments. Organic chemists have obtained pure and fairly strong solutions of each, and reacted each of them with solutions of other compounds which are allegedly likely to be found on a ‘primitive’ earth. Some cytosine is produced. This then apparently justifies experiments trying to link up pure and dry cytosine and ribose to form the nucleoside *cytidine*. However, these experiments have been unsuccessful (although analogous experiments with purines have produced 2% yields of nucleosides),19 despite a high level of investigator interference.

缺少重要的组成部分——胞嘧啶 进化生物化学家罗伯特·夏皮罗 (Robert Shapiro) 在《美国国家科学院院刊》上发表了一篇关于胞嘧啶“益生元”合成的详细研究。16 他之前的研究指出，腺嘌呤 17 和核糖 18 都不是任何自我复制分子的合理的益生元成分，但 胞嘧啶的问题更加严重。 总之，这些研究对具有任何沃森-克里克碱基配对的生命前复制基因是否可能以非生物方式产生提出了严重怀疑。 夏皮罗指出，在气体放电实验中没有产生丝毫胞嘧啶，在陨石中也没有发现胞嘧啶。 因此，他指出，要么它极难合成，要么它在检测之前就分解了。 因此，胞嘧啶的“益生元”生产始终是间接的，并且涉及上面提到的方法。 即在一些火花放电实验中发现了氰基乙炔（HC=CC=N）和氰基乙醛（H₃CCOC=N）。 有机化学家已经获得了每种化合物的纯净且相当强的溶液，并将它们与据称可能在“原始”地球上发现的其他化合物的溶液进行反应。 产生一些胞嘧啶。 这显然证明了尝试将纯且干燥的胞嘧啶和核糖连接起来形成核苷胞苷的实验是合理的。 然而，这些实验并没有成功（尽管类似的嘌呤实验产生了 2% 的核苷产率）19，尽管研究者的干扰程度很高。

Unavailability of cytosine precursors

Shapiro also critiqued some of the ‘prebiotic’ cytosine productions. He pointed out that both cyanoacetylene and cyanoacetaldehyde are produced in spark discharge experiments with an unlikely methane/nitrogen (CH₄/N₂) mixture. The classical Miller experiment used ammonia (NH₃), but NH₃, H₂O, and hydrogen sulfide (H₂S) greatly hindered cyanoacetylene and cyanoacetaldehyde formation. However, most evolutionists now believe that the primitive atmosphere was ‘probably dominated by CO₂ and N₂.’20

Furthermore, cyanoacetylene and cyanoacetaldehyde would undergo side reactions with other nucleophiles rather than produce cytosine. For example, cyanoacetylene and cyanoacetaldehyde both react with the amino group, which would destroy any prebiotic amino acids. And there is one destructive molecule which is unavoidably present: water. Cyanoacetylene readily hydrolyzes to form cyanoacetaldehyde (t½ = 11 days at pH 9, 30°C),20 although one should not count on this as a reliable source of cyanoacetaldehyde because cyanoacetylene would more likely be destroyed by other reactions.20 And cyanoacetaldehyde, while more stable than cyanoacetylene, is still quite quickly hydrolyzed (t½ = 31 years at pH 9, 30°C).21

The implausible production scenarios and likely rapid destruction means it is unrealistic to assume that the concentration of cyanoacetylene and cyanoacetaldehyde could remotely approach that needed to produce cytosine.

胞嘧啶前体不可用 夏皮罗还批评了一些“益生元”胞嘧啶的生产。 他指出，氰基乙炔和氰基乙醛都是在火花放电实验中用不太可能的甲烷/氮气（CH₄/N2）混合物产生的。 经典的米勒实验使用氨 (NH₃)，但 NH₃、H2O 和硫化氢 (H2S) 极大地阻碍了氰基乙炔和氰基乙醛的形成。 然而，现在大多数进化论者认为，原始大气“可能主要由二氧化碳和氮气主导。”20 此外，氰基乙炔和氰基乙醛会与其他亲核试剂发生副反应，而不是产生胞嘧啶。 例如，氰基乙炔和氰基乙醛都与氨基发生反应，这会破坏任何益生元氨基酸。 并且不可避免地存在一种破坏性分子：水。 氰基乙炔很容易水解形成氰基乙醛（t½ = 11 天，pH 9，30°C）20，但不应将其视为氰基乙醛的可靠来源，因为氰基乙炔更有可能被其他反应破坏。20 和氰基乙醛，而 比氰基乙炔更稳定，但仍能很快水解（t½ = 31 年，pH 9、30°C）。21 令人难以置信的生产场景和可能的快速破坏意味着假设氰基乙炔和氰基乙醛的浓度可能远远接近生产胞嘧啶所需的浓度是不现实的。

Instability of cytosine

As pointed out above, cytosine is deaminated/hydrolyzed (to uracil) far too rapidly for any ‘hot’ origin-of-life scenario. But it is still very unstable at moderate temperatures—t½ = 340 years at 25°C. This shows that a cold earth origin-of-life scenario would merely alleviate, but not overcome, the decomposition problem. And a low temperature also retards synthetic reactions as well as destructive ones.

On single-stranded DNA in solution, t½ of an individual cytosine residue = 200 years at 37°C, while the double helix structure provides good protection—t½ = 30,000 years.22 Such C→U mutations would be a great genetic hazard, but cells have an ingenious repair system involving a number of enzymes. It first detects the mutant U (now mismatched with G) and removes it from the DNA strand, opens the strand, inserts the correct C, and closes the strand.22 It seems that such a repair system would be necessary from the beginning, because a hypothetical primitive cell lacking this would mutate so badly that error catastrophe would result. And the far greater instability of cytosine on single-stranded nucleic acid is yet another problem that proponents of the RNA-world must account for.

Also, cytosine is readily decomposed under solar UV radiation, which requires that prebiotic synthesis should be carried out in the dark.21

胞嘧啶的不稳定性 如上所述，对于任何“热”生命起源场景来说，胞嘧啶脱氨基/水解（生成尿嘧啶）的速度都太快了。 但它在中等温度下仍然非常不稳定——25°C 时 t½ = 340 年。 这表明寒冷的地球生命起源情景只能缓解但不能克服分解问题。 低温还会阻碍合成反应以及破坏性反应。 对于溶液中的单链 DNA，单个胞嘧啶残基的 t½ = 37°C 下 200 年，而双螺旋结构提供了良好的保护 — t½ = 30,000 年。22 这种 C→U 突变将是一个巨大的遗传危害，但 细胞有一个巧妙的修复系统，涉及多种酶。 它首先检测突变体 U（现在与 G 不匹配）并将其从 DNA 链中移除，打开链，插入正确的 C，然后关闭链。22 似乎这样的修复系统从一开始就是必要的，因为 假设的原始细胞缺乏这一点，就会发生严重的突变，从而导致错误灾难。 单链核酸上胞嘧啶的不稳定性更大，这是 RNA 世界的支持者必须考虑的另一个问题。 此外，胞嘧啶在太阳紫外线辐射下很容易分解，这要求益生元的合成应在黑暗中进行。 21

An efficient prebiotic synthesis of cytosine?

This was claimed by Robertson and Miller.23 They rightly disagreed with a previous suggested synthesis of cytosine from cyanoacetylene and cyanate (OCN⁻) because cyanate is rapidly hydrolyzed to CO₂ and NH₃. Instead, they heated 10⁻³ M cyanoacetaldehyde with various concentrations of urea ((NH₂)₂CO) in a sealed ampoule at 100°C for five hours with 30–50% yields of cytosine. Urea is produced in spark discharge experiments with N₂, CO, and H₂O.

However, Shapiro criticised this experiment on the grounds of the unavailability of cyanoacetaldehyde and instability of cytosine, as above. Robertson and Miller avoided the latter problem by stopping the reaction after five hours. But in a real prebiotic world, such a reaction would most likely continue with hydrolysis of cytosine.

Shapiro also shows that urea is too unstable to reach the concentrations required (>0.1 M). Urea exists in equilibrium with small amounts of its isomer, ammonium cyanate, and since cyanate is hydrolysed readily, more urea must convert to maintain the equilibrium ratio (K = 1.04 × 10⁻⁴ at 60°C).21 Robertson and Miller’s sealed tube thus provided a further example of unacceptable investigator interference, because this prevented escape of NH₃, thus unrealistically retarding cyanate and urea decomposition. In an open system, ‘half of the urea was destroyed after 5 hr at 90°C and pH 7’,21 and t½ is estimated at 25 years at 25°C.21

The usual cross-reaction problem would intervene in the real world. For example, urea can react with glycine to form N-carbamoyl glycine,21 which would remove both urea and amino acids from a primordial soup.

Also, the primordial soup would be far too dilute, so Robertson and Miller propose that seawater was concentrated by evaporation in lagoons. But this would require isolation of the lagoon from fresh seawater which would dilute the lagoon, evaporation to about 10⁻⁵ of its original volume, then cytosine synthesis. However, such conditions are geologically ‘rare or non-existent’ today.24 Concentrating mechanisms would also concentrate destructive chemicals.

The conditions required for cytosine production are incompatible with those of purine production. Therefore this scenario must also include a well-timed rupture of the lagoon, releasing the contents into the sea, so both pyrimidines and purines can be incorporated into a replicator.

胞嘧啶的有效益生元合成？ Robertson 和 Miller 提出了这一观点。23 他们正确地不同意之前提出的由氰乙炔和氰酸盐 (OCN⁻) 合成胞嘧啶的建议，因为氰酸盐会迅速水解为 CO2 和 NH3。 相反，他们将 10 -3 M 氰基乙醛与不同浓度的尿素 ((NH2)2CO) 在密封安瓿中于 100°C 下加热 5 小时，胞嘧啶产率为 30-50%。 尿素是在火花放电实验中用 N2、CO 和 H2O 生产的。 然而，如上所述，夏皮罗以氰基乙醛不可用和胞嘧啶不稳定为由批评了该实验。 罗伯逊和米勒通过在五小时后停止反应避免了后一个问题。 但在真正的生命起源世界中，这种反应很可能会随着胞嘧啶的水解而继续。 Shapiro 还表明，尿素太不稳定，无法达到所需的浓度 (>0.1 M)。 尿素与少量的异构体氰酸铵处于平衡状态，并且由于氰酸盐很容易水解，因此必须转化更多的尿素以维持平衡比例（60°C 时 K = 1.04 × 10⁻⁴）。21 Robertson 和 Miller 的密封管 因此提供了另一个不可接受的调查员干扰的例子，因为这阻止了 NH₃ 的逃逸，从而不切实际地延迟了氰酸盐和尿素的分解。 在开放系统中，“在 90°C、pH 7 下 5 小时后，一半的尿素被破坏”21，在 25°C 下，t½ 估计为 25 年。21 通常的交叉反应问题会干扰现实世界。 例如，尿素可以与甘氨酸反应形成 N-氨基甲酰基甘氨酸，21 这会从原始汤中去除尿素和氨基酸。 此外，原始汤会太稀，因此罗伯逊和米勒提出海水通过泻湖蒸发而浓缩。 但这需要将泻湖与新鲜海水隔离，这会稀释泻湖，蒸发至其原始体积的约 10 -5 ，然后进行胞嘧啶合成。 然而，这样的条件在今天的地质学上“罕见或不存在”。24浓缩机制也可以浓缩破坏性化学物质。 胞嘧啶生产所需的条件与嘌呤生产所需的条件不相容。 因此，这种情况还必须包括泻湖适时破裂，将内容物释放到海中，这样嘧啶和嘌呤都可以被纳入复制器中。

Shapiro’s materialistic faith

Shapiro concluded:

‘the evidence that is available at the present time does not support the idea that RNA, or an alternative replicator that uses the current set of RNA bases, was present at the start of life.’ 25

But unwilling to abandon evolution, he suggests two alternative theories:

1. Cairns-Smith’s clay mineral idea,13 which seems to be driven more by dissatisfaction with other theories than evidence for his own.

‘Cairns-Smith cheerfully admits the failings of his pet hypothesis: no-one has been able to coax clay into something resembling evolution in the laboratory; nor has anyone found anything resembling a clay-based organism in nature.’26

[**Update:** recent research shows more difficulties with this idea: [Darwin’s warm pond idea is tested](https://creation.com/), 13 February 2006:

‘Professor Deamer said that amino acids and DNA, the “building blocks” for life, and phosphate, another essential ingredient, clung to the surfaces of clay particles in the volcanic pools.

‘“The reason this is significant is that it has been proposed that clay promotes interesting chemical reactions relating to the origin of life,” he explained.

‘“However,” he added, “in our experiments, the organic compounds became so strongly held to the clay particles that they could not undergo any further chemical reactions.”’]

2. Life began as a cyclic chemical reaction, e.g. Günter Wächtershäuser’s theory that life began on the surface of pyrite, which Stanley Miller calls ‘paper chemistry’.27

‘Wächtershäuser himself admits that his theory is for the most part “pure speculation”.’28,29

Shapiro’s dogmatism is illustrated in his interesting popular-level book *Origins: A Skeptic’s Guide to the Creation of Life in the Universe*, where he effectively critiques many origin-of-life scenarios. But he says, in a striking admission that no amount of evidence would upset his faith:

‘some future day may yet arrive when all reasonable chemical experiments run to discover a probable origin of life have failed unequivocally. Further, new geological evidence may yet indicate a sudden appearance of life on the earth. Finally, we may have explored the universe and found no trace of life, or processes leading to life, elsewhere. Some scientists might choose to turn to religion for an answer. Others, however, myself included, would attempt to sort out the surviving less probable scientific explanations in the hope of selecting one that was still more likely than the remainder.’30

夏皮罗的唯物主义信仰 夏皮罗总结道： “目前可用的证据并不支持 RNA 或使用当前 RNA 碱基集的替代复制子在生命之初就存在的观点。”25 但他不愿意放弃进化论，提出了两种替代理论： 1.凯恩斯-史密斯的粘土矿物想法，13这似乎更多是出于对其他理论的不满，而不是他自己的证据。 凯恩斯-史密斯高兴地承认他最喜欢的假设的失败：没有人能够在实验室里将粘土变成类似于进化的东西； 也没有人在自然界中发现任何类似粘土有机体的东西。”26 [更新：最近的研究表明这个想法有更多困难：达尔文的温暖池塘想法经过测试，2006 年 2 月 13 日： 迪默教授说，生命的“基石”氨基酸和 DNA 以及另一种重要成分磷酸盐附着在火山池中粘土颗粒的表面。 “这一点之所以重要，是因为有人提出粘土会促进与生命起源相关的有趣化学反应，”他解释道。 “然而，”他补充道，“在我们的实验中，有机化合物变得如此牢固地附着在粘土颗粒上，以至于它们无法进行任何进一步的化学反应。”] 2. 生命始于循环化学反应，例如 Günter Wächtershäuser 的生命起源于黄铁矿表面的理论，斯坦利·米勒称之为“纸化学”。 27 “Wächtershäuser 本人也承认他的理论大部分是“纯粹的推测”。”28,29 夏皮罗的教条主义在他有趣的通俗读物《起源：宇宙生命创造的怀疑论者指南》中得到了体现，他在书中有效地批评了许多生命起源的场景。 但他惊人地承认，没有任何证据可以动摇他的信念： “未来的某一天可能会到来，那时所有旨在发现可能的生命起源的合理化学实验都明确失败了。 此外，新的地质证据可能表明地球上突然出现了生命。 最后，我们可能已经探索了宇宙，但在其他地方没有发现生命的踪迹或导致生命的过程。 一些科学家可能会选择向宗教寻求答案。 然而，其他人，包括我自己，会尝试整理现存的不太可能的科学解释，希望选择一个比其余的更有可能的解释。’30

Conclusion

* No plausible prebiotic synthesis of cytosine yet exists.
* Vital ‘building blocks’ including cytosine and ribose are too unstable to have existed on a hypothetical prebiotic earth for long.
* Even if cytosine and ribose could have existed, there is no known prebiotic way to combine them to form the nucleoside cytidine, even if we granted unacceptably high levels of investigator interference.
* Building blocks would be too dilute to actually build anything, and would be subject to cross-reactions.
* Even if the building blocks could have formed polymers, the polymers would readily hydrolyse.
* There is no tendency to form the *high-information* polymers required for life as opposed to *random* ones.

# Life on Mars?

## Separating fact from fiction

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### ****Update, 14 Jan 2022:**** Life on Mars claim retracted.

We are reposting this article on the front page because of this belated retraction after a quarter century. It was a hot topic just as I was moving from Wellington, New Zealand to work for CMI-Au in Brisbane. So my very first articles for CMI were on the claims of life from Mars: newsletter, this one for *Creation* magazine, and a [perspective](https://creation.com/images/pdfs/tj/j10_3/j10_3_293-296.pdf) for the *Journal of Creation.*

Various anti-creationists were trumpeting this, and this was before we had our website to answer them easily, so we were stuck with paper responses. On one case, a vociferous anticreationist professor predicted that creationist would have merely religious answers, without science. I submitted a response summarizing similar arguments to this article, but the editors censored out all the scientific arguments, to make it look like the anti-creationist was right.

But now the Mars rovers have confirmed just what we said 25 years ago. The organic molecules that people were excited about clearly had an abiotic (non-life) origin. A summary of the research in the prestigious journal *Science*.

火星上有生命吗？ 将事实与虚构分开 作者：乔纳森·萨法蒂 2022 年 1 月 14 日更新：火星上有生命的说法被撤回。 由于四分之一个世纪后迟来的撤稿，我们将这篇文章重新发布在头版。 当我从新西兰惠灵顿搬到布里斯班的 CMI-Au 工作时，这是一个热门话题。 因此，我在 CMI 上发表的第一篇文章是关于火星上存在生命的主张：时事通讯，这是《Creation》杂志的一篇文章，也是《Creation》杂志的一个观点。 各种反神创论者都在鼓吹这一点，而这是在我们的网站可以轻松回答他们之前，所以我们只能用纸质答复来解决。 在一个案例中，一位强烈反对神创论的教授预测神创论者只会有宗教答案，而没有科学。 我提交了一份回复，总结了与本文类似的论点，但编辑们审查了所有科学论点，使其看起来像反神创论者是正确的。 但现在火星探测器证实了我们 25 年前所说的话。 人们兴奋的有机分子显然具有非生物（非生命）起源。 著名期刊《科学》上的研究摘要。

#### **Abiotic formation of organic molecules**

Mars rovers have found complex organic molecules in the ancient rocks exposed on the planet’s surface and methane in the modern atmosphere. It is unclear what processes produced these organics, with proposals including both biotic and abiotic sources. Steele et al. analyzed the nanoscale mineralogy of the Mars meteorite ALH 84001 and found evidence of organic synthesis driven by serpentinization and carbonation reactions that occurred during the aqueous alteration of basalt rock by hydrothermal fluids. The results demonstrate that abiotic production of organic molecules operated on Mars 4 billion years ago.[a](https://creation.com/life-on-mars#a)

We obviously don’t agree with the claimed age, but it shows that the chemicals are *not* evidence for life on Mars. But of course this didn’t stop the evolutionary spin from the lead researcher Andrew Steele, of the Carnegie Institution for Science:

These kinds of non-biological, geological reactions are responsible for a pool of organic carbon compounds from which life could have evolved and represent a background signal that must be taken into consideration when searching for evidence of past life on Mars. Furthermore, if these reactions happened on ancient Mars, they must have happened on ancient Earth, and could possibly explain the results from Saturn’s moon Enceladus as well. All that is required for this type of organic synthesis is for a brine that contains dissolved carbon dioxide to percolate through igneous rocks. The search for life on Mars is not just an attempt to answer the question “are we alone?” It also relates to early Earth environments and addresses the question of “where did we come from?”[b](https://creation.com/life-on-mars#b)

More likely, it shows the *limit* of the type of organic molecules abiotic processes can produce. Such materials are chemical ‘dead ends’, and never *did* progressed further towards life—and never *could,* for chemical reasons (see [Origin of Life Questions and Answers](https://creation.com/origin-of-life-questions-and-answers)).

有机分子的非生物形成 火星探测器在暴露在地球表面的古代岩石中发现了复杂的有机分子，并在现代大气中发现了甲烷。 目前还不清楚是什么过程产生了这些有机物，建议包括生物和非生物来源。 斯蒂尔等人。 分析了火星陨石 ALH 84001 的纳米级矿物学，发现了由热液对玄武岩进行水蚀变过程中发生的蛇纹石化和碳酸化反应驱动的有机合成的证据。 结果表明，40 亿年前火星上就已经存在有机分子的非生物生产。 我们显然不同意所声称的年龄，但这表明这些化学物质并不是火星上存在生命的证据。 当然，这并没有阻止卡内基科学研究所首席研究员安德鲁·斯蒂尔的进化论： 这些类型的非生物地质反应导致了一系列有机碳化合物的产生，生命可以从这些化合物中进化出来，并且代表了在寻找火星上过去生命的证据时必须考虑的背景信号。 此外，如果这些反应发生在古代火星上，它们也一定发生在古代地球上，并且也可能解释土星卫星土卫二的结果。 这种类型的有机合成所需要的只是含有溶解二氧化碳的盐水渗透到火成岩中。 在火星上寻找生命不仅仅是为了回答“我们孤独吗？”这个问题。 它还与早期地球环境有关，并解决了“我们从哪里来？”b 的问题。 更有可能的是，它显示了非生物过程可以产生的有机分子类型的限制。 这些材料是化学的“死胡同”，从来没有进一步向生命方向发展——而且由于化学原因永远不可能（参见生命起源问题与解答）。

#### **Notes**

1. Steele, A. and 15 others, Organic synthesis associated with serpentinization and carbonation on early Mars, *Science* **375**(6577):172–177, 13 Jan 2022. [Return to text.](https://creation.com/life-on-mars#note-a)
2. Carnegie Institution for Science, Martian meteorite’s organic materials origin not biological, formed by geochemical interactions between water and rock, phys.org, 13 Jan 2022. [Return to text.](https://creation.com/life-on-mars" \l "note-b)

If asked ‘What was the hot media topic of 1996?’, many would reply, ‘The sensational claim that scientists have discovered life from Mars.’ It certainly dominated the newspapers and television channels for some time. The news has been great publicity for NASA, just when the US Congress was discussing funding cuts.

笔记 A。 Steele, A. 和其他 15 人，与早期火星蛇纹石化和碳酸化相关的有机合成，Science 375(6577):172–177，2022 年 1 月 13 日。返回文本。 b. 卡内基科学研究所，火星陨石的有机材料并非生物来源，而是由水和岩石之间的地球化学相互作用形成，phys.org，2022 年 1 月 13 日。返回文本。 如果被问到“1996 年的热门媒体话题是什么？”，许多人会回答：“科学家在火星上发现生命的耸人听闻的说法。”它确实在一段时间内占据了报纸和电视频道的主导地位。 就在美国国会讨论削减经费之际，这一消息对美国宇航局来说是一次巨大的宣传。

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The timing of the announcement was brilliant, coinciding with the release of the blockbuster movie Independence Day, about an extraterrestrial invasion of Earth.

The possibility of life on Mars has fascinated many, including the wealthy American astronomer Percival Lowell, who erroneously thought he had discovered hundreds of canals by 1908. But when the Viking spacecraft visited Mars in 1976, no trace of life was found, despite sophisticated detection techniques.

Many articles have proclaimed that this latest ‘discovery’ would, if confirmed, disprove traditional Christianity. They argued that life on Mars would show that matter has an inbuilt tendency to form life. Thus, a Creator is unnecessary, and the Earth and humanity are nothing special. However, the professing evangelical President of the USA, Bill Clinton, was very enthusiastic, saying, ‘If this discovery is confirmed, it would surely be one of the most stunning insights into our universe that science has discovered.’1

这一宣布的时机非常巧妙，恰逢关于外星人入侵地球的卖座电影《独立日》上映。 火星上存在生命的可能性让许多人着迷，其中包括富有的美国天文学家珀西瓦尔·洛厄尔 (Percival Lowell)，他错误地认为自己在 1908 年之前已经发现了数百条运河。但是，当维京号飞船于 1976 年访问火星时，尽管进行了精密的探测，却没有发现生命的踪迹。 技术。 许多文章宣称，这一最新的“发现”如果得到证实，将反驳传统基督教。 他们认为，火星上的生命表明物质具有形成生命的内在倾向。 因此，造物主是不必要的，地球和人类也没什么特别的。 然而，自称福音派的美国总统比尔·克林顿却非常热情地说道：“如果这一发现得到证实，这肯定是科学发现的对我们宇宙最令人惊叹的见解之一。”1

## What was actually found?

No-one has found life on Mars; the announcement concerns a potato-sized rock on Earth (from Antarctica). This rock, thought to be a meteorite, contains tiny globules which superficially resemble bacteria in shape, and certain chemicals which supposedly came from once-living organisms. Note that the most which is being claimed is evidence for fossil **microbial** life, not ‘little green men’.

## Did the rock really come from Mars?

We do not know for sure, although about the only thing most researchers agree upon is that it did. The gases trapped inside the rock’s tiny pores reportedly match today’s atmosphere on Mars (argon and carbon dioxide). However, its mineral composition differs from that of the 11 other meteorites believed to be martian, and it is reportedly (according to evolutionary dating methods) several billion years older than these other 11. But it does have the same distinctive oxygen isotope ratio, which has supposedly remained unchanged for ‘billions of years’. This is evidence that they all may have come from the same parent body, but is not conclusive. For a rock to escape Mars’ gravity, its speed would need to be over five times greater than that of a rifle bullet.2 Some scientists believe an impact from a large enough object could cause this.

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到底发现了什么？ 没有人在火星上发现过生命； 该公告涉及地球上（来自南极洲）的一块土豆大小的岩石。 这块岩石被认为是陨石，含有表面形状类似于细菌的微小球体，以及某些据说来自曾经存在的生物体的化学物质。 请注意，人们声称最多的是化石微生物生命的证据，而不是“小绿人”。 这块岩石真的来自火星吗？ 我们不确定，尽管大多数研究人员唯一同意的是它确实如此。 据报道，岩石微小孔隙内的气体与当今火星上的大气（氩和二氧化碳）相匹配。 然而，它的矿物成分与其他 11 颗被认为是火星陨石的矿物成分不同，而且据报道（根据进化年代测定方法）它比其他 11 颗陨石要早数十亿年。但它确实具有相同的独特氧同位素比率， 据说“数十亿年来”都保持不变。 这证明它们可能都来自同一个母体，但还不是决定性的。 对于一块岩石来说，要想逃脱火星的引力，它的速度需要比步枪子弹的速度快五倍以上。2一些科学家认为，足够大的物体的撞击可能会导致这种情况。 对于一块岩石来说，要想逃离火星的引力，它的速度需要比步枪子弹的速度快五倍以上。

## Was any life actually found?

One of Australia’s most ardent atheistic sceptics proclaimed ‘Mars life’ as a fact, and, without the caution one would expect from a scientist, used it as an excuse to launch another tirade against scientists who believe the universe and life were created. But the facts do not justify his dogmatic claims.

Some of the structures in the rock are unusual, and are shaped a bit like some bacteria. But you cannot judge most things by their outward appearance. The chief researcher for one team examining it admitted that such shapes could represent dried-up mud.

A huge problem with the alleged fossil bacteria is their tiny size — many times smaller than all known free-living bacteria.3 The Martian objects simply do not have enough room to pack in all the information needed for a self-reproducing cell.4 This is why William Schopf of the University of California, LA, a leading expert on microfossils, said: ‘I think it is very unlikely they have remnants of biological activity.’

真的发现了生命吗？ 澳大利亚最热心的无神论怀疑论者之一宣称“火星生命”是一个事实，并且没有像科学家所期望的那样谨慎，以此为借口对那些相信宇宙和生命是被创造的科学家发起另一场长篇大论。 但事实并不能证明他的教条主张是正确的。 岩石中的一些结构很不寻常，形状有点像某些细菌。 但你不能通过外表来判断大多数事物。 一个研究小组的首席研究员承认，这种形状可能代表干涸的泥土。 所谓的化石细菌的一个巨大问题是它们的体积很小——比所有已知的自由生活的细菌小很多倍。3火星物体根本没有足够的空间来容纳自我复制细胞所需的所有信息。4 这就是为什么洛杉矶加利福尼亚大学的微化石领域权威专家威廉·肖普夫（William Schopf）说：“我认为它们不太可能拥有生物活性的残余物。”

Most people don’t know that another team which analysed the **same rock** found that it **lacked** a key sign of biological activity. The leader, Jim Papike, director of the Institute of Meteoritics at the University of New Mexico, said: ‘When we looked at the ratio [of two types of sulphur], there was no evidence that it was in a ratio for life forms.’ In fact, he said that the ratio pointed in the opposite direction.5

## So why did people think life was found?

**Tiny globules of minerals called carbonates, with even tinier oval and tube-shaped objects on the surface.** Limestone and marble, for example, consist mainly of carbonate minerals. However, the key paper6 concedes that ‘The origin of these globules is controversial’, and that they could have formed by processes unconnected with life. In particular, there is some evidence that they were formed at a temperature far too hot for life.

Another possibility is that these chemicals are from Earth and contaminated the meteorite….

**Molecules called PAHs** (Polycyclic Aromatic Hydrocarbons, many of which are strong cancer-causing agents). However, these molecules are not always produced by living things. They are commonly found in soot and diesel exhaust. Also, ‘PAHs are very widespread compounds in asteroids and not diagnostic of life’ according to Robert Clayton, a geochemist at the University of Chicago. He also pointed out that PAHs in fossils have about a thousand times the variety of those in this rock.7

大多数人不知道另一个团队分析了同一块岩石，发现它缺乏生物活性的关键标志。 领导者、新墨西哥大学陨石研究所所长吉姆·帕皮克说：“当我们研究[两种硫]的比例时，没有证据表明它与生命形式存在比例。” ” 事实上，他说这个比率指向相反的方向。5 那么为什么人们认为生命被发现了呢？ 称为碳酸盐的微小矿物球，表面有更小的椭圆形和管状物体。 例如，石灰石和大理石主要由碳酸盐矿物组成。 然而，关键论文6承认“这些球体的起源是有争议的”，它们可能是通过与生命无关的过程形成的。 特别是，有一些证据表明它们是在对生命来说太热的温度下形成的。 另一种可能性是这些化学物质来自地球并污染了陨石……。 称为 PAH（多环芳烃，其中许多是强致癌物质）的分子。 然而，这些分子并不总是由生物产生。 它们常见于烟灰和柴油机尾气中。 此外，芝加哥大学地球化学家罗伯特·克莱顿表示，“多环芳烃是小行星中非常普遍的化合物，不能用来诊断生命”。 他还指出，化石中的多环芳烃种类大约是岩石中的多环芳烃种类的一千倍。7

Another possibility is that these chemicals are from Earth and contaminated the meteorite once it was here. Richard Zare, who headed the chemistry team, tried to rule out this explanation because there are more PAHs deep inside the rock than on the surface, whereas contaminants would tend to affect the surface more than the inside. But Robert Gregory, a geologist at Southern Methodist University points out that water could seep into the many fissures in the rock and concentrate PAHs on the inside, while those on the surface would be destroyed by UV light.8

**Certain iron compounds.** The rock contains a mineral called magnetite, also called lodestone (which was used in the first compasses), as well as another mineral similar to ‘fool’s gold’.

另一种可能性是，这些化学物质来自地球，并在陨石到达这里后就污染了它。 化学团队负责人理查德·扎尔（Richard Zare）试图排除这种解释，因为岩石深处的多环芳烃含量比表面多，而污染物对表面的影响往往大于对内部的影响。 但南卫理公会大学的地质学家 Robert Gregory 指出，水可能会渗入岩石的许多裂缝中，使多环芳烃集中在内部，而表面的多环芳烃则会被紫外线破坏。 8 某些铁化合物。 该岩石含有一种称为磁铁矿的矿物，也称为磁石（用于第一个指南针），以及另一种类似于“愚人金”的矿物。

[](https://dl0.creation.com/articles/p005/c00534/PlanetMars-lge.jpg)Among the most prominent features on the Martian surface is the massive canyon formation known as the Valles Marineris. The canyon system is more than 4,000 km (2,486 miles) long, 200 km (125 miles) wide, and up to 7 km (5 miles) deep. Compare this with Earth’s Grand Canyon at 446 km (277 miles) long, 30 km (18 miles) wide, and 1.6 km (1 mile) deep. [Click](https://dl0.creation.com/articles/p005/c00534/PlanetMars-lge.jpg) for larger view.

These minerals can be formed by living organisms or by processes having nothing to do with life. It is the occurrence of these minerals together which suggests (to some) that they were formed by living cells. But the researchers haven’t ruled out all possible non-living processes.

## Would life on Mars prove particles-to-people evolution?

Many sceptics have committed a logical error, because even if life were actually found on Mars, it would not prove that it had evolved there.

First, it could not rule out an Earth origin for that life. After all, if rocks can be blasted from Mars to Earth, it should be possible to blast them the other way.9 A less dramatic possibility, which scientists have considered for years, is that spores from Earth were pushed out of the upper atmosphere into space by light pressure, especially during a solar flare. Therefore, the alleged Martian life could originally have been seeded by Earth life.

Second, evolutionists have not succeeded in showing how non-living matter can jump the many hurdles required to form living cells.10

火星表面最显着的特征之一是被称为水手谷的巨大峡谷。 峡谷系统长超过 4,000 公里（2,486 英里），宽 200 公里（125 英里），深 7 公里（5 英里）。 与此相比，地球上的大峡谷长 446 公里（277 英里），宽 30 公里（18 英里），深 1.6 公里（1 英里）。 单击查看大图。 这些矿物质可以由生物体或与生命无关的过程形成。 这些矿物质一起出现表明（对某些人来说）它们是由活细胞形成的。 但研究人员并没有排除所有可能的非生命过程。 火星上的生命会证明粒子到人类的进化吗？ 许多怀疑论者犯了一个逻辑错误，因为即使在火星上确实发现了生命，也不能证明它是在那里进化的。 首先，它不能排除该生命起源于地球的可能性。 毕竟，如果岩石可以从火星炸到地球，那么也应该可以用另一种方式将它们炸到。 9 科学家们多年来一直在考虑的一个不太引人注目的可能性是，来自地球的孢子被从高层大气推到了那里。 空间受到光压的影响，尤其是在太阳耀斑期间。 因此，所谓的火星生命最初可能是地球生命的种子。 其次，进化论者还没有成功地证明非生命物质如何能够跨越形成活细胞所需的许多障碍。 10

## What does Scripture say?

The Bible does not explicitly say that no life was created outside the Earth. Some Christians of yesteryear, e.g. the British scholar Richard Bentley, even theorised that God’s omnipotence and glory might be expressed by many planets with life.11

However, it must be noted that most supporters of ET life have a strong evolutionary bias, as pointed out at the beginning of this article. Both Carl Sagan and H.G. Wells wrote books supporting evolution and opposing Christianity. It is tragic that millions of dollars are wasted on seeking complex signals from space which would prove an alien intelligence, but such people refuse to consider that the complex signals of our DNA and protein point to an Intelligence which made us. It is also sad to see President Clinton virtually pledging billions of dollars to help the space program because he thinks some shapes and chemicals in a rock show that life was on Mars. Yet in the USA, millions of dollars are spent, with his approval, killing unborn human babies with heartbeats and brainwaves, because he presumably maintains that they are not alive!

Scripture strongly implies that no intelligent life exists elsewhere, and the millions of taxpayers’ dollars spent on SETI projects have failed to refute this. The Earth was created purposely to be home for humans. It was on Earth that humans rebelled against their Creator and brought the cosmos under the curse of death and decay ([Romans 8:22](https://biblia.com/bible/esv/Rom%208.22)). It was also the place where the Creator took on the nature of one of His creatures, died for their sins, and rose from the dead. It would therefore seem hard to reconcile intelligent life on other worlds with the Fall and the Incarnation. It would also seem odd for God to create microscopic life on other planets, but we should not be dogmatic on this.

圣经怎么说？ 圣经没有明确指出地球以外没有生命被创造。 过去的一些基督徒，例如 英国学者理查德·本特利 (Richard Bentley) 甚至推测，上帝的无所不能和荣耀可能通过许多有生命的行星来表达。 11 然而，必须指出的是，正如本文开头所指出的，大多数外星人生命的支持者都具有强烈的进化偏见。 卡尔·萨根和 H·G·威尔斯都写过支持进化论和反对基督教的书。 可悲的是，数百万美元被浪费在寻找来自太空的复杂信号上，这些信号将证明存在外星智能，但这些人拒绝考虑我们的 DNA 和蛋白质的复杂信号指向创造了我们的智能。 同样令人难过的是，克林顿总统实际上承诺投入数十亿美元来帮助太空计划，因为他认为岩石中的一些形状和化学物质表明火星上存在生命。 然而在美国，在他的批准下，花费了数百万美元，用心跳和脑电波杀死未出生的人类婴儿，因为他大概坚持认为他们没有活着！ 圣经强烈暗示其他地方不存在智慧生命，而花费在 SETI 项目上的数百万纳税人的钱也未能反驳这一点。 地球的诞生是为了人类的家园。 正是在地球上，人类反抗了他们的造物主，并将宇宙置于死亡和腐烂的诅咒之下（罗马书 8:22）。 在这里，造物主呈现了他的一个受造物的本性，为他们的罪孽而死，并从死里复活。 因此，似乎很难将其他世界的智慧生命与堕落和化身相调和。 上帝在其他星球上创造微观生命似乎也很奇怪，但我们不应该在这一点上教条主义。

## Summary

The media speculations about ‘life on Mars’ were premature, to say the least. Some researchers in the field believe the evidence is actually against any life. Some have suggested that the claim is a publicity stunt by NASA to gain more Government funding. At most, the evidence is only vaguely suggestive of microbial life. If so, there is still no reason that this could not have had an earth origin.

These dubious claims about ‘life’ in a rock are a smoke-screen, hiding the fact that true life is only found in the Rock ([Isaiah 44:8](https://biblia.com/bible/esv/Isa%2044.8)), and that the only way to eternal life is through the chief Cornerstone, Jesus Christ ([Ephesians 2:20](https://biblia.com/bible/esv/Eph%202.20), cf. [John 14:6](https://biblia.com/bible/esv/John%2014.6), [Acts 4:12](https://biblia.com/bible/esv/Acts%204.12)).

概括 至少可以说，媒体对“火星上有生命”的猜测还为时过早。 该领域的一些研究人员认为，这些证据实际上反对任何生命。 一些人认为，这一说法是美国宇航局为了获得更多政府资助而进行的宣传噱头。 至多，证据只是模糊地暗示微生物的存在。 如果是这样，仍然没有理由认为它不可能起源于地球。 这些关于岩石中“生命”的可疑说法只是烟幕弹，掩盖了这样一个事实：真正的生命只能在岩石中找到（以赛亚书 44:8），而通往永生的唯一途径是通过房角石耶稣。 基督（以弗所书 2:20，参见约翰福音 14:6，使徒行传 4:12）。

**Was life really created in a test tube? And does it disprove biblical creation?**

***by***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-d-sarfati)

生命真的是在试管中创造出来的吗？ 它是否反驳了圣经的创造论？ 作者：乔纳森·萨法蒂

Photo iStockphoto/Kangah

Headlines are buzzing with the news of Dr Craig Venter’s sensational “creation of a synthetic life form”. Naturally, one atheopathic invader of CMI’s Facebook fan page gloated:

“You can now make life from no life in your own lab, no need for a God just a Man. So I guess you will suddenly change from saying ‘can’t be done’ to worrying about morals. There are deep philosophical ideas that this brings up. I doubt many Young Earth Creationalists [sic] will grasp the significance of this for quite some time.”

So what was actually achieved, and what does it mean?

In 2002, I wrote about Dr Venter’s plans to make new life, in [Will scientists create new life forms—and what would it prove?](https://creation.com/will-scientists-create-new-life-formsand-what-would-it-prove), covering not only the above point but others about “playing God”, biohazards, and information. Readers might wish to study this article before proceeding further. My colleague Dr Carl Wieland also wrote an article for [*Creation* magazine](https://creation.com/periodicals) **26**(3):16–17 in 2004, [Creating life in a test-tube?](https://creation.com/creating-life-in-a-test-tube) which is also worth studying for overlapping as well as different points.

**What was actually achieved?**

The leftist UK newspaper, *The Guardian*, had a headline [Craig Venter creates synthetic life form](http://www.guardian.co.uk/science/2010/may/20/craig-venter-synthetic-life-form). But the subheading read: “Craig Venter and his team have built the genome of a bacterium from scratch and incorporated it into a cell to make what they call the world’s first synthetic life form.” This was the culmination of 15 years of research.

克雷格·文特尔博士轰动一时的“创造合成生命形式”的新闻成为头条新闻。 自然地，CMI Facebook 粉丝页面的一位无神论者幸灾乐祸地说道： “你现在可以在自己的实验室里从无生命中创造出生命，不需要上帝，只需一个人。 所以我猜你会突然从说“做不到”变成担心道德。 这带来了深刻的哲学思想。 我怀疑许多年轻的地球创造论者[原文如此]在相当长一段时间内不会理解这一点的重要性。” 那么，实际取得了什么成果，又意味着什么呢？ 2002年，我在《科学家会创造新的生命形式吗？它将证明什么？》中写到了文特尔博士创造新生命的计划，不仅涵盖了上述观点，还涵盖了其他有关“扮演上帝”、生物危害和信息的内容。 读者可能希望在继续阅读之前先研究一下这篇文章。 我的同事 Carl Wieland 博士还在 2004 年为《Creation》杂志 26(3):16-17 写了一篇文章，在试管中创造生命？ 这也值得研究重叠点和不同点。 实际取得了什么成果？ 英国左翼报纸《卫报》的标题是克雷格·文特尔创造了合成生命形式。 但副标题是：“克雷格·文特尔和他的团队从头开始构建了细菌的基因组，并将其整合到细胞中，形成了他们所谓的世界上第一个合成生命形式。” 这是 15 年研究的结晶。

***Existing* cell machinery needed**

‘If I can just synthesize life in the test tube … then I’ll have proven that no intelligence was necessary to form life in the beginning.’—Logic-challenged atheopathic scientist

Note very carefully what this said: the DNA was built from scratch, then placed into an *already existing* cell before it could work. This shows that it’s not enough just to make DNA; it needs the *machinery* of a cell before it works. This has long been a “vicious circle” for chemical evolution (or “abiogenesis”), or the origin of life from non-living life: DNA is no use without machinery to translate it, but this machinery is itself encoded in the DNA—see [Self-replicating enzymes? A critique of some current evolutionary origin-of-life models](https://creation.com/self-replicating-enzymes).

**DNA sequence is *software***

In an [online video](http://www.guardian.co.uk/science/video/2010/may/20/craig-venter-new-life-form), Dr Venter explains his work:

“It’s pretty stunning when you just replace the DNA software in the cell, and the cell instantly starts reading that new software, starts making a whole different set of proteins, and within a short while, all the characteristics of the first species disappear, and a new species emerges from this software that controls that cell going forward. …

“Life is basically the result of an information process, a software process. Our genetic code is our software, and our cells are dynamically, constantly reading our genetic code, making new proteins, and the proteins make the other cellular components. …

“This is now the first time where we’ve started with information in the computer, built that software molecule, now over a million letters of genetic code, put that into a recipient cell, and have this process start where that information converted that cell into a new species.”

Life is basically the result of an information process, a software process. Our genetic code is our software, and our cells are dynamically, constantly reading our genetic code.—Craig Venter

需要现有的细胞机械 “如果我能在试管中合成生命……那么我就证明生命最初的形成并不需要智力。”——逻辑受到挑战的无神论科学家 请仔细注意这句话的意思：DNA 是从头开始构建的，然后在它发挥作用之前将其放入一个已经存在的细胞中。 这表明仅仅制造 DNA 是不够的；还需要制造 DNA。 它需要细胞的机制才能发挥作用。 长期以来，这一直是化学进化（或“自然发生”）或非生命生命起源的“恶性循环”：如果没有机器翻译，DNA 就毫无用处，但这种机器本身就被编码在 DNA 中—— 看到自我复制酶吗？ 对当前一些进化生命起源模型的批评。 DNA序列是软件 在在线视频中，文特尔博士解释了他的工作： “当你更换细胞中的 DNA 软件时，细胞会立即开始读取新软件，开始制造一套完全不同的蛋白质，在很短的时间内，第一个物种的所有特征都消失了，这是非常令人震惊的。 一个新物种从控制该细胞前进的软件中出现。 …… “生命基本上是信息过程、软件过程的结果。 我们的遗传密码就是我们的软件，我们的细胞动态地、不断地读取我们的遗传密码，制造新的蛋白质，而这些蛋白质则制造其他细胞成分。 …… “这是我们第一次从计算机中的信息开始，构建软件分子，现在有超过一百万个遗传密码字母，将其放入受体细胞中，并从信息转换该细胞的地方开始这个过程。 变成一个新物种。” 生命基本上是信息过程、软件过程的结果。 我们的遗传密码就是我们的软件，我们的细胞动态地、不断地读取我们的遗传密码。-Craig Venter

This lines up with what evolutionist Paul Davies says. He is anti-creationist and even anti-Christian, but he argues that the living cell is like an incredibly powerful supercomputer. That’s because the secret of life lies not with the chemical ingredients of DNA, but with their organizational *arrangement*. They code for proteins, via the decoding machinery mentioned above.1 Davies calls the living cell “an information processing and replicating system of astonishing complexity.”2 Davies continued:

“DNA is not a special life-giving molecule, but a genetic databank that transmits its information using a mathematical code. Most of the workings of the cell are best described, not in terms of material stuff—hardware—but as information, or software. Trying to make life by mixing chemicals in a test tube is like soldering switches and wires in an attempt to produce Windows 98. It won’t work because it addresses the problem at the wrong conceptual level.”

But this leaves Davies with a problem in explaining how life could have arisen from non-living chemicals:

“How did nature fabricate the world’s first digital information processor—the original living cell—from the blind chaos of blundering molecules? How did molecular hardware get to write its own software?”

Indeed, the chemical interactions between the DNA letters cannot explain their order. In fact, the letters are not even chemically combined with each other; rather, they form rungs of a ladder comprising deoxyribose and phosphate. Michael Polanyi (1891–1976), former chairman of physical chemistry at the University of Manchester (UK) who turned to philosophy, [affirmed this decades ago](https://creation.com/some-thermodynamics-criticisms-and-answers-2):

“As the arrangement of a printed page is extraneous to the chemistry of the printed page, so is the base sequence in a DNA molecule extraneous to the chemical forces at work in the DNA molecule. It is this physical indeterminacy of the sequence that produces the improbability of any particular sequence and thereby enables it to have a meaning—a meaning that has a mathematically determinate information content.”3

这与进化论者保罗·戴维斯的说法一致。 他是反神创论者，甚至反基督教的，但他认为活细胞就像一台极其强大的超级计算机。 这是因为生命的秘密不在于DNA的化学成分，而在于它们的组织排列。 它们通过上述解码机制编码蛋白质。1 戴维斯将活细胞称为“一个极其复杂的信息处理和复制系统。”2 戴维斯继续说道： “DNA 不是一种特殊的赋予生命的分子，而是一个使用数学代码传输信息的基因数据库。 细胞的大部分运作方式都不是用物质（硬件）来最好地描述，而是用信息或软件来描述。 试图通过在试管中混合化学物质来创造生命，就像焊接开关和电线试图生产 Windows 98 一样。它不会起作用，因为它在错误的概念层面上解决了问题。” 但这给戴维斯在解释生命如何从非生命化学物质中产生时带来了一个问题： “大自然是如何从错误的分子的盲目混乱中制造出世界上第一个数字信息处理器——原始的活细胞？ 分子硬件是如何编写自己的软件的？” 事实上，DNA 字母之间的化学相互作用无法解释它们的顺序。 事实上，这些字母甚至没有通过化学方式相互结合；它们是相互结合的。 相反，它们形成了包含脱氧核糖和磷酸盐的梯级。 英国曼彻斯特大学物理化学系前主席迈克尔·波兰尼（Michael Polanyi，1891-1976 年）转向哲学，几十年前就肯定了这一点： “由于打印页面的排列与打印页面的化学性质无关，因此 DNA 分子中的碱基序列与 DNA 分子中起作用的化学力无关。 正是序列的这种物理不确定性产生了任何特定序列的不可能性，从而使其具有意义——具有数学上确定的信息内容的意义。”3

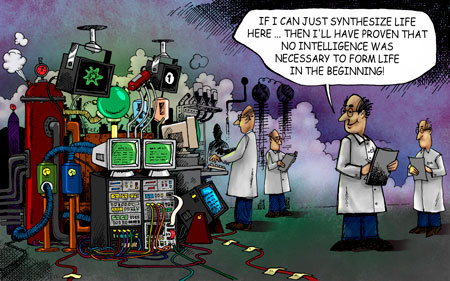
Furthermore, Venter modeled his software on the *known* arrangements of the simplest known self-replicating organism, a *Mycoplasma*. In the abstract of his paper [Creation of a bacterial cell controlled by a chemically synthesized genome](https://www.science.org/doi/10.1126/science.1190719) published in the journal *Science*, he and his co-workers state:

“We report the design, synthesis, and assembly of the 1.08-Mbp *Mycoplasma mycoides* JCVI-syn1.0 genome starting from digitized genome sequence information and its transplantation into a *Mycoplasma* *capricolum* recipient cell to create new *Mycoplasma mycoides* cells that are controlled only by the synthetic chromosome. The only DNA in the cells is the designed synthetic DNA sequence, including ‘watermark’ sequences and other designed gene deletions and polymorphisms, and mutations acquired during the building process. The new cells have expected phenotypic properties and are capable of continuous self-replication.”

That is, he decoded the sequence of one organism, then used this information to synthesize DNA in that sequence. He made some modifications: adding four “watermarks” and extra coding for a substance that would turn blue in the presence of certain drugs. Then it was implanted it into a bacterium of the same genus.

此外，文特尔根据已知的最简单的自我复制生物——支原体——的已知排列来建模他的软件。 在《科学》杂志上发表的论文《创造由化学合成基因组控制的细菌细胞》的摘要中，他和他的同事指出： “我们报告了 1.08-Mbp 蕈状支原体 JCVI-syn1.0 基因组的设计、合成和组装，该基因组从数字化基因组序列信息开始，并将其移植到山羊支原体受体细胞中，以创建仅受 合成染色体。 细胞中唯一的DNA是设计的合成DNA序列，包括“水印”序列和其他设计的基因删除和多态性，以及在构建过程中获得的突变。 新细胞具有预期的表型特性，并且能够持续自我复制。” 也就是说，他解码了一种生物体的序列，然后利用该信息合成该序列中的 DNA。 他做了一些修改：添加了四个“水印”和一种在某些药物存在时会变成蓝色的物质的额外编码。 然后将其植入同属的细菌中。

**DNA is chemically difficult to make**



Even aside from the informational content, which is the order of the chemicals, and the need for decoding machinery, there is a huge problem in ordinary chemistry in getting *any* large DNA molecule. Venter explained that ordinary chemical synthesizers make DNA only 50–80 letters long, so it was quite a jump to making something exceeding a *million* letters. Furthermore, these synthesizers use very complicated starting materials, deoxyribonucleotides, which are a long way from being produced in a primordial soup (see [some of the tremendous difficulties involved in making ribonucleotides](https://creation.com/cairns-smith-detailed-criticisms-of-the-rna-world-hypothesis), required for the fashionable [RNA World](https://creation.com/rna-self-replication) ideas, and [Origin of life: instability of building blocks](https://creation.com/origin-of-life-instability-of-building-blocks)). Furthermore, they are chemically *activated*, so they have the energy to link up into the large molecules (see [Origin of life: the polymerization problem](https://creation.com/origin-of-life-the-polymerization-problem)), and all “right handed” as required, whereas a primordial soup would produce a 50/50 mixture of “left-handed” and “right-handed” molecules (see [Origin of life: the chirality problem](https://creation.com/origin-of-life-the-chirality-problem)).

DNA很难用化学方法制造 即使抛开信息内容（即化学物质的顺序）以及解码机制的需要，普通化学中获取任何大的 DNA 分子也存在巨大的问题。 文特尔解释说，普通的化学合成器只能制造出 50-80 个字母长的 DNA，因此制造出超过 100 万个字母的 DNA 是一个很大的飞跃。 此外，这些合成器使用非常复杂的起始材料，即脱氧核糖核苷酸，这距离在原始汤中生产还有很长的路要走（请参阅制造核糖核苷酸所涉及的一些巨大困难，这是时尚 RNA 世界思想和生命起源：不稳定性所必需的） 的构建块）。 此外，它们是化学活化的，因此它们有能量连接成大分子（参见生命起源：聚合问题），并且根据需要都是“右手”，而原始汤会产生 50/50 的混合物 “左手”和“右手”分子（参见生命起源：手性问题）。

Actually, Venter used [proteins found in yeast to join large lengths of DNA](https://www.sciencenews.org/article/genome-bottle).

DNA is certainly the most compact information storage and retrieval system known to date (see [DNA: marvellous messages or mostly mess?](https://creation.com/dna-marvellous-messages-or-mostly-mess)), but it is chemically unstable, and even physically unwieldy. [Viruses are now known to have a special powerful mini-motor to wind up this extremely long and thin molecular thread](https://creation.com/even-a-tiny-virus-has-a-powerful-mini-motor).

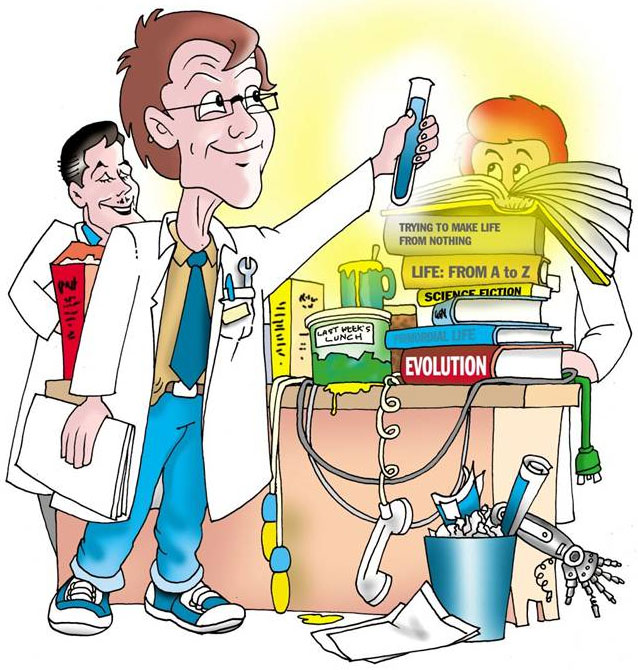
**Summary**

Venter’s work was an amazing scientific achievement, the result of years of research and much ingenuity. There were at least three problems he had to solve to make his synthetic life; these are listed here, alongside his solutions:

1. Operating machinery: using an already existing cell
2. Software: obtaining the information of an already existing cell, modifying it, and synthesizing DNA with this information.
3. Joining up this molecule despite the chemical and physical difficulties. Venter used proteins from yeast to help.

**Did Venter really make new life?**

事实上，文特尔使用酵母中发现的蛋白质来连接大长度的 DNA。 DNA 无疑是迄今为止已知的最紧凑的信息存储和检索系统（参见 DNA：奇妙的信息还是大多混乱？），但它在化学上不稳定，甚至在物理上也很笨重。 现在已知病毒有一个特殊的强大微型马达来缠绕这种极长而细的分子线。 概括 文特尔的工作是一项令人惊叹的科学成就，是多年研究和独创性的成果。 为了创造他的合成生命，他至少必须解决三个问题： 这里列出了这些以及他的解决方案： 1. 操作机械：使用已有的单元 2.软件：获取已有细胞的信息，对其进行修改，并用该信息合成DNA。 3. 尽管存在化学和物理上的困难，仍将这个分子连接起来。 文特尔使用酵母中的蛋白质来提供帮助。 文特尔真的创造了新生命吗？

[](https://dl0.creation.com/articles/p073/c07370/7370-creating-life-from-nothing.jpg)

Small wonder that the claims of “synthetic life” have critics. The *Science News* report [Genome from a bottle](https://www.sciencenews.org/article/genome-bottle) cited a couple:

To some, though, this man-made genome is not technically artificial. “It’s a great feat, but I wouldn’t call it an artificial organism,” Collins says [bioengineer James Collins, a Howard Hughes Medical Institute investigator at Boston University who was not involved in the study]. Synthetic, he contends, implies designed from scratch, not plagiarized from a natural genome. What’s more, the experiment required a recipient cell to provide the cytoplasm to hold the transplanted genome. “It’s small, but it’s an important quibble,” he says.

To claim the creation of synthetic life, asserts Glenn McGee of the Center for Practical Bioethics in Kansas City, Mo., the entire organism must be successfully produced from raw materials.

“The landmark achievement has yet to occur,” McGee says. “What they’ve done is they’ve successfully transplanted DNA from one thing to another without noticeably harming the operation of the old DNA, as best they understand it, from their definition of its function. When I put it that way, it’s a hell of a lot less significant.”

[Anti-creationist geneticist Steve Jones](https://creation.com/whale-tales) is another critic, as quoted in a [*Guardian* profile of Venter](http://www.guardian.co.uk/theobserver/2010/may/23/observer-profile-craig-venter):

Jones is sceptical about the hyperbole of breathless headlines. “The idea that this is “playing God” is just daft. What he has done in genetic terms would be analogous to taking an Apple Mac programme and making it work on a PC — and then saying you have created a computer. It’s not trivial, but it is utterly absurd the claims that are being made about it.”

难怪“合成生命”的说法遭到批评。 《科学新闻》报道《瓶子里的基因组》引用了一些例子： 但对一些人来说，这种人造基因组在技术上并不是人造的。 “这是一项伟大的壮举，但我不会称其为人工有机体，”柯林斯说（生物工程师詹姆斯·柯林斯，波士顿大学霍华德休斯医学研究所研究员，未参与这项研究）。 他认为，合成意味着从头开始设计，而不是抄袭自然基因组。 更重要的是，该实验需要受体细胞提供细胞质来容纳移植的基因组。 “虽然很小，但这是一个重要的狡辩，”他说。 密苏里州堪萨斯城实用生物伦理学中心的格伦·麦吉断言，要声称创造了合成生命，整个有机体必须由原材料成功生产出来。 “里程碑式的成就尚未实现，”麦吉说。 “他们所做的是成功地将 DNA 从一件事移植到另一件事，而没有明显损害旧 DNA 的运作，正如他们对旧 DNA 功能的定义所理解的那样。 当我这么说时，事情就变得不那么重要了。” 反神创论遗传学家史蒂夫·琼斯是另一位批评者，正如《卫报》对文特尔的简介中所引用的那样： 琼斯对令人窒息的头条新闻的夸张表示怀疑。 “认为这是‘扮演上帝’的想法是愚蠢的。 从遗传学的角度来看，他所做的事情类似于采用苹果 Mac 程序并使其在 PC 上运行，然后说你已经创建了一台计算机。 这不是小事，但有关它的说法完全荒谬。”

**Conclusion**

In the [2002 article](https://creation.com/will-scientists-create-new-life-formsand-what-would-it-prove) cited above, we wrote about Venter’s proposal as follows:

Almost as soon as the news broke, we received a gloating email basically saying that we should be so frightened that we may as well disband CMI, saying:

“New life forms can now be produced in a dish. So much for saying man can’t create life. Keep defending your deep seated belief though, people depend on you.”

… CMI has never actually claimed that man can’t create life. Rather, we claim that *intelligence* is required to generate life, and specifically the literally encyclopedic quantities of information on which life depends. So, as illustrated by the cartoon on the right, if Venter and Smith succeed, it would actually *reinforce* our claim! They rely on meticulous planning, not just throwing a few ‘building blocks’ into something resembling the hypothetical primordial soup.

The DNA software sequence was planned after analyzing an already existing microbe, the components joined with intricate chemistry largely based on proteins from living organisms, and the product was read with already-existing cell machinery.

Indeed, far from showing that chemical evolution is plausible, Venter’s achievement shows many reasons why it is **not**. The DNA software sequence was planned after analyzing an already existing microbe, the components joined with intricate chemistry largely based on proteins from living organisms, and the product was read with already-existing cell machinery. So the critics above have a good point: this wasn’t really a synthetic life form.

But what if they had not only manufactured the DNA from its components, but also made proteins from their components to function like the yeast ones, and managed to make the decoding machines and cytoplasm as well? Venter says that such a feat is years away. Then there might be a real claim that they had made synthetic life. Would this then be proof against the need for a Designer of life? Not at all. Our [2004 article](https://creation.com/creating-life-in-a-test-tube) cited above pointed out:

[I]f it were to happen, then in one sense, Christians should be getting excited, using it as evidence for creation. … if someone were to claim that synthesizing life in a test-tube wipes out the idea of creation, they would in effect be saying, ‘*Synthesizing* life in a test-tube proves that it *evolved*.’ Now substitute the italicized words in that phrase with others of identical meaning, and the absurdity of it becomes clear: ‘*Using intelligence to make* life in a test-tube proves that *it made itself and did not arise through intelligence*.’ …

say someone, washed ashore on a remote island, sees a portable battery-operated television set. Never having seen a TV set before, they eventually happen to switch it on and watch it in amazement. Puzzling about how this device came to be, its discoverer decides to take it apart. Years are spent studying it and learning all about how it works. Using thousands of hours of mind-power and effort, the person learns how to make an exact copy of each part,4 and how to put the parts together in exactly the same way as the original. Finally, the moment has arrived—the switch is thrown—*voilà*, it works. Now if such an amazingly brilliant achievement had taken place, it would obviously be the height of foolishness for such a person to say, excitedly, ‘Wow, now I know for certain that the device I found made itself!’

So, as we said years ago, such news is far from a threat to biblical creation, but a strong vindication.

结论 在上面引用的 2002 年的文章中，我们对文特尔的提议是这样写的： 几乎消息一传出，我们就收到了一封幸灾乐祸的电子邮件，基本上是说我们应该感到害怕，以至于我们不如解散 CMI，其中写道： “现在可以在培养皿中产生新的生命形式。 说了这么多，人类无法创造生命。 不过，请继续捍卫你根深蒂固的信念，人们依赖你。” …… CMI 从未真正声称人类无法创造生命。 相反，我们声称需要智力来产生生命，特别是生命所依赖的百科全书式的大量信息。 因此，正如右边的漫画所示，如果文特尔和史密斯成功，它实际上会加强我们的主张！ 他们依赖于精心的计划，而不是仅仅将一些“积木”扔进类似于假设的原始汤的东西中。 DNA 软件序列是在分析了现有的微生物后规划的，这些组件与主要基于活生物体蛋白质的复杂化学结合在一起，并且产品是用现有的细胞机器读取的。 事实上，文特尔的成就远非表明化学演化是合理的，而是揭示了化学演化不合理的许多原因。 DNA 软件序列是在分析了现有的微生物后规划的，这些组件与主要基于活生物体蛋白质的复杂化学结合在一起，并且产品是用现有的细胞机器读取的。 所以上面的批评者有一个很好的观点：这并不是真正的合成生命形式。 但如果他们不仅用其成分制造了 DNA，还用其成分制造了像酵母一样发挥功能的蛋白质，并且还成功地制造了解码机器和细胞质呢？ 文特尔表示，这样的壮举还需要数年时间才能实现。 那么就可能真正声称他们创造了合成生命。 那么这会证明不需要生活设计师吗？ 一点也不。 上面引用的我们 2004 年的文章指出： 如果这真的发生，那么从某种意义上说，基督徒应该感到兴奋，用它作为创造的证据。 ......如果有人声称在试管中合成生命消除了创造的想法，他们实际上会说，“在试管中合成生命证明它是进化的。”现在替换该短语中的斜体字 与其他具有相同含义的词，其荒谬性就显而易见了：“用智力在试管中创造生命，证明生命是自己创造的，而不是通过智力产生的。”…… 有人说，在一个偏远的岛屿上被冲上岸后，他看到了一台便携式电池供电的电视机。 他们以前从未见过电视机，但最终碰巧打开它并惊讶地观看。 它的发现者对这个装置是如何产生的感到困惑，决定将其拆开。 人们花费了数年时间来研究它并了解它是如何工作的。 通过花费数千小时的精神力量和努力，人们学会了如何制作每个部件的精确副本，4以及如何以与原始部件完全相同的方式将部件组合在一起。 终于，这一刻到来了——按下开关——瞧，它起作用了。 现在，如果发生了如此令人惊叹的辉煌成就，那么对于这样一个人来说，兴奋地说：“哇，现在我确信我发现的设备是自己制造的，这显然是愚蠢至极的！” 因此，正如我们多年前所说，这样的消息远非对圣经创造的威胁，而是强有力的证明。

**Hydrothermal origin of life?**

***by***[***Jonathan Sarfati***](https://creation.com/dr-jonathan-d-sarfati)

**Abstract**

Some Japanese researchers have claimed to prove that life could have arisen in a submarine hydrothermal vent. However, the most complex molecule their ‘simulation’ produced was hexaglycine, in the microscopic yield of 0.001%. Compared to the complexity of even the simplest living cell, hexaglycine is extremely simple. High temperatures would degrade any complex molecules over the alleged geological time.

热液生命起源？ 作者：乔纳森·萨法蒂

概括

一些日本研究人员声称证明了生命可能在海底热液喷口中出现。 然而，他们的“模拟”产生的最复杂的分子是六甘氨酸，微观产量为 0.001%。 与最简单的活细胞的复杂性相比，六甘氨酸极其简单。 高温会在所谓的地质时间内降解任何复杂的分子。

**Introduction**

The simplest possible cell, according to recent theoretical analysis, would need a bare minimum of 256 genes coding for the required enzymes, which are long polypeptides. And it is doubtful whether such a hypothetical organism could survive, because such an organism could barely repair DNA damage, could no longer fine-tune the ability of its remaining genes, would lack the ability to digest complex compounds, and would need a comprehensive supply of organic nutrients in its environment.1

One major difficulty is linking up the building blocks at all, let alone in the right sequence. This is because thermodynamic considerations show that long molecules like proteins and nucleic acids tend to break up into their component monomers (amino acids and nucleotides respectively).2 Any undirected energy input is more likely to be destructive rather than constructive, like ‘a bull in a china shop’, and to increase the variety of undesirable side reactions possible.

介绍 根据最近的理论分析，最简单的细胞需要至少 256 个编码所需酶的基因，这些酶是长多肽。 而且这种假想的生物体是否能够生存还值得怀疑，因为这样的生物体几乎无法修复DNA损伤，无法再微调其剩余基因的能力，缺乏消化复杂化合物的能力，并且需要全面的供应 其环境中的有机营养物1 一个主要的困难是将各个构建块连接起来，更不用说以正确的顺序了。 这是因为热力学考虑表明，蛋白质和核酸等长分子往往会分解成其组成单体（分别是氨基酸和核苷酸）。2任何无定向的能量输入更有可能是破坏性的，而不是建设性的，就像“一头公牛” 一家瓷器店”，并增加了各种不良副反应的可能性。

**Hydrothermal vents**

Some researchers have proposed that life began in submarine hydrothermal vents, where superheated subterranean water pours into the sea. The idea is that the heat can help synthesize polymers, which would then be quenched in the surrounding sea water—this would prevent the same energy from destroying the products soon after they were formed.

Five researchers in Nagaoka, Japan, claimed to have simulated such conditions in a flow reactor.3 They circulated 500 ml of a strong solution of glycine (0.1 M) through several chambers at a high pressure of 24.0 MPa. The first chamber was heated mainly to 200–250 ° C; from there, the liquid was injected at the rate of 8–12 ml/min into a cooling chamber kept at 0 ° C. Then the liquid was depressurized before samples were extracted at various intervals. The whole cycle was completed in 1–1.3 hours. In some of the runs, 0.01 M CuCl2 was added to the 0.1 M glycine solution, which was also acidified to pH 2.5 by HCl at room temperature.

热液喷口 一些研究人员提出，生命起源于海底热液喷口，过热的地下水涌入大海。 这个想法是，热量可以帮助合成聚合物，然后在周围的海水中淬火——这将防止相同的能量在产品形成后立即破坏它们。 日本长冈的五名研究人员声称已在流动反应器中模拟了此类条件。3 他们在 24.0 MPa 的高压下将 500 毫升浓甘氨酸溶液 (0.1 M) 在多个室中循环。 第一室主要加热至200-250℃； 然后，将液体以 8–12 毫升/分钟的速率注入保持在 0°C 的冷却室中。然后将液体减压，然后以不同的时间间隔提取样品。 整个周期在1-1.3小时内完成。 在某些实验中，将 0.01 M CuCl2 添加到 0.1 M 甘氨酸溶液中，并在室温下用 HCl 将其酸化至 pH 2.5。

**Experimental results**

The most spectacular results occurred in the runs with the extra CuCl2 and HCl. The Cu2+ ions catalyzed the formation of tetraglycine (yield 0.1%). Even some hexaglycine formed (yield 0.001%). But the product with the highest yield was the cyclic dimer, diketopiperazine, which peaked at about 1% yield, then dropped. The reader is not informed as to how much effort was invested in optimizing the conditions to maximize the amount of larger polyglycines.

Assessment

The team leader, Koichiro Matsuno, was quoted as follows:

‘For 10 years, underwater hydrothermal vents have been thought to be the place where life began—and we were able to prove it.’ 4

But is this justified by the experimental results? No! As shown by the following reasons, Matsuno’s claim is based on evolutionary faith, which results in over-optimistic interpretation of the data.

1. The concentration of glycine of 0.1 M was far higher than could be expected in a real primordial soup. In reality, prebiotic simulations of glycine production produce far lower yields. Also, any glycine produced would be subject to oxidative degradation in an oxygenic atmosphere. Or else, if there was a primitive oxygen-free atmosphere,5 the lack of an ozone layer would result in destruction by ultraviolet radiation. Also, adsorption by clays, precipitation or complexation by metal ions, or reactions with other organic molecules would reduce the concentration still further. A more realistic concentration would be 10–7 M.6
2. While the hydrothermal conditions might be right for this experiment, overall, they would be harmful in the long term to other vital components of life. For example, the famous pioneer of evolutionary origin-of-life experiments, Stanley Miller, points out that polymers are *‘too unstable to exist in a hot prebiotic environment’*.7 Miller has also pointed out that the RNA bases are destroyed very quickly in water at 100 ° C — adenine and guanine have half lives of about a year, uracil about 12 years, and cytosine only 19 days.8 Intense heating also readily destroys many of the complex amino acids such as serine and threonine.9 Another problem is that the exclusive ‘left-handedness’ required for life is destroyed by heating, i.e. the amino acids are *racemized*.10 But this was not put to the test because the Japanese team used the simplest amino acid, glycine, which is the only achiral amino acid used in living systems. It seems incomprehensible that after designing this experiment with such care other amino acids would not have been tested. The fact that they are all known to undergo various non-peptide bond reactions has surely not escaped the researchers’ attention.
3. The longest polymer (or rather, oligomer) formed was hexaglycine. Most enzymes, however, have far more than six amino acid residues—usually hundreds. And even the hexaglycine produced was found only in minuscule amounts.
4. This experiment gave a simple homo-oligomer, i.e. all monomers are the same. But life requires many polymers in *precise sequences* of 20 *different* types of amino acids. Thus Matsuno’s experiments offer not the slightest explanation for the complex, high-information polymers of living organisms.

实验结果 最引人注目的结果发生在使用额外的 CuCl2 和 HCl 的运行中。 Cu2+离子催化四甘氨酸的形成（产率0.1%）。 甚至形成了一些六甘氨酸（产率0.001%）。 但产率最高的产物是环状二聚体二酮哌嗪，其产率达到峰值约 1%，然后下降。 读者不知道在优化条件以最大化较大聚甘氨酸的量方面投入了多少努力。 评估 团队负责人 Koichiro Matsuno 的引述如下： “十年来，水下热液喷口一直被认为是生命开始的地方——我们能够证明这一点。”4 但实验结果证明这是合理的吗？ 不！ 从以下理由可以看出，松野的主张是基于进化论信仰，导致对数据的解释过于乐观。 1. 0.1M的甘氨酸浓度远远高于真正的原始汤中的预期浓度。 事实上，对甘氨酸生产的益生元模拟产生的产量要低得多。 此外，产生的任何甘氨酸在含氧气氛中都会发生氧化降解。 否则，如果存在原始的无氧大气5，臭氧层的缺乏就会导致紫外线辐射的破坏。 此外，粘土的吸附、金属离子的沉淀或络合、或与其他有机分子的反应都会进一步降低浓度。 更现实的浓度是 10–7 M.6 2. 虽然水热条件可能适合该实验，但总体而言，从长远来看，它们会对生命的其他重要组成部分有害。 例如，生命进化起源实验的著名先驱斯坦利·米勒 (Stanley Miller) 指出，聚合物“太不稳定，无法在炎热的生命起源环境中存在”。7 米勒还指出，RNA 碱基在高温环境下很快就会被破坏。 100°C 的水 — 腺嘌呤和鸟嘌呤的半衰期约为一年，尿嘧啶约为 12 年，胞嘧啶只有 19 天。8 强烈加热也很容易破坏许多复杂的氨基酸，如丝氨酸和苏氨酸。9 另一个问题是 生命所需的独特“左旋性”会因加热而被破坏，即氨基酸被外消旋化。 10但这并没有经过测试，因为日本团队使用了最简单的氨基酸——甘氨酸，它是唯一的非手性氨基酸 生命系统中使用的酸。 令人难以理解的是，在如此谨慎地设计了这个实验之后，其他氨基酸却没有被测试。 众所周知，它们都会发生各种非肽键反应，这一事实肯定没有逃过研究人员的注意。 3.形成的最长的聚合物（或者更确切地说，低聚物）是六甘氨酸。 然而，大多数酶的氨基酸残基远远超过六个——通常是数百个。 甚至所产生的六甘氨酸的含量也微乎其微。 4. 该实验给出了简单的均聚低聚物，即所有单体都相同。 但生命需要许多具有 20 种不同类型氨基酸精确序列的聚合物。 因此，松野的实验并没有对生物体复杂的、高信息的聚合物提供任何解释。

**Conclusion**

As the non-creationist information theorist Hubert Yockey observed over 20 years earlier (and he has not revised his opinion since):

‘Research on the origin of life seems to be unique in that the conclusion has already been authoritatively accepted … . What remains to be done is to find the scenarios which describe the detailed mechanisms and processes by which this happened.

One must conclude that, contrary to the established and current wisdom a scenario describing the genesis of life on earth by chance and natural causes which can be accepted on the basis of fact and not faith has not yet been written.’ 11

[**Update:** recent research shows more difficulties with this idea: [Darwin’s warm pond idea is tested](https://creation.com/target=), 13 February 2006:

‘David Deamer, emeritus professor of chemistry at the University of California at Santa Cruz, said ahead of his presentation: “It is about 140 years since Charles Darwin suggested that life may have begun in a ‘warm little pond’.

‘“We are now testing Darwin’ idea, but in ‘hot little puddles’ associated with the volcanic regions of Kamchatka (Russia) and Mount Lassen (California, US).

‘“The results are surprising and in some ways disappointing. It seems that hot acidic waters containing clay do not provide the right conditions for chemicals to assemble themselves into ‘pioneer organisms’.”

‘Professor Deamer said that amino acids and DNA, the “building blocks” for life, and phosphate, another essential ingredient, clung to the surfaces of clay particles in the volcanic pools.

‘“The reason this is significant is that it has been proposed that clay promotes interesting chemical reactions relating to the origin of life,” he explained.

‘“However,” he added, “in our experiments, the organic compounds became so strongly held to the clay particles that they could not undergo any further chemical reactions.”’]

结论 正如非神创论信息理论家休伯特·约基 (Hubert Yockey) 20 多年前所观察到的那样（此后他没有修改自己的观点）： “关于生命起源的研究似乎是独一无二的，因为结论已经被权威接受……” 剩下要做的就是找到描述发生这种情况的详细机制和过程的场景。 人们必须得出这样的结论：与既定的和当前的智慧相反，描述地球上生命的起源是偶然和自然原因的情景尚未被写出，这种情景可以根据事实而不是信仰来接受。 11 [更新：最近的研究表明这个想法有更多困难：达尔文的温暖池塘想法经过测试，2006 年 2 月 13 日： 加州大学圣克鲁斯分校化学名誉教授戴维·迪默 (David Deamer) 在演讲前表示：“查尔斯·达尔文提出生命可能起源于‘温暖的小池塘’，已有约 140 年了。 “我们现在正在测试达尔文的想法，但在与堪察加半岛（俄罗斯）和拉森山（美国加利福尼亚州）火山地区相关的‘热小水坑’中。 “结果令人惊讶，而且在某些方面令人失望。 似乎含有粘土的热酸性水无法为化学物质组装成‘先锋生物’提供合适的条件。” 迪默教授说，生命的“基石”氨基酸和 DNA 以及另一种重要成分磷酸盐附着在火山池中粘土颗粒的表面。 “这一点之所以重要，是因为有人提出粘土会促进与生命起源相关的有趣化学反应，”他解释道。 “然而，”他补充道，“在我们的实验中，有机化合物变得如此牢固地附着在粘土颗粒上，以至于它们无法进行任何进一步的化学反应。”]

**Did God create life on other planets?**

Otherwise why is the universe so big?

***by***[***Gary Bates***](https://creation.com/gary-bates)

[INTRODUCTION ADDED NOVEMBER 2009:  
We have received numerous inquiries from around the world on the issue, with CMI-US CEO Gary Bates quoted on CNN television just days ago. In light of this recent story, we are republishing the following article by Gary (the author of the creationist classic [*Alien Intrusion: UFOs and the Evolution Connection*](https://creation.com/store_redirect.php?sku=10-2-174)) which will be of great interest to you in understanding this growing phenomenon.]

Many people, Christian or otherwise, struggle with the notion that the earth is the only inhabited planet in this enormous universe. In short, is there life on other planets?

上帝在其他星球上创造了生命吗？ 不然宇宙为何这么大？ 通过加里·贝茨 [2009 年 11 月添加的简介： 我们收到了来自世界各地关于这个问题的大量询问，几天前 CNN 电视台援引了 CMI-US 首席执行官加里·贝茨 (Gary Bates) 的话说。 鉴于最近的这个故事，我们将重新发表加里（创造论经典《外星人入侵：不明飞行物与进化的联系》的作者）撰写的以下文章，这对您了解这一日益增长的现象将会非常有兴趣。] 许多人，无论是基督徒还是其他人，都对地球是这个巨大宇宙中唯一有人居住的星球这一观念感到挣扎。 简而言之，其他星球上有生命吗？

stockxpert[](https://dl0.creation.com/articles/p056/c05608/5608moon_lge.jpg)

Those who believe life evolved on the earth usually see it as virtual ‘fact’ that life has evolved on countless other planets. Discovering life on other planets would in turn be seen as confirming their evolutionary belief.

But even many Christians think, ‘God must have created life elsewhere, otherwise this enormous universe would be an awful waste of space.’ In my experience, this seems to be the major underlying reason why people think that there must be other life ‘out there’. However, our thinking should be based on what God said He did (the Bible), and not what we think He would, should or might have done.

Firstly, since God is the one who made the universe, it can scarcely be ‘big’ to Him. Humans struggle with its vastness because our comprehension is limited to the created time/space dimensions within which we exist, and it is mind-bending to try and comprehend anything beyond our dimensional existence. Size is only relative to us as inhabitants of this universe. And size and time are related somewhat. Because the universe is big to us we consider how long it would take us to travel across it, for example. But, time itself began with the creation of the physical universe, so how can we comprehend what eternity is, or might be? What was ‘before’ the universe? Similarly, how do we imagine how ‘big’ God is? We cannot use a tape measure that is made of the very atoms He made to measure Him. One example of this might be if you were asked to build a small house and you did. Now you are asked to build a large house. In our dimensions, for you to build the larger house it would require more effort and take more time. So, is it harder, or does it take longer for God to build a big universe compared to a smaller one (according to our perspective on what constitutes large or small of course)? Of course not, because He isn’t bound by time and space (which He created). [Isaiah 40:28](https://biblia.com/bible/esv/Isa%2040.28) says; ‘… the everlasting God, the LORD, the Creator of the ends of the earth, does not grow weak nor weary …’.

We are impressed that God made billions of galaxies with billions of stars in them and suitably so, because that is one of the reasons for making them. But as mentioned, size is not an issue for God. Stars are relatively simple structures as they are just great big balls of gas. It would take more ‘creative input’, in that sense, for Jesus’ miracle of feeding the five thousand than for the creation of countless quasars (there is immense genetic complexity in the structure of even a dead fish).

那些相信生命在地球上进化的人通常将生命在无数其他行星上进化的事实视为虚拟的“事实”。 在其他行星上发现生命反过来又会被视为证实了他们的进化论信念。 但甚至许多基督徒也认为，“上帝一定在其他地方创造了生命，否则这个巨大的宇宙将是对空间的严重浪费。”根据我的经验，这似乎是人们认为“外面一定存在其他生命”的主要原因。 那里'。 然而，我们的思考应该基于上帝所说的他所做的（圣经），而不是我们认为他会、应该或可能做的事情。 首先，既然上帝是创造宇宙的那一位，那么宇宙对他来说几乎不可能是“大”的。 人类与它的巨大性作斗争，因为我们的理解仅限于我们存在的所创造的时间/空间维度，而尝试和理解超出我们维度存在的任何事物都是令人费解的。 大小仅与我们作为这个宇宙的居民有关。 而且大小和时间也有一定的关系。 例如，因为宇宙对我们来说很大，所以我们会考虑穿越它需要多长时间。 但是，时间本身是从物质宇宙的创造开始的，那么我们如何理解永恒是什么，或者可能是什么？ 宇宙“之前”是什么？ 同样，我们如何想象上帝有多大？ 我们不能使用由他制造的原子制成的卷尺来测量他。 一个例子可能是，如果您被要求建造一座小房子，而您确实这样做了。 现在你被要求建造一座大房子。 在我们的尺寸里，你建造更大的房子需要更多的努力和时间。 那么，与较小的宇宙相比，上帝建造一个大宇宙是否更困难，或者需要更长的时间（当然，根据我们对什么构成大或小的看法）？ 当然不是，因为他不受时间和空间（他创造的）的束缚。 以赛亚书 40:28 说； “……永恒的上帝，耶和华，地极的创造者，不会软弱或疲倦……”。 令我们印象深刻的是，上帝创造了数十亿个星系，其中有数十亿颗恒星，而且确实如此，因为这是创造它们的原因之一。 但正如前面提到的，大小对上帝来说不是问题。 恒星的结构相对简单，因为它们只是巨大的气球。 从这个意义上说，耶稣养活五千人的奇迹比创造无数类星体需要更多的“创造性投入”（即使是死鱼的结构也存在巨大的遗传复杂性）。

**The Bible and ETs**

It is often asked, ‘Just because the Bible teaches about God creating intelligent life only on Earth, why *couldn’t* He have done so elsewhere?’ After all, Scripture does not discuss everything, e.g. motorcars. However, the biblical objection to ET is not merely an argument from silence. Motor cars, for example, are not a salvation issue, but we believe that sentient, intelligent, moral-decision-capable beings is, because it would undermine the authority of Scripture. In short, understanding the big picture of the Bible/gospel message allows us to conclude clearly that the reason the Bible doesn’t mention extraterrestrials (ETs) is that there aren’t any.1 Surely, if the earth were to be favoured with a visitation by real extraterrestrials from a galaxy far, far away, then one would reasonably expect that the Bible, and God in His sovereignty and foreknowledge, to mention such a momentous occasion, because it would clearly redefine man’s place in the universe.

1. The Bible indicates that the *whole creation* groans and travails under the weight of sin ([Romans 8:18–22](https://biblia.com/bible/esv/Rom%208.18%E2%80%9322)). The effect of the Curse following Adam’s Fall was *universal.*2 Otherwise what would be the point of God destroying this *whole creation* to make way for a new heavens and Earth—[2 Peter 3:13](https://biblia.com/bible/esv/2%20Pet%203.13), [Revelation 21:1](https://biblia.com/bible/esv/Rev%2021.1) ff? Therefore, any ETs living elsewhere would have been (unjustly) affected by the Adamic Curse through no fault of their own—they would not have inherited Adam’s sin nature.
2. When Christ (God) appeared in the flesh, He came to Earth not only to redeem mankind but eventually the *whole creation* back to Himself ([Romans 8:21](https://biblia.com/bible/esv/Rom%208.21), [Colossians 1:20](https://biblia.com/bible/esv/Col%201.20)). However, Christ’s atoning death at Calvary cannot save these hypothetical ETs, because one needs to be a physical descendant of Adam for Christ to be our ‘kinsman-redeemer’ ([Isaiah 59:20](https://biblia.com/bible/esv/Isa%2059.20)). Jesus was called ‘the last Adam’ because there was a real first man, Adam ([1 Corinthians 15:22](https://biblia.com/bible/esv/1%20Cor%2015.22),[45](https://biblia.com/bible/esv/1%20Corinthians%2015.45))—not a first Vulcan, Klingon etc. This is so a sinless human Substitute takes on the punishment all humans deserve for sin ([Isaiah 53:6](https://biblia.com/bible/esv/Isa%2053.6),[10](https://biblia.com/bible/esv/Isaiah%2053.10); [Matthew 20:28](https://biblia.com/bible/esv/Matt%2020.28); [1 John 2:2](https://biblia.com/bible/esv/1%20John%202.2), [4:10](https://biblia.com/bible/esv/1%20John%204.10)), with no need to atone for any (non-existent) sin of his own ([Hebrews 7:27](https://biblia.com/bible/esv/Heb%207.27)).
3. Since this would mean that any ETs would be lost for eternity when this present creation is destroyed in a fervent heat ([2 Peter 3:10](https://biblia.com/bible/esv/2%20Pet%203.10), [12](https://biblia.com/bible/esv/2%20Peter%203.12)), some have wondered whether Christ’s sacrifice might be repeated elsewhere for other beings. However, Christ died *once for all* ([Romans 6:10](https://biblia.com/bible/esv/Rom%206.10), [1 Peter 3:18](https://biblia.com/bible/esv/1%20Pet%203.18)) on the *earth*. He is not going to be crucified and resurrected again on other planets ([Hebrews 9:26](https://biblia.com/bible/esv/Heb%209.26)). This is confirmed by the fact that the redeemed (earthly) church is known as Christ’s bride ([Ephesians 5:22–33](https://biblia.com/bible/esv/Eph%205.22%E2%80%9333); [Revelation 19:7–9](https://biblia.com/bible/esv/Rev%2019.7%E2%80%939)) in a marriage that will last for eternity.3 Christ is *not* going to be a polygamist with many other brides from other planets.
4. The Bible makes no provision for God to redeem any other species, any more than to redeem fallen angels ([Hebrews 2:16](https://biblia.com/bible/esv/Heb%202.16)).

Fitting them in there … somehow!

One attempt to fit ETs in the Bible is on the basis of a word in [Hebrews 11:3](https://biblia.com/bible/esv/Heb%2011.3): ‘Through faith we understand that the *worlds* were framed by the word of God, so that things which are seen were not made of things which do appear.’

The word ‘worlds’ appears in the KJV translation and some others, and some claim that it refers to other inhabitable planets. However, the word is αἰῶν (*aiōn*), from which we derive the word ‘eons’. Thus modern translations render the word as ‘universe’ (entire space-time continuum) because it correctly describes ‘everything that exists in time and space, visible and invisible, present and eternal’. Even if it was referring to other planets, it is an unwarranted extrapolation to presume intelligent life on them.

圣经和外星人 人们经常问：“既然圣经教导上帝只在地球上创造了智慧生命，为什么他不能在其他地方这样做呢？”毕竟，圣经并没有讨论一切，例如，生命。 汽车。 然而，圣经对外星人的反对不仅仅是沉默的论证。 例如，汽车不是救赎问题，但我们相信有感觉、有智慧、有道德决策能力的生物是救赎问题，因为这会破坏圣经的权威。 简而言之，了解《圣经》/福音信息的大局可以让我们清楚地得出结论，《圣经》没有提到外星人 (ET) 的原因是根本不存在。1 当然，如果地球受到青睐的话 如果真正的外星人从遥远的星系来访，那么人们就会合理地期望圣经以及具有主权和预知的上帝会提及这样一个重大时刻，因为它将清楚地重新定义人类在宇宙中的位置。 1. 圣经指出，一切受造之物都在罪的重压下叹息、劳苦（罗马书 8：18-22）。 亚当堕落之后的咒诅的影响是普遍的。2 否则，上帝毁灭这整个创造物，为新天新地让路，还有什么意义呢——彼得后书 3:13，启示录 21:1 ff？ 因此，任何生活在其他地方的外星人都会（不公正地）受到亚当诅咒的影响，而这并不是他们自己的过错——他们不会继承亚当的罪性。 2. 当基督（神）以肉身显现时，他来到地球不仅是为了救赎人类，而且最终让整个受造界回到他自己身边（罗马书8:21，歌罗西书1:20）。 然而，基督在各各他的赎罪之死无法拯救这些假想的外星人，因为一个人需要成为亚当的肉身后裔，基督才能成为我们的“亲属救赎者”（以赛亚书59:20）。 耶稣被称为“最后的亚当”，因为有一个真正的第一个人亚当（哥林多前书 15:22,45），而不是第一个瓦肯人、克林贡人等。因此，一个无罪的人类替代者承担了全人类应得的惩罚。 罪（以赛亚书 53:6,10；马太福音 20:28；约翰一书 2:2, 4:10），不需要为他自己的任何（不存在的）罪赎罪（希伯来书 7:27）。 3. 因为这意味着，当当前的创造物在酷热中被毁灭时，任何外星人都将永远消失（彼得后书 3:10, 12），一些人想知道基督的牺牲是否会在其他地方为其他生物重复。 然而，基督在世上只死一次（罗马书 6:10，彼前书 3:18）。 他不会在其他星球上被钉十字架并再次复活（希伯来书 9:26）。 被救赎的（地上）教会在永恒的婚姻中被称为基督的新娘（以弗所书 5：22-33；启示录 19：7-9）这一事实证实了这一点。3 基督不会是一个 与来自其他星球的许多其他新娘的一夫多妻制。 4. 圣经没有规定上帝要救赎任何其他物种，就像救赎堕落的天使一样（希伯来书2:16）。 将它们安装在那里……不知何故！ 将外星人纳入圣经的一种尝试是基于希伯来书 11:3 中的一句话：“我们因着信，明白世界是由上帝的道所构成的，所以所见的事物并不是由可见的事物构成的”。 出现。' “世界”这个词出现在英王钦定本和其他一些译本中，有些人声称它指的是其他宜居行星。 然而，这个词是αἰῶν (aiōn)，我们从中衍生出“eons”这个词。 因此，现代翻译将这个词翻译为“宇宙”（整个时空连续体），因为它正确地描述了“时间和空间中存在的一切，可见的和不可见的，现在的和永恒的”。 即使它指的是其他行星，假设它们上面有智慧生命也是一种毫无根据的推断。

It should also be remembered that expressions like “the heavens and earth” ([Genesis 1:1](https://biblia.com/bible/esv/Gen%201.1)) are a figure of speech known as a *merism*. This occurs when two opposites or extremes are combined to represent the whole or the sum of its parts. For example, if I said “I painted the whole building from top to bottom.” One would understand this to mean everything in the whole building. Similarly, biblical Hebrew has no word for ‘the universe’ and can at best say ‘the all’, so instead it used the merism “the heavens and the earth”. It is clear that New Testament passages like the aforementioned [Romans 8:18–22](https://biblia.com/bible/esv/Rom%208.18%E2%80%9322) and [Hebrews 11:3](https://biblia.com/bible/esv/Heb%2011.3) are pointing back to the Genesis (“heavens and earth”) creation, and thus, everything that God made and when time as we know it began. See this [further explanation.](https://creation.com/slipshod-logic-in-creation-for-kids#merism)

*Jesus’ teaching was causing division among the Jews, because they always believed that salvation from God was for them alone. Jesus was reaffirming that He would be the Saviour of all mankind.*

Another is the passage in [John 10:16](https://biblia.com/bible/esv/John%2010.16) in which Jesus says, ‘I have other sheep, which are not of this fold; I must bring them also, and they will hear My voice; and they will become one flock with one shepherd.’ However, even an ET-believing astronomer at the Vatican (thus a ‘hostile witness’ to the ‘no ETs cause’), a Jesuit priest by the name of Guy Consalmagno, concedes, ‘In context, these “other sheep” are presumably a reference to the Gentiles, not extraterrestrials.’4 Jesus’ teaching was causing division among the Jews (vs. 19), because they always believed that salvation from God was for them alone. Jesus was reaffirming that He would be the Saviour of *all* mankind.

A novel approach

A more recent idea to allow for ETs arose out of a perceived need to protect Christianity in the event of a real alien visitation to Earth. Michael S. Heiser is an influential Christian UFOlogist/speaker with a Ph.D. in Hebrew Bible and Ancient Semitic Languages. He claims that the arguments put forward earlier might not apply to God-created aliens. Because they are not descendants of Adam they have not inherited his sin nature, and thus, are not morally guilty before God. Just like ‘bunny rabbits’ on the earth, they do not need salvation—even though they will die, they are going to neither heaven nor hell.

还应该记住，像“天地”（创世记 1:1）这样的表达方式是一种被称为分词现象的修辞手法。 当两个对立或极端组合起来代表整体或其部分的总和时，就会发生这种情况。 例如，如果我说“我从上到下粉刷了整栋大楼”。 人们会理解这意味着整栋大楼的一切。 同样，圣经希伯来语中没有“宇宙”这个词，最多只能说“一切”，所以它使用了“天地”这个词。 很明显，新约圣经的经文，如前面提到的罗马书 8：18-22 和希伯来书 11：3 都指向创世记（“天地”）的创造，因此，上帝创造的一切以及我们所知道的时间 开始了。 请参阅此进一步解释。 耶稣的教导在犹太人中引起了分裂，因为他们始终相信上帝的救恩只属于他们。 耶稣重申他将成为全人类的救主。 另一处是约翰福音10章16节，其中耶稣说：‘我还有另外的羊，不属于这个圈的； 我也必须带他们来，他们就会听到我的声音； 然而，即使是梵蒂冈一位相信外星人的天文学家（因此是“没有外星人事业”的“敌对证人”），一位名叫盖伊·康萨尔马尼奥（Guy Consalmagno）的耶稣会牧师，也承认， “根据上下文，这些‘另外的羊’大概是指外邦人，而不是外星人。”4 耶稣的教导在犹太人中引起了分裂（第 19 节），因为他们始终相信上帝的救恩只属于他们。 耶稣重申他将成为全人类的救主。 一种新颖的方法 最近允许外星人存在的想法是出于在外星人真正造访地球时保护基督教的需要。 迈克尔·S·海瑟 (Michael S. Heiser) 是一位颇具影响力的基督教不明飞行物学家/演讲家，拥有博士学位。 希伯来圣经和古闪族语言。 他声称之前提出的论点可能不适用于上帝创造的外星人。 因为他们不是亚当的后裔，所以他们没有继承亚当的罪性，因此在上帝面前没有道德上的罪责。 就像地球上的“小兔子”一样，他们不需要救赎——即使他们会死，他们也不会去天堂，也不会去地狱。

On the surface this seems a compelling argument; after all, fallen angels are intelligent but are beyond salvation (“For surely it is not angels he helps, but Abraham’s descendants.” [Hebrews 2:16](https://biblia.com/bible/esv/Heb%202.16)). Angels are immortal and not of our corporeal dimension. And Heiser’s ETs in spaceships require a level of intelligence not found in rabbits. This acutely highlights the injustice of their suffering the effects of the Curse, including death and ultimately extinction when the heavens are ‘rolled up like a scroll’ ([Revelation 6:14](https://biblia.com/bible/esv/Rev%206.14)). It also seems bizarre to assign no moral responsibility for the actions of highly intelligent beings.

Heiser also claims that vastly intelligent ETs would not displace mankind’s position as being made in the image of God because ‘image’ just means humans have been placed as God’s representatives on the earth.

However, the Bible says we are made in God’s image *and* likeness ([Genesis 1:26](https://biblia.com/bible/esv/Gen%201.26)). Man was immediately created a fully intelligent being about 6,000 years ago and was involved in craftsmanship shortly thereafter ([Genesis 4:22](https://biblia.com/bible/esv/Gen%204.22)). Since that time, even we have not been able to develop technologies advanced enough to travel to other star systems. If aliens were capable of developing incredible faster-than-light spaceships needed to get here, one would presume they must have been created with vastly superior intellect to ours—which would make them even more in God’s likeness in that sense than we are. Or, their creation is much older than the 6,000 years of the biblical six-day timeframe; the aliens were created before man and had sufficient time to develop their technologies. However, God created Earth on Day 1 and later the heavenly bodies on Day 4.

从表面上看，这似乎是一个令人信服的论点；但事实上，这似乎是一个令人信服的论点。 毕竟，堕落天使虽然聪明，但却无法得救（“他帮助的不是天使，乃是亚伯拉罕的后裔。”希伯来书 2:16）。 天使是不朽的，不属于我们的肉体维度。 海瑟在宇宙飞船中的外星人需要一定程度的智力，而兔子则没有。 这尖锐地凸显了他们遭受诅咒影响的不公正，包括死亡和最终的灭绝，因为诸天“像书卷一样被卷起来”（启示录6:14）。 对高智商生物的行为不承担任何道德责任似乎也很奇怪。 海瑟还声称，高度智慧的外星人不会取代人类按照上帝形象创造的地位，因为“形象”只是意味着人类被视为上帝在地球上的代表。 然而，圣经说我们是按照神的形象和样式造的（创世记 1:26）。 大约 6,000 年前，人类立即被创造为完全智能的生物，并在不久之后就开始从事手工艺（创世记 4:22）。 从那时起，即使我们也无法开发出足够先进的技术来前往其他恒星系统。 如果外星人有能力开发出到达这里所需的令人难以置信的超光速宇宙飞船，人们就会认为他们的智力一定比我们高得多——这将使他们在这个意义上比我们更加像上帝。 或者，他们的创造比圣经中六天时间框架的 6000 年要古老得多； 外星人是在人类之前被创造的，并且有足够的时间来发展他们的技术。 然而，上帝在第一天创造了地球，随后在第四天创造了天体。

Influenced from outside the Bible

Although Heiser does not promote theistic evolution, he is sympathetic to a universe billions of years old, as proposed by the progressive creationist Dr Hugh Ross.5 In theory, this could allow the time necessary for any unseen ETs to develop the almost science-fiction-like technologies required to get here. But, this is circular reasoning.

There is a huge problem for the Gospel in these long ages. First, it’s important to understand that modern scientific idea of long ages (i.e. millions and billions of years) derived from the *belief* that sedimentary rock layers on Earth represent eons of time.6 This in turn derived from the dogmatic *assumption* that there were no special acts of creation or a global Flood, so that Earth’s features must be explained by processes seen to be happening now.7 This philosophy of *uniformitarianism* seems to amply fulfil the Apostle Peter’s prophecy recorded in [2 Peter 3:3–7](https://biblia.com/bible/esv/2%20Pet%203.3%E2%80%937).

The conflict with the Gospel is that these very same rock layers contain fossils—a record of dead things showing evidence of violence, disease and suffering. Thus, taking a millions-of-years view, even without evolution, places death and suffering long before the Fall of Adam. This undermines the Gospel and the very reasons that Christ came to the earth—such as reversing the effects of the Curse. [Romans 5:12](https://biblia.com/bible/esv/Rom%205.12) clearly states that sin and death entered into the creation as a result of Adam’s actions. There was no death before the Fall.

受到圣经以外的影响 尽管海瑟并不提倡有神论进化论，但他对一个数十亿年前的宇宙表示同情，正如进步神创论者休·罗斯博士所提出的那样。 5 理论上，这可能为任何看不见的外星人提供必要的时间来发展近乎科幻小说中的宇宙 到达这里所需的类似技术。 但是，这是循环推理。 在漫长的岁月里，福音存在着一个巨大的问题。 首先，重要的是要理解，现代科学关于长年龄（即数百万年和数十亿年）的观念源自地球上的沉积岩层代表了亿万年时间的信念。 6这反过来又源自教条式假设，即不存在特殊的沉积岩层。 创造行为或全球性洪水，因此地球的特征必须用现在正在发生的过程来解释。7 这种均变论哲学似乎充分实现了使徒彼得在彼得后书 3:3-7 中记录的预言。 与福音的冲突在于，这些岩石层中含有化石——死亡事物的记录，显示出暴力、疾病和痛苦的证据。 因此，从数百万年的角度来看，即使没有进化论，死亡和痛苦也早在亚当堕落之前就已经存在了。 这破坏了福音和基督来到世上的真正原因——例如扭转诅咒的影响。 罗马书 5 章 12 节明确指出，罪和死亡因亚当的行为而进入受造界。 堕落之前没有死亡。

Ranking the created order

[Psalm 8:5](https://biblia.com/bible/esv/Ps%208.5) says that man was made a little lower than the angels and crowned with glory and honour. Heiser has said that salvation is based upon ranking, not intelligence. If so, where in the Bible (which omits to mention them) would ET sit in this pecking order? Would they be higher than man, and lower than angels, for example? If these advanced ETs were capable of visiting the earth, mankind would now be subject to *their* dominion. (Even if the ETs were friendly, potentially they would be much more powerful due to their intelligence and technology.) This would be in direct contravention to God’s ordained authority structure when he ordered mankind to ‘subdue’ the earth—also known as the dominion mandate ([Genesis 1:28](https://biblia.com/bible/esv/Gen%201.28)).

Be ‘awe’ inspired

[Psalm 19:1](https://biblia.com/bible/esv/Ps%2019.1) tells us a major reason that the universe is so vast: ‘The heavens declare the glory of God; and the firmament shows His handiwork.’ There are many similar passages in Scripture. They help us understand who God is and how powerful He is.

It reminds us that the more we discover about this incredible universe, the more we should be in awe of the One who made it all. In short rather than looking up and wondering ‘I wonder what else is out there?’ and imaginary aliens we’ve never seen. We should instead be considering the very One that made it all.

Could there be ‘simple life’ elsewhere in space?

对创建的订单进行排名 诗篇8:5说，人比天使微小一点，却得了荣耀尊贵为冠冕。 海瑟说过，救赎是基于排名，而不是智力。 如果是这样，那么外星人在圣经中的哪个位置（没有提及）呢？ 例如，他们会高于人类，低于天使吗？ 如果这些先进的外星人能够访问地球，人类现在将受到他们的统治。 （即使外星人是友好的，由于他们的智慧和技术，他们可能会变得更加强大。）这将直接违反上帝命令人类“征服”地球（也称为统治权）时所命定的权威结构 使命（创世记 1:28）。 受到“敬畏”的启发 诗篇 19:1 告诉我们宇宙如此浩瀚的一个主要原因：‘诸天述说神的荣耀； 穹苍显明他的手段。圣经中还有许多类似的段落。 它们帮助我们了解神是谁以及他有多么强大。 它提醒我们，我们对这个令人难以置信的宇宙了解得越多，我们就越应该敬畏创造这一切的那一位。 简而言之，不要抬头思考“我想知道那里还有什么？”以及我们从未见过的想象中的外星人。 相反，我们应该考虑的是创造这一切的那一位。 太空其他地方可能存在“简单生活”吗？

NASA[](https://dl0.creation.com/articles/p056/c05608/5608alien_rover2_lge.jpg)Two identical Mars Rovers traverse the surface searching for evidence of water. Evolutionary researchers are eagerly looking for past or present signs of (even) microscopic life.

The Bible’s ‘big picture’ seems to preclude *intelligent* life elsewhere in God’s universe1 (see main text). But what if bacteria were found on other planets, for example? This is exceedingly unlikely, but ‘God-made’ bacteria would not violate the Gospel (see [Is the Bible Falsifiable and would a real ET do it?](https://creation.com/is-the-bible-falsifiable-and-would-a-real-live-et-do-it)). And in any case, any ‘microbes on Mars’ were likely as a result of human contamination.2 What would be their purpose? The entire focus of creation is mankind on this Earth; the living forms on Earth’s beautifully balanced biosphere are part of our created life support system.

If bacteria are found elsewhere in the solar system, it will be hailed as proof that life can ‘just evolve’.3 However, we have previously predicted in print that in such an unlikely event, the organisms will have earth-type DNA, etc., consistent with having originated from here as contaminants—either carried by recent man-made probes, or riding fragments of rock blasted from Earth by meteorite impacts.

References

1. Compare Grigg, R., [Did life come from outer space?](https://creation.com/did-life-come-from-outer-space) *Creation* **22**(4):40–43, 2000; creation.com/life-from-space, Bates, G., [*Alien Intrusion: UFOs and the evolution connection*](https://creation.com/store_redirect.php?sku=10-2-174), Master Books, Arkansas, USA, 2004.
2. Sarfati, J., [Conclusive evidence for life from Mars? Remember last time!](https://creation.com/conclusive-evidence-for-life-from-mars) creation.com/mars, 15 May 2002.
3. Matthews, M., [Space life? Answering unearthly allegations](https://creation.com/space-life-creation-magazine), *Creation* **25**(3):54–55, 2003; creation.com/space-life.
4. 两辆相同的火星漫游者穿越表面寻找水的证据。 进化研究人员热切地寻找过去或现在（甚至）微观生命的迹象。 圣经的“大局”似乎排除了上帝宇宙中其他地方的智慧生命（见正文）。 但是，例如，如果在其他行星上发现细菌怎么办？ 这是极不可能的，但“上帝制造”的细菌不会违背福音（参见圣经是否可证伪，真正的外星人会这么做吗？）。 无论如何，“火星上的微生物”很可能是人类污染的结果。2 它们的目的是什么？ 整个创造的焦点是地球上的人类； 地球美丽平衡的生物圈上的生命形式是我们创造的生命支持系统的一部分。 如果在太阳系的其他地方发现细菌，它将被誉为生命可以“进化”的证据。3然而，我们之前在印刷品中预测，在这种不太可能发生的事件中，生物体将拥有地球型 DNA 等 ……与污染物的起源相一致——要么是由最近的人造探测器携带的，要么是由陨石撞击从地球上喷出的岩石碎片携带的。 参考 1. 比较 Grigg, R.，生命来自外太空吗？ 创造 22(4):40–43, 2000; creation.com/life-from-space，Bates, G.，《外星人入侵：UFO 与进化的联系》，Master Books，美国阿肯色州，2004 年。 2. Sarfati, J.，火星存在生命的确凿证据？ 记得上次！ creation.com/mars，2002 年 5 月 15 日。 3. 马修斯，M.，太空生活？ 回答超自然的指控，《创世记》25(3):54–55，2003 年； creation.com/space-life。

# Hoyle on Origin of Life

Famous British mathematician/astronomer, Sir Fred Hoyle, realized the improbability of life forming just by physics and chemistry on earth and so initially thought it could have formed somewhere else in the universe and been seeded on earth from there. However, he apparently later realized that even if the whole universe were an experiment for all its supposed evolutionary age, life would not form. He is quoted as saying,

“The likelihood of the formation of life from inanimate matter is one to a number with 40,000 naughts after it ... It is big enough to bury Darwin and the whole theory of evolution. There was no primeval soup, neither on this planet nor any other, and if the beginnings of life were not random, they must therefore have been the product of purposeful intelligence.”

—Sir Fred Hoyle, as quoted by Lee Elliot Major, “Big enough to bury Darwin”. Guardian (UK) education supplement, Thursday August 23, 2001; http://education.guardian.co.uk/higher/physicalscience/story/0,9836,541468,00.html

**Note:** For some calculations on the probability of life forming by physics and chemistry alone (‘no intelligence allowed’), see [Answering another uninformed atheist: Galileo, Miller–Urey, probability](https://creation.com/answering-another-uninformed-atheist-galileo-miller-urey-probability#P). Note that these calculations use assumptions that are more ridiculously in favour of the naturalistic origin of life than Hoyle’s—hence the better odds, albeit still wildly impossible.

霍伊尔论生命起源

英国著名数学家/天文学家弗雷德·霍伊尔爵士意识到，仅通过地球上的物理和化学作用不可能形成生命，因此最初认为生命可能在宇宙的其他地方形成，并从那里播种到地球上。 然而，他后来显然意识到，即使整个宇宙都是其假定的进化时代的实验，生命也不会形成。 引用他的话说， “无生命物质形成生命的可能性是一比一，后面有 40,000 个零……它大到足以埋葬达尔文和整个进化论。 无论是在这个星球上，还是在任何其他星球上，都不存在原始汤，如果生命的起源不是随机的，那么它们一定是有目的的智慧的产物。” ——弗雷德·霍伊尔爵士，李·埃利奥特·梅杰引用，“大到足以埋葬达尔文”。 Guardian（英国）教育增刊，2001 年 8 月 23 日星期四； http://education.guardian.co.uk/higher/physicalscience/story/0,9836,541468,00.html 注意：对于仅通过物理和化学（“不允许有情报”）来计算生命形成概率的一些计算，请参阅回答另一位无知的无神论者：伽利略，米勒-尤里，概率。 请注意，这些计算使用的假设比霍伊尔的假设更荒谬地支持生命的自然起源——因此可能性更大，尽管仍然非常不可能。