

Lesson 3

Can Life Arise by Chance? What Difference Would That Make?

(Follows Chapters 3, 4)

1. How complex did early modern scientists such as Darwin and Huxley think that life forms are?

(Read pages 41–43, Notes 1–10, pages 257–258)

Summary. In 1868, Darwin’s disciple Thomas Huxley found something immensely important—an evolving substance that was halfway between life and non-life. As it turned out, the substance wasn’t evolving into anything, but the incident points out that Huxley and other scientists of his day thought that life forms would be simple jellies. Similarly, the publicity that greeted the Miller-Urey experiment that produced amino acids in 1953 assumed that only a short step separated organic compounds from life. Today, life forms are thought to resemble supercomputers, a fact which makes their origin a mystery.

Think about it. When accounting for the origin of life, what difference does it make whether life forms are simple jellies or supercomputers? Does design or chance seem to be the more obvious explanation in each case?

Apply it. If you can, view the NOVA program, *Origins*, aired on PBS September 28 and 29, 2004, or visit the Web site, <http://www.pbs.org/wgbh/nova/origins/>. Write down any questions you would like to ask that are not answered in the program/on the Web site.

2. What modern discoveries have deepened our knowledge of the complexity of life?

(Read pages 43–47, Notes 11–21, pages 258–260)

Summary. The development of the science of biochemistry in the 1950s revealed a world inside the cell that is staggering in complexity. Even scientists who resisted design, such as astronomer Fred Hoyle, were aware of the problem that intracellular complexity created for Darwinian evolution. In 1996, biochemist Michael Behe brought the controversy to the public by arguing that Darwinian evolution could not create the complexity of the bacterial flagellum, the rotary propeller by which a bacterium moves. He described the flagellum as *irreducibly complex*, meaning that it could not arise by Darwinian means (natural law working on chance events). In order to do its job, the flagellum must exist in its present state.

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Think about it. A messy room is complex. So is a computer’s operating program. What distinguishes the two?

Apply it. View the components of a bacterial flagellum at <http://id-www.ucsb.edu/fscf/library/origins/graphics-captions/Flagellum.html>. To get a sense of the overall complexity of the life inside a cell, view *Voyage Inside the Cell*.

Study hint. When we view a technical representation of a complex life process such as *Voyage Inside the Cell*, we may be puzzled by what we are seeing at first. One approach is to write down the terms used and research them. Then, when we view the representation again, we will understand better. (Note: *Voyage Inside the Cell* is a computer animation. Most machinery inside cells is below the wavelength of visible light, so we do not “see” it directly.)

3. What difference does it make whether life arises by design or by chance?

(Read pages 51–52, Notes 1–4, pages 260–261)

Summary. Modernist culture assumes that life arises by chance. Chance existence and survival is a major theme of most modernist works of art, literature, architecture, politics, economics, and religion, as well as many other topics. The popular entertainment that derives from modernist literature also assumes that life arises and develops by chance.

Think about it. How would a belief in a chance origin of life impact a culture? How would a belief in a designed origin of life impact a culture?

Apply it. Read a play or novel from the existentialist school of literature, for example, Act One of Samuel Beckett’s *Waiting for Godot* (see Web links below for the Act One on line). What does the playwright assume to be bedrock fact about the universe?

4. What do we know about the origin of life?

(Read pages 52–54, Notes 5–15, pages 261–262)

Summary. Contrary to widespread popular belief, Darwin’s *On the Origin of Species* did not propose an origin of life. Darwin himself regarded the whole topic as a mystery. Natural selection, as described by Darwin and his successors, applies to life forms that already exist. It does not tell us how they came to exist. Today’s science has mainly succeeded in outlining the difficulties that face the origin of life researcher. One problem is that life is mainly information rather than matter, and information is not a material quantity.

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Think about it. Perhaps all of the cells in your body have been replaced since the time when you were an embryo. What makes you yourself, and continuous with the person you were when you were, say, five years old?

Apply it. Read about some origin of life theories at the student intelligent design site, <http://www-ac.s.ucsd.edu/~idea/origlife.htm>, or view *Focus on the Origin of Life: An interview with Dean H. Kenyon* and/or *Focus on the Origin of Life: Interview with Dr. Charles Thaxton*.

5. Where are we now?

(Read pages 54–56, Notes 16–20, page 262)

Summary. In science, mysteries have tended to increase with the amount of information available. It is very difficult to understand the design of intricate, interlocking systems such as genes, and still more difficult to understand their origin. Also, as Gödel's theorem (page 56) demonstrates, we must start with some assumptions or we cannot prove anything. In other words, a stance of absolute skepticism will not help. We must determine what the evidence suggests.

Think about it. Would a simple, chance origin for life be an advantage or a disadvantage for naturalism? Explain.

Apply it. Try to develop an irrefutable proof of your own existence. Ask someone to review your proof from the standpoint of disproving it. How airtight is your proof?

Challenge 1: (Current events): Scientists hope to find life on Mars or perhaps on Europa, one of Jupiter's moons. Find out at NASA's Web site (www.nasa.gov) the reasons for the hope that life can exist on either of these bodies. Also view *Privileged Planet: The Search for Purpose in the Universe* and/or read the sections of *Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery* by Guillermo Gonzalez and Jay W. Richards that deal with Mars. (Note: Use the index to find the sections that deal with Mars.) In a couple of paragraphs, give some reasons for and against life on Mars.

Challenge 2: (Science concepts): Read about origin of life theories at the student intelligent design site, <http://www-ac.s.ucsd.edu/~idea/origlife.htm>, or if possible, view *Focus on the Origin of Life: An interview with Dean H. Kenyon* (1994) or *Focus on the Origin of Life: Interview with Dr. Charles Thaxton* (2000), and identify some of the issues around the origin of life. Are these issues usually addressed in popular discussions? What assumptions do popular discussions make?

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Challenge 3 (Science concepts): Research a specific origin of life theory such as hot soup, cold soup, prebiotic pizza, RNA world, clay world, silicon world, and self-organization. Create a chart, as follows:

Basic Idea	Strengths	Weaknesses

(Note: If you can, read Chapter 11, “The Enigma of Life’s Origin” in *Michael Denton’s Evolution: A Theory in Crisis*.)

Challenge 4 (Science–biology): View *Voyage Inside the Cell* and pick one topic to research further (for example, mitochondria or centrosome).

Challenge 5 (Science–biology): Read about the bacterial flagellum in *Darwin’s Black Box* by Michael Behe or watch *Irreducible Complexity* with Michael J. Behe.

Big Question: What difference does it make whether life could arise by chance?

They Said It! – Quotes to Ponder

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, as Monod points out the machinery by which the cell (at least the nonprimitive cell which is the only one we know) translates the code “consists of a least fifty macromolecular components which are themselves coded in DNA” (Monod, 1970; 1971, 143). Thus the code cannot be translated except by using certain products of its translation. This constitutes a really baffling circle: a vicious circle, it seems for any attempt to form a model, or a theory, of the genesis of the genetic code.

– Karl Popper, 1974

An honest man, armed with all the knowledge available to us now, could only state that in some sense, the origin life appears at the moment to be almost a miracle, so many are the conditions which would have had to have been satisfied to get it going.

– Francis Crick, 1981

Alongside the level of ingenuity and complexity exhibited by the molecular machinery of life, even our most advanced artefacts appear clumsy. We feel humbled, as neolithic man would in the presence of twentieth-century technology.

– Michael Denton, 1985

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Anyone trying to solve this puzzle immediately encounters a paradox. Nowadays nucleic acids are synthesized only with the help of proteins, and proteins are synthesized only if their corresponding nucleotide sequence is present. It is extremely improbable that proteins and nucleic acids, both of which are structurally complex, arose spontaneously in the same place at the same time. Yet it also seems impossible to have one without the other. And so, at first glance, one might have to conclude that life could never, in fact, have originated by chemical means.

– L. E. Orgel, 1994

Earth formed about 4.5 billion years ago. No one knows exactly when or how life began, and the final, most important events leading to the origin of life are perhaps the least understood chapters of the story.

– Space.com, December 2000

Self-Test 3a

1. Of the following, which is the main difficulty that scientists encounter when they attempt to explain the origin of life? a) Life is very old. b) Life is very complex. c) Private religious beliefs get in the way. d) The universe is hostile to life. Explain.
2. Did 19th century scientists think that cells were complex? Do 21st century scientists agree with their view? Explain, giving examples.

Self-Test 3b

1. Assume that, in conversation, you are told, “Darwin explained the origin of life, and all scientists agree with him.” Is that a correct assessment of the current state of research? Give a response.
2. Assume that you are informed that a cell has been found that is only slightly more complex than a chemical element, thus it might be considered only “half alive” Why, based on current science, might you doubt this information?

Web links

- The bacterial flagellum: The flagellum is often used by scientists who argue for intelligent design as an example of irreducible complexity (that is, it cannot evolve without intelligence because no simpler system would be functional). See <http://id-www.ucsb.edu/fscf/library/origins/graphics-captions/Flagellum.html>.

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- Student intelligent design clubs:

Intelligent Design and Evolution Awareness Center www.ideacenter.org

or

ARN's student division, www.idurc.org

- *Waiting for Godot* by Samuel Beckett, tragicomedy in 2 acts: Beckett's work explored the meaningless universe of modernism. [http://www http://samuel-beckett.net/Waiting_for_Godot_Part1.html](http://www.idurc.org/Waiting_for_Godot_Part1.html)
- *Origins*, a PBS series that focuses on the search for a naturalistic origin of life, aired in 2004. It provides a Web site with many related resources: <http://www.pbs.org/wgbh/nova/origins/>

Further reading/viewing

- *Darwin's Black Box* by Michael Behe (New York: Free Press, 1966). Note particularly the information on the bacterial flagellum. (ARN Cat# B022)
- *Evolution: A Theory in Crisis* by Michael Denton (Chevy Chase: Adler & Adler, 1986). This book provides a good account of the evidence against Darwinism. (ARN Cat# B003)
- *Focus on Origins: An Interview with Dr. Robert C. Newman*. (ARN Cat# V018)
- *Focus on the Origin of Life: An interview with Dean H. Kenyon* (1994). (ARN Cat# V007)
- *Focus on the Origin of Life: Interview with Dr. Charles Thaxton* (2000). (ARN Cat# V014)
- *Icons of Evolution: Science or Myth?* (Washington: Regnery 2000). Note particularly the information on the Miller-Urey experiment. (ARN Cat# B038)
- *Icons of Evolution Study Kit* (documentary and study guide). Note particularly the information on the Miller-Urey experiment. (ARN Cat# V025SKS)
- *Irreducible Complexity* by Michael J. Behe. (ARN Cat# V010)
- *Privileged Planet: How Our Place in the Cosmos Is Designed for Discovery* by Guillermo Gonzalez and Jay W. Richards. (Washington: Regnery: 2004). (ARN Cat# B086)

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- *Privileged Planet: The Search for Purpose in the Universe.* (ARN Cat# V039)
- *Voyage Inside the Cell* by Christian Sardet, Laurent Larssonneur, & Andreas Koch (Paris: Digital Studios, 2004). (ARN Cat# V035)

Lesson 3 Notes