

# Truth or Dare with Dr. Ken Miller

## A Lecture Guide to the Anti-Intelligent Design Claims by Dr. Kenneth Miller

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### Introduction

Brown University biologist Dr. Kenneth Miller is the kind of person you naturally want to believe. He has a charismatic personality and a fast-paced, upbeat, and energetic lecture style. On top of all that, he umpires softball, rides horses, and is undoubtedly an all-around nice guy. If you're in college, Dr. Miller makes you wish you'd taken him for introductory biology rather than the boring prof you probably were stuck with. If you're out of college, he might even make you fondly recall undergraduate courses when learning from a capable professor engaged your mind.

While these qualities make for an enjoyable lecture, they have no bearing on whether or not the arguments and assertions of Dr. Miller are factually correct and true. Those familiar with Dr. Miller know that he regularly uses the same arguments against intelligent design (ID) when he lectures, and unfortunately, his arguments are not only weak, but they are rife with misrepresentations of ID.

Dr. Miller has been informed about many of these errors before, which makes it unfortunate that he continues to promote them. The purpose of this Guide is to help you understand, navigate, and critically evaluate common claims in anti-ID lectures by Ken Miller. Whatever opinion you come to hold, don't let yourself be hoodwinked: check the facts for yourself and dare Dr. Miller to tell the truth about intelligent design.

### I. Science and Religion: Is Evolution "Random and Undirected"?

Ken Miller styles himself as a Catholic theistic evolutionist, leading one critic to observe that he is sometimes presented as if any potential conflicts between evolution and religion are "reconciled, as it were, in his person."<sup>1</sup> Dr. Miller has the right

to believe whatever he wishes; there is no need nor desire to question his personal faith. What we do seek, however, are straight answers from Dr. Miller about inconsistencies in his evolving statements on this topic.

Five editions of Miller's textbook, *Biology*, stated that "evolution works without either plan or purpose ... Evolution is random and undirected."<sup>2</sup> At the Dover trial, Dr. Miller admitted on cross-examination that this description "requires a conclusion about meaning and purpose that I think is beyond the realm of science."<sup>3</sup>

Why did this language appear in his book? When pressed, Miller has offered two suspect explanations: He testified he "immediately took it out of the book"<sup>4</sup> after the third edition, even though the language actually remained for all five editions.<sup>2</sup> Dr. Miller may legitimately blame this mistake on a memory lapse, but there is more.

Dr. Miller also tried to blame this language on his co-author, Joseph Levine, stating that "this was a statement that Joe inserted."<sup>4</sup> This may sound plausible, until we read in Miller's own book *Finding Darwin's God* (no co-author to blame there) uses identical language to describe neo-Darwinian evolution:

- "random, undirected process of mutation had produced the 'right' kind of variation for natural selection to act upon" (p. 51)
- "a random, undirected process like evolution" (p. 102)
- "blind, random, undirected evolution [could] have produced such an intricate set of structures and organs, so brilliantly dedicated to a single purpose" (p. 137)

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[pbsevolution/pbsgilder072601.htm](http://pbsevolution/pbsgilder072601.htm)

<sup>2</sup> Kenneth Miller and Joseph Levine, *Biology* (1<sup>st</sup> ed., 1991), p. 658; (2<sup>nd</sup> ed., 1993), p. 658; (3<sup>rd</sup> ed., 1995), p. 658; (4<sup>th</sup> ed., 1998), p. 658; (5<sup>th</sup> ed. 2000), p. 658. For details, see [www.evolutionnews.org/2006/07/ken\\_millers\\_random\\_and\\_undirec.html](http://www.evolutionnews.org/2006/07/ken_millers_random_and_undirec.html)

<sup>3</sup> [Day 2 AM Testimony, p. 4.](#)

<sup>4</sup> [Day 2 AM Testimony, p. 7.](#)

- "the random, undirected processes of mutation and natural selection" (p. 145)
- "Evolution is a natural process, and natural processes are undirected" (p. 244)

**A. Truth or Dare:** *How can Dr. Miller blame the "evolution works without either plan or purpose ... Evolution is random and undirected" language on his co-author Levine when his own book contains nearly identical language? More importantly, how does Miller reconcile the view that evolution is "random," "blind," "undirected" and "works without either plan or purpose" with traditional theism? Is Dr. Miller an open theist, where he believes God isn't truly omniscient or omnipotent and cannot know the outcome of evolution? Dr. Miller has every right to believe as he wishes, but if this is his view, does it place him within Catholic orthodoxy?*

Finally, both the 1991 and 1994 editions of Miller & Levine's *Biology: The Living Science* textbook left readers with a striking passage on the purported implications of Darwinism: "Darwin knew that accepting his theory required believing in *philosophical materialism*, the conviction that matter is the stuff of all existence and that all mental and spiritual phenomena are its by-products. Darwinian evolution was not only purposeless but also heartless--a process in which the rigors of nature ruthlessly eliminate the unfit. Suddenly, humanity was reduced to just one more species in a world that cared nothing for us. The great human mind was no more than a mass of evolving neurons. Worst of all, there was no divine plan to guide us."<sup>5</sup> *Ask Dr. Miller to explain this one too.*

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<sup>5</sup> Joseph Levine & Kenneth Miller, *Biology: Discovering Life* (1<sup>st</sup> ed., D.C. Heath and Co., 1992), pg. 152; (2<sup>nd</sup> ed. D.C. Heath and Co., 1994), p. 161. Emphasis in original.

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<sup>1</sup> Josh Gilder, "There is no religious bias in the PBS Evolution Project because Ken Miller says there isn't," at [www.arn.org/docs/](http://www.arn.org/docs/)

## II. Misrepresenting the Definition of Intelligent Design

At the Dover trial, Ken Miller asserted under oath that intelligent design is merely “a negative argument against evolution” which requires an appeal to the supernatural: “It is what a philosopher might call the argument from ignorance, which is to say that, because we don’t understand something, we assume we never will, and therefore we can invoke a cause outside of nature, a supernatural creator or supernatural designer.”<sup>6</sup> Dr. Miller even stated this holds true in all cases: “The evidence is always negative, and it basically says, if evolution is incorrect, the answer must be design.”<sup>6</sup> These are outright misrepresentations of ID made by Dr. Miller, and it’s likely you’ll hear these same mistakes at any anti-ID lectures from Dr. Miller that you attend.

*The Positive Argument for Design:* At the Dover trial, ID proponents were extremely clear that ID is not merely a negative argument against evolution but uses a strong positive argument. Michael Behe refuted Miller’s testimony by stating: “This argument for design is an entirely positive argument. This is how we recognize design by the purposeful arrangement of parts.”<sup>7</sup> Behe also made this clear in the afterward to *Darwin’s Black Box*: “[I]rreducibly complex systems such as mousetraps and flagella serve both as negative arguments against gradualistic explanations like Darwin’s and as positive arguments for design. The negative argument is that such interactive systems resist explanation by the tiny steps that a Darwinian path would be expected to take. The positive argument is that their parts appear arranged to serve a purpose, which is exactly how we detect design.”<sup>8</sup>

Scott Minnich and Stephen Meyer also explain the positive argument for design: “Molecular machines display a key signature or hallmark of design, namely, irreducible complexity. In all irreducibly complex systems in which the cause of the system is known by experience or observation, intelligent design or engineering played a role the origin of the system ... in any other

context we would immediately recognize such systems as the product of very intelligent engineering. Although some may argue this is a merely an argument from ignorance, we regard it as an inference to the best explanation, given what we know about the powers of intelligent as opposed to strictly natural or material causes.”<sup>9</sup>

ID is thus not merely a negative argument against evolution but is based upon finding in nature the types of complexity which in our experience derive from intelligent causes. Stephen Meyer makes this point clear in a scientific paper published in *Proceedings of the Biological Society of Washington*: “Our experience-based knowledge of information-flow confirms that systems with large amounts of specified complexity (especially codes and languages) invariably originate from an intelligent source from a mind or personal agent.”<sup>10</sup> This specified complexity, also called complex and specified information (CSI), is a tell-tale indicator that intelligence was at work. Meyer explains why this makes for a positive—not negative—argument for design: “by invoking design to explain the origin of new biological information, contemporary design theorists are not positing an arbitrary explanatory element unmotivated by a consideration of the evidence. Instead, they are positing an entity possessing precisely the attributes and causal powers that the phenomenon in question requires as a condition of its production and explanation.”<sup>10</sup>

*ID and the Supernatural:* ID proponents have made it clear that ID appeals to an intelligent cause, and necessarily not to a supernatural one. During the Dover trial, pro-ID microbiologist Scott Minnich was asked “whether intelligent design requires the action of a supernatural creator,” and replied, “It does not.”<sup>11</sup> Likewise, William Dembski writes that

<sup>9</sup> [“Genetic analysis of coordinate flagellar and type III regulatory circuits in pathogenic Bacteria,”](#) in *Proceedings of the Second International Conference on Design & Nature*, Rhodes Greece (2004).

<sup>10</sup> Stephen C. Meyer, [“The origin of biological information and the higher taxonomic categories,”](#) *Proceedings of the Biological Society of Washington*, Vol. 117(2):213-239 (2004).

<sup>11</sup> [Day 20 PM Testimony, pp. 45-46.](#)

“design theorists recognize that the nature, moral character and purposes of this intelligence lie beyond the competence of science and must be left to religion and philosophy,”<sup>12</sup> and explains with Jonathan Wells that “[e]xplanations that call on intelligent causes require no miracles but cannot be reduced to materialistic explanations.”<sup>13</sup> Similarly Michael Behe writes that “as regards the identity of the designer, modern ID theory happily echoes Isaac Newton’s phrase *hypothesis non fingo* [to make no hypothesis].”<sup>14</sup>

The reasons why ID merely appeals to intelligence and not to the “supernatural” are principled rather than rhetorical. As explained earlier, we have observation-based experience with intelligence showing us that intelligence is the cause of high CSI. This allows us to scientifically detect intelligent causation when we find CSI in nature. But we have no observation-based experience with the supernatural, and thus a scientific investigation which detects high CSI in nature can infer intelligent causation, but such a scientific investigation could not go so far as to specify that the intelligence is supernatural. ID is thus a positive argument that, contrary to Miller’s words, does not merely argue that “if evolution is incorrect, the answer must be design.”<sup>6</sup> In contrast, ID uses a positive argument and respects the boundaries of science: it merely appeals to intelligence, does not try to go beyond what the data can tell us and determine whether the designer is natural or supernatural.

Good scholarship always tries to critique one’s opponents’ actual and strongest arguments rather than merely tearing down straw men caricatures. Unfortunately, Dr. Miller is notorious for using the latter approach rather than the former when attacking ID. As Michael Behe observes: “In philosophy there is something called the ‘principle of charitable reading.’ In a nutshell it means that one should construe an author’s argument in the best way possible, so that the argument is

<sup>12</sup> *The Design Revolution*, p. 42 (2004).

<sup>13</sup> *The Design of Life*, pp. 13-14 (2008).

<sup>14</sup> “The Modern Intelligent Design Hypothesis,” *Philosophia Christi*, Vol. 3, p. 165 (2001).

<sup>6</sup> [Day 1 PM Testimony, pp. 15, 36-37.](#)

<sup>7</sup> [Day 10 AM Testimony, p. 110.](#)

<sup>8</sup> *Darwin’s Black Box*, pp. 263-264 (2006).

engaged in its strongest form. Unfortunately, in my experience Miller does the opposite — call it the ‘principle of malicious reading.’ He ignores (or doesn’t comprehend) context, ignores (or doesn’t comprehend) the distinctions an author makes, and construes the argument in the worst way possible.”<sup>15</sup>

In *Only a Theory*, Miller claims that “The most sincere compliment anyone can pay to a scientific idea is to take it seriously.”<sup>16</sup> Does Dr. Miller show any indication that he takes ID seriously?

**B. Truth or Dare:** *Why does Dr. Miller misrepresent ID as a negative argument against evolution that appeals to the supernatural when so many leading ID proponents have made it clear that ID has a strong positive argument and appeal to an intelligent cause, not a supernatural one? Is he informing his audiences about the actual theory of ID as it’s promoted by its proponents? Does Dr. Miller feel that the actual arguments of ID proponents are too strong, so he must twist them, dodge them, and tear down straw men?*

### III. Confusing Evidence for Common Ancestry With Evidence for Darwinian Evolution

Both at the Dover trial and in his lectures and books (such as *Only a Theory*), one of Dr. Kenneth Miller’s primary responses to Michael Behe’s arguments for irreducible complexity is to cite evidence for common ancestry. This class of evidence does not refute Behe because at most, evidence of sequence similarity in DNA demonstrates common ancestry—not a Darwinian evolutionary pathway. Indeed, on closer inspection, it turns out that much of Miller’s favorite evidence does not even provide a strong case for common descent: Miller assumes that functional genetic similarities must result from common descent, ignoring the possibility that such biochemical similarities might result from *common design upon a functional blueprint*.

First, one of Miller’s most common mistakes is to forget that evidence of common ancestry is NOT evidence of a Darwinian pathway, and thereby does

not refute irreducible complexity. Behe, the leading proponent of irreducible complexity who also accepts common descent, aptly observes that “modern Darwinists point to evidence of common descent and erroneously assume it to be evidence of the power of random mutation.”<sup>17</sup>

Behe puts it even more clearly in *Darwin’s Black Box*: “Although useful for determining lines of descent...comparing sequences cannot show how a complex biochemical system achieved its function—the question that most concerns us in this book. By way of analogy, the instruction manuals for two different models of computer put out by the same company might have many identical words, sentences, and even paragraphs, suggesting a common ancestry (perhaps the same author wrote both manuals), but comparing the sequences of letters in the instruction manuals will never tell us if a computer can be produced step-by-step starting from a typewriter....Like the sequence analysts, I believe the evidence strongly supports common descent. But the root question remains unanswered: What has caused complex systems to form?”<sup>18</sup>

Miller’s citation of similarities in DNA sequences in no way refutes irreducible complexity, nor does it demonstrate a stepwise Darwinian evolutionary pathway.

**C. Truth or Dare:** *Why does Dr. Miller repeatedly offer evidence of common descent as if it refutes irreducible complexity, when it doesn’t logically demonstrate a Darwinian pathway and in fact the leading proponent of irreducible complexity accepts common descent?*

Second, even though intelligent design is not necessarily incompatible with common descent (more on this later in Section IV), it should be noted that many of Dr. Miller’s centerpiece examples of evidence for common descent turn out to be quite weak.

As noted, functional genetic similarities may result from common design rather than common descent. After all, designers regularly re-use

components or parts that work in different designs—such as re-using cars and wheels in airplanes, or re-using keyboards on both laptops and cell phones. Thus, when we find functional genetic similarity in different organisms, it might indicate common design.

Though he might not admit it, some of Miller’s arguments implicitly concede this point. Miller contends that the way to refute design is not to find shared functional similarities but to find supposed nonfunctional “junk” DNA. As Miller writes: “Intelligent design cannot explain the presence of a nonfunctional pseudogene, unless it is willing to allow that the designer made serious errors, wasting millions of bases of DNA on a blueprint full of junk and scribbles. Evolution, however, can explain them easily. Pseudogenes are nothing more than chance experiments in gene duplication that have failed, and they persist in the genome as evolutionary remnants of the past history of the  $\beta$ -globin genes.”<sup>19</sup>

Though Miller wrote those words in 1994, he continues to use the  $\beta$ -globin pseudogene as a refutation of ID—it was his centerpiece example of a pseudogene in his 2005 Dover testimony, in his 2008 book *Only a Theory*, and it’s often mentioned in his lectures. Privately, Miller has cited such pseudogenes as “case-closed” evidence of common descent because “common ancestry is the only possible explanation for so many matching errors in the same gene.”<sup>20</sup>

Dr. Miller may be closing this case prematurely. Two authors wrote in *Annual Review of Genetics*: “pseudogenes that have been suitably investigated often exhibit functional roles.”<sup>21</sup> According to these authors, functions include “gene expression, gene regulation, [and] generation of genetic (antibody, antigenic, and other) diversity.”<sup>21</sup> They further suggest that conserved DNA sequences in pseudogenes implies they have function: “Pseudogenes exhibit evolutionary conservation of gene

<sup>15</sup> Michael Behe, “Miller vs. Luskin Part 1,” at [www.amazon.com/gp/blog/post/PLNK24TD6BTRVMLKI](http://www.amazon.com/gp/blog/post/PLNK24TD6BTRVMLKI)

<sup>16</sup> *Only a Theory*, p. 44 (2008).

<sup>17</sup> *The Edge of Evolution*, p. 95 (2007).

<sup>18</sup> *Darwin’s Black Box*, pp. 175-176 (1996),

<sup>19</sup> “Life’s Grand Design,” *Technology Review*, Vol 97(2): 24-32 (February / March 1994).

<sup>20</sup> Private correspondence with Dr. Miller.

<sup>21</sup> Evgeniy S. Balakirev, and Francisco J. Ayala, Pseudogenes, “Are They ‘Junk’ or Functional DNA?,” *Annual Review of Genetics*, Vol. 37:123-51 (2003), emphasis added.

sequence, reduced nucleotide variability, excess synonymous over nonsynonymous nucleotide polymorphism, and other features that are expected in genes or DNA sequences that have functional roles.”<sup>21</sup> Following such sound logic, the British pro-ID group Truth in Science recounts how Miller’s favorite example — the  $\beta$ -globin pseudogene— shows evidence of conserved sequence, implying that it could have function, which could refute Miller’s centerpiece evidence of a functionless, junk DNA “pseudogene”: *“The very fact that the beta-globin pseudogene appears to be conserved in humans, chimpanzees and gorillas speaks eloquently of the fact that this DNA has some important biological function. Genetic sequences are conserved and maintained when any mutation would render them non-functional (or less functional) and when any loss of activity is damaging the organism’s prospects of survival. Such sequences are said to be under purifying (or stabilising) selection which means that deleterious mutations are removed from the gene pool restricting genetic diversity. ... According to the recent review by Sasidharan and Gerstein: ‘Although pseudogenes have generally been considered as evolutionary ‘dead-ends’, a large proportion of these sequences seem to be under some form of purifying selection - whereby natural selection eliminates deleterious mutations from the population - and genetic elements under selection have some use.’ In the case of the beta-globin pseudogene, Wanapirak et al. have reported amazing conservation in the fine structure of the DNA with identical super-helical twists in the human, mouse, bovine, rabbit and chicken genomes. It needs to be remembered that maintenance of the genetic integrity of these structures is biochemically costly. It takes energy to duplicate DNA. The replicating machinery in the cell has built-in proof reading and excising enzymes that constantly check for mutation and damage. Numerous repair mechanisms have been identified to correct genetic damage and to excise incorrect sequences.”*<sup>22</sup>

By assuming that the pseudogenes like the  $\beta$ -globin pseudogene in humans are functionless “junk” DNA, Dr. Miller is not only wrong; he may be hindering the progress of science by discouraging scientists from discovering its true function. This is ironic for someone who has accused ID of stopping science.

Finally, a piece of evidence Dr. Miller commonly cites as demonstrating human/chimp common ancestry is the fusion of chromosome 2 in humans, which he argues has a structure similar to what one would expect if chimp chromosomes 2a and 2b were fused together, end to end. Without belaboring the details (which are covered elsewhere<sup>23</sup>), the evidence for human chromosomal fusion simply indicates that our ancestors once had 48 chromosomes. But it tells us nothing definitive about whether our lineage leads back to a common ancestor shared with with apes. Human chromosomal fusion merely shows that at some point within our human lineage, two chromosomes became fused. That’s it.

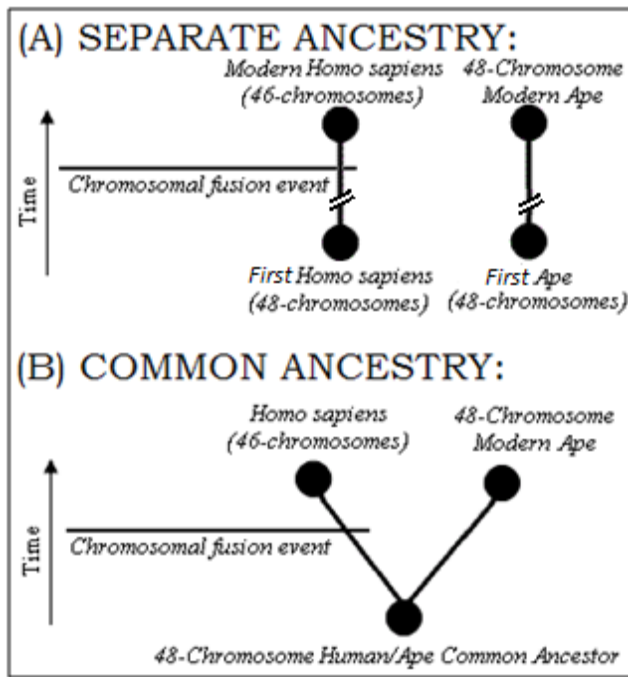
If we step outside the Darwinian box, then the following scenario becomes possible: (1) The human lineage arose separately from that of apes with 48 chromosomes, (2) a chromosomal-fusion event occurred, and (3) the trait spread throughout the human population. In such a scenario, the evidence would appear precisely as we find it, without any common ancestry between humans and apes. The two diagrams at right show two models for explaining the evidence for human chromosomal fusion.

At most, the fusion evidence confirms something we already knew: humans and apes share a similar genetic structure. But this might have been predicted by morphological studies without considering evolution. Again, common

design can also account for such functional genetic similarities, and the fusion evidence does not demonstrate that humans share a common ancestor with apes.

Dr. Miller may reply that his model predicts the fusion evidence. But if we didn’t find evidence for fusion in human chromosome 2, would that really refute Darwinism? No. Evolutionists would just claim that the fused telomeres and extra centromere were deleted.

**D. Truth or Dare:** *Has it actually been established that pseudogenes—especially those with conserved sequence like the  $\beta$ -globin pseudogene—are functionless “junk”-DNA? Wouldn’t it be more appropriate to take a “wait and see” approach, especially since so many types of once-dismissed “junk”-DNA have turned out to have function? Why must common design be excluded from our explanatory toolkit to account for the genetic similarities between humans and apes? Does the fusion evidence really require we share a common ancestor with apes?*



#### IV. The Name-Dropping Approach to Transitional Fossils

Dr. Miller not only conflates evidence for common descent with evidence for Darwinian evolution, but in his book *Only a Theory* he even goes so far as to misrepresent ID as necessarily challenging common descent and requiring “individual

<sup>22</sup> “The Changing Face of Pseudogenes,” at [www.truthinscience.org.uk/site/content/view/277/65](http://www.truthinscience.org.uk/site/content/view/277/65) (internal citations removed).

<sup>23</sup> See [www.ideacenter.org/contentmgr/showdetails.php/id/1392](http://www.ideacenter.org/contentmgr/showdetails.php/id/1392) or [www.salvomag.com/new/articles/salvo6/6luskin.php](http://www.salvomag.com/new/articles/salvo6/6luskin.php)

species, directly created by the designer, each without any relationship to the other."<sup>24</sup> This of course is not at all true. As we saw in the previous section, Michael Behe states, "I believe the evidence strongly supports common descent."<sup>18</sup> Similarly, William Dembski explains: "Intelligent design does not require organisms to emerge suddenly or to be specially created from scratch by the intervention of a designing intelligence."<sup>25</sup>

**E. Truth or Dare:** *Why does Dr. Miller misrepresent ID as incompatible with common descent and even requiring special creation of each individual species when ID proponents have been very clear that their theory does not require this?*

Misrepresentations aside, as part of his case for common descent, Professor Miller loves to name-drop fossils which allegedly demonstrate evolutionary transitions between various groups. While there are a number of examples he likes to give, three can be covered here:

**Fish to Amphibians:** Dr. Miller commonly cites *Tiktaalik* as a transitional form between fish and amphibians. Its discoverer Neil Shubin even claimed it is a "fish with a wrist." The reality is that *Tiktaalik* has a fin that is quite unextraordinarily fish-like and has a wholly different structure from the true wrists of tetrapods. Since *Tiktaalik* has no carpal bones, phalanges, or other tetrapod wrist-bones, it would seem that the wrist of *Tiktaalik* exists only the minds of evolutionists with overactive imaginations.<sup>26</sup>

**Whales Transitions:** Dr. Miller cites alleged fossil transitions between land-mammals and whales. He often

name-drops many fossils, but whale evolution expert Philip Gingerich admits that this series merely has "fossils illustrating three or four steps that bridge the precursor of whales to today's mammals."<sup>27</sup> Even if we grant—for the sake of argument—that some of these fossils have characteristics intermediate between land-mammals and whales, neo-Darwinists are still left with a grave conundrum: Alan Feduccia observes that "the evolution of whales (the 'poster child' for macroevolution) from terrestrial ungulates is well documented at < 10 million years."<sup>28</sup>

Think about that for a moment.

According to the fossil record, if neo-Darwinism is correct then whales, with all of their complex adaptations for aquatic life evolved by unguided natural selection and random, blind mutations from a "primitive little mammal"<sup>29</sup> to a full-fledged whale in less than ten million years. Whales have a long generation time, meaning that there were perhaps only a few million generations at best to allow for the change to add up. If they had a generation time as short as 5 years, Haldane's dilemma predicts that at most only a few thousand mutations could become fixed into an evolving population during that time period.<sup>30</sup> This is dramatically insufficient to account for the innumerable complex genetic changes that would be required to convert a land mammal into a fully aquatic whale. In other words, regardless of what fossils are found, the fossil record permits dramatically insufficient time to convert a land-mammal into a whale by neo-Darwinian processes.

**Hominid Fossils:** Ken Miller often cites hominid fossils as alleged examples of transitional forms. His book *Only a Theory* states that when it comes to human origins, "[w]e have, in reality, discovered so many missing links that the real question has become how to deal with this embarrassment of

riches—in other words, how to connect the dots."<sup>31</sup>

The leading evolutionary biologist Ernst Mayr, in his 2004 book *What Makes Biology Unique?: Considerations on the Autonomy of a Scientific Discipline*, stated: "The earliest fossils of *Homo*, *Homo rudolfensis* and *Homo erectus*, are separated from *Australopithecus* by a large, unbridged gap. How can we explain this seeming saltation? Not having any fossils that can serve as missing links, we have to fall back on the time-honored method of historical science, the construction of a historical narrative."<sup>32</sup> It seems that Miller's standard for a "missing link" is any fossil that exists, regardless of whether it actually demonstrates the evolution of humans. But when it comes to key evolutionary events—such as fossils that bridge the gap between the ape-like australopithecines and our genus *Homo*, Mayr acknowledged that the links are still "missing."

**F. Truth or Dare:** *Why does Dr. Miller believe these are "missing links" that demonstrate evolution? Can he go beyond name-dropping and elaborate on the specific qualities that cause them to be "missing links"? Is it mathematically feasible to evolve a fully aquatic whale from a small land-mammal in less than ten million years? Why do leading authorities like Ernst Mayr differ from Ken Miller and state that we are indeed "missing" key links between ape-like australopithecines and our genus Homo?*

## V. Spinning Tales on the Flagellum

Ken Miller has been making the same objections about irreducible complexity and the bacterial flagellum for a long time. In his Dover testimony, his book *Only a Theory*, and in other writings he argues that irreducible complexity for the flagellum is refuted because about 10 flagellar proteins can also be used to construct a toxin-injection machine (called the Type-III Secretory System, or T3SS) that some predatory bacteria use to kill other cells. Miller may even boast that Judge Jones ruled that the T3SS explained how the bacterial flagellum could evolve: "[W]ith regard

<sup>24</sup> *Only a Theory*, p. 51 (2008).

<sup>25</sup> *The Design Revolution*, p. 178 (2004).

<sup>26</sup> For more responses on *Tiktaalik*, see:

• "An 'Ulnare' and an 'Intermedium' a Wrist Do Not Make: A Response to Carl Zimmer," at [www.evolutionnews.org/2008/08/an\\_ulfare\\_and\\_an\\_intermedium\\_a.html](http://www.evolutionnews.org/2008/08/an_ulfare_and_an_intermedium_a.html)

• "Tiktaalik roseae: Where's the Wrist?," at [www.evolutionnews.org/2008/07/tiktaalik\\_roseae\\_wheres\\_the\\_wr.html](http://www.evolutionnews.org/2008/07/tiktaalik_roseae_wheres_the_wr.html)

• "For Darwinian Evolution, It's One Step Forward, Acknowledging Two Steps Back: Taking A Look at Tiktaalik," at [www.evolutionnews.org/2006/04/one\\_step\\_forward\\_two\\_steps\\_bac.html](http://www.evolutionnews.org/2006/04/one_step_forward_two_steps_bac.html)

<sup>27</sup> [www.actionbioscience.org/evolution/gingerich.html](http://www.actionbioscience.org/evolution/gingerich.html)

<sup>28</sup> "'Big bang' for tertiary birds?," *Trends in Ecology and Evolution*, Vol.18:172-176 (2003).

<sup>29</sup> Steven Stanley, *The New Evolutionary Timetable*, p. 93.

<sup>30</sup> See Walter ReMine, *The Biotic Message*.

<sup>31</sup> *Only a Theory*, p. 92 (2008).

<sup>32</sup> *What Makes Biology Unique?*, p. 198 (2004).

to the bacterial flagellum, Dr. Miller pointed to peer-reviewed studies that identified a possible precursor to the bacterial flagellum, a subsystem that was fully functional, namely the Type-III Secretory System.”<sup>33</sup>

However, there are strong reasons to doubt these hypotheses.

First, leading biologists argue that phylogenetic data implies the T3SS could not have been a precursor to the flagellum.<sup>34</sup> As *New Scientist* reported: “One fact in favour of the flagellum-first view is that bacteria would have needed propulsion before they needed T3SSs, which are used to attack cells that evolved later than bacteria. Also, flagella are found in a more diverse range of bacterial species than T3SSs. ‘The most parsimonious explanation is that the T3SS arose later,’ says biochemist Howard Ochman at the University of Arizona in Tucson.”<sup>35</sup>

Second, the T3SS is composed of only about ¼ of the proteins in the flagellum, and does not account for how the fundamental function of the flagellum—its propulsion system—evolved. The unresolved challenge that the irreducible complexity of the flagellum continues to pose for Darwinian evolution is starkly summarized by William Dembski: “At best the T[3]SS represents one possible step in the indirect Darwinian evolution of the bacterial flagellum. But that still wouldn’t constitute a solution to the evolution of the bacterial flagellum. What’s needed is a complete evolutionary path and not merely a possible oasis along the way. To claim otherwise is like saying we can travel by foot from Los Angeles to Tokyo because we’ve discovered the Hawaiian Islands. Evolutionary biology needs to do better than that.”<sup>36</sup>

Dembski’s critique is apt because it recognizes that Miller wrongly characterizes irreducible complexity as focusing on the non-functionality of sub-parts. In contrast, Behe properly tests irreducible complexity by

assessing the plausibility of the entire functional system to assemble in a step-wise fashion, even if sub-parts can have functions outside of the final system. The “leap” required by going from one functional sub-part to the entire functional system is indicative of the degree of irreducible complexity in a system. Contrary to Miller’s assertions, Behe never argued that irreducible complexity mandates that sub-parts can have no function outside of the final system.

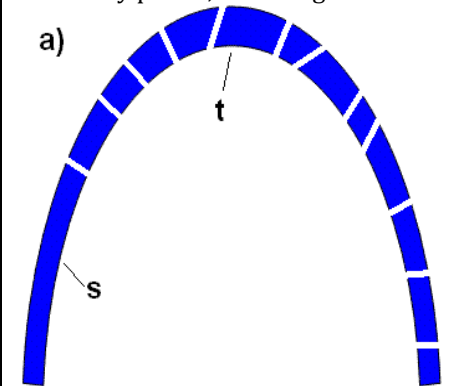
Miller misconstrued the proper way of testing irreducible complexity, and his argument amounts to this: *if my laptop’s power cord could also be used to power my toaster, then my laptop is no longer irreducibly complex.* Because a laptop requires a number of parts necessary for function, this is preposterous. So is Dr. Miller’s straw method of testing irreducible complexity, as seen in the 2 diagrams at right.

In contrast, microbiologist Scott Minnich properly tested for irreducible complexity through genetic knock-out experiments. He presented this evidence during the Dover trial, which showed that the flagellum is irreducibly complex with respect to its complement of 35 genes: “One mutation, one part knock out, it can’t swim. Put that single gene back in we restore motility. ... knock out one part, put a good copy of the gene back in, and they can swim. By definition the system is irreducibly complex. We’ve done that with all 35 components of the flagellum, and we get the same effect.”<sup>37</sup>

Minnich explained that even if Miller’s scenario turned out to be true, it would **not** demonstrate a Darwinian origin of the flagellum because there is a huge leap in complexity from a T3SS to a flagellum. Unfortunately, Judge Jones ignored Minnich’s research supporting irreducible complexity of the flagellum, and instead ruled that Miller refuted the irreducible complexity of the flagellum. Ironically, a review article in *Nature Reviews Microbiology* the following year admitted that “the flagellar research community has scarcely begun to consider how these systems have

evolved.”<sup>38</sup> Did Miller actually demonstrate the flagellum could have evolved by Darwinian evolution?

**Figure A:** Consider an irreducibly complex functional arch, divided up into many pieces, including s and t:



**Figure B:** Take away the keystone of the arch, t, and the arch falls down. But piece s may be left standing:



Does the fact that s remains standing imply the rest of the arch is not irreducibly complex? No. Likewise, the fact that a fraction of the flagellum forms T3SS does not imply that the flagellum itself is not irreducibly complex. To refute irreducible complexity, Dr. Miller would have to show how a fully functional flagellum could form in a step-by-step fashion. He hasn’t shown anything close to that.

**G. Truth or Dare:** Why does Dr. Miller promote an improper way of testing for irreducible complexity and misconstrue Behe’s theories as prohibiting the use of sub-parts in other systems? Has Dr. Miller actually provided anything close to a complete evolutionary pathway for the origin of the flagellum? Has anyone done this? How does Miller’s evidence refute Scott Minnich’s genetic knockout experiments which show the flagellum is irreducibly complex with respect to its complement of about 35 genes?

<sup>33</sup> *Kitzmiller v. Dover* ruling, p. 76.

<sup>34</sup> See Milton H. Saier, Jr., Evolution of Bacterial Type III Protein Secretion Systems, *Trends in Microbiology* 113:12 (2004).

<sup>35</sup> Dan Jones, “Uncovering the evolution of the bacterial flagellum,” *New Scientist* (2-16-08).

<sup>36</sup> Dembski, Rebuttal to Reports by Opposing Expert Witnesses, p. 52, at [www.designinference.com/documents/2005.09.Expert\\_Rebuttal\\_Dembski.pdf](http://www.designinference.com/documents/2005.09.Expert_Rebuttal_Dembski.pdf)

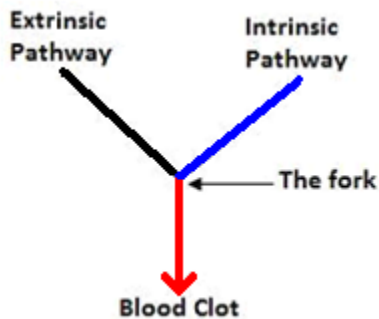
<sup>37</sup> [Day 20 PM Testimony pp. 107-108.](#)

<sup>38</sup> Pallen & Matzke, “From The Origin of Species to the Origin of Bacterial Flagella,” *Nat. Revs. Microbiology*, Vol. 4:788 (2006).

## VI. Misrepresenting Behe's Arguments for the Irreducible Complexity of Blood Clotting

Another area where Ken Miller misrepresents irreducible complexity is the blood clotting cascade. With the flagellum, Miller took a shortcut by arguing that if a few parts can do something else, irreducible complexity is refuted. With the blood clotting cascade, Miller claims that if blood clotting works without parts that Behe doesn't claim in *Darwin's Black Box* are part of the irreducibly complex core of the system, then blood clotting isn't irreducibly complex. Not only is Miller's objection fallacious, but it misrepresents Michael Behe's arguments.

Roughly speaking, there are three "prongs" to the blood clotting cascade: two pathways which initiate the cascade (the extrinsic and intrinsic pathways) and the cascade itself, which forms the clot. These prongs are illustrated in the diagram below:



Simply put, in *Darwin's Black Box*, Michael Behe makes it very clear that he only argues for irreducible complexity for the components after the "fork." Behe makes this unmistakably clear, writing: "Leaving aside the system before the fork in the pathway, where some details are less well known, the blood-clotting system fits the definition of irreducible complexity."<sup>39</sup> Behe also made this clear at the Dover trial, stating:

"The relative importance of the two [initiation] pathways in living organisms is still rather murky. Many experiments on blood clotting are hard to do. And I go on to explain why they must be murky. And then I continue on the next slide. Because of that uncertainty, I said, let's, leaving aside the system before the fork in the pathway, where some details are less well-known, the blood clotting system

fits the definition of irreducible complexity. And I noted that the components of the system beyond the fork in the pathway are fibrinogen, prothrombin, Stuart factor, and proaccelerin. So I was focusing on a particular part of the pathway, as I tried to make clear in *Darwin's Black Box*. If we could go to the next slide. Those components that I was focusing on are down here at the lower parts of the pathway. And I also circled here, for illustration, the extrinsic pathway. It turns out that the pathway can be activated by either one of two directions. **And so I concentrated on the parts that were close to the common point after the fork.** So if you could, I think, advance one slide. If you concentrate on those components, a number of those components are ones which have been experimentally knocked out such as fibrinogen, prothrombin, and tissue factor. And if we go to the next slide, I have red arrows pointing to those components. And you see that they all fall in the area of the blood clotting cascade that I was specifically restricting my arguments to. And if you knock out those components, in fact, the blood clotting cascade is broken. So my discussion of irreducible complexity was, I tried to be precise, and my argument, my argument is experimentally supported."<sup>40</sup>

Ken Miller's response is that certain vertebrates—such as the puffer fish or certain cetaceans—lack components of the *intrinsic pathway* (such as blood clotting factors XI, XII, and XIIIa), and their blood still clots. The problem for Miller is that all of the components he cites are *before the fork*. Since Behe made it clear in *Darwin's Black Box* that his argument for irreducible complexity only applied to components of the blood clotting cascade *after the fork*, it's an open and shut case that Miller has not refuted Behe's arguments.

It's this simple: Miller tested for irreducible complexity in components that Behe doesn't argue are irreducibly complex, as he makes clear in *Darwin's Black Box*. Miller also blatantly misquotes Behe in *Only a Theory* on this point, misrepresenting Behe's arguments as if they apply to the

intrinsic pathway. For details on this matter, see:

*Kenneth Miller, Michael Behe, and the Irreducible Complexity of the Blood-Clotting Cascade Saga* at <http://www.discovery.org/a/14081>

**H. Truth or Dare:** Why does Dr. Miller misrepresent Michael Behe's arguments in Darwin's Black Box as requiring that the intrinsic pathway is part of the irreducibly complex core of the blood clotting cascade? Why doesn't Miller critique Behe's actual arguments in Darwin's Black Box rather than misrepresenting them?

## VII. Ken Miller and the Evolution of the Immune System: "Not Good Enough"?

A final area where Ken Miller misrepresents Behe's arguments is regarding the origin of the immune system. In *Only a Theory*, Miller claims that when the plaintiffs' attorneys at the Dover trial did a literature-dump bluff on Behe during cross-examination—placing before him over 50 papers and nearly a dozen books purportedly explaining the evolution of the immune system—that Behe said that they were "not 'good enough.'" Miller even goes so far as to characterize Behe's response as follows: "Even when presented with every opportunity to make their case, the defenders of design resorted to little more than saying 'It's not good enough for me' in the face of overwhelming evidence for evolution."<sup>41</sup> What did Behe really say?

If by overwhelming evidence for "evolution," Miller meant neo-Darwinian evolution, where random mutation and natural selection are the driving force generating biological complexity in an adaptive, step-by-step fashion, then Behe is on quite firm ground in doubting Miller's assertion of "overwhelming" evidence for the evolution of the immune system. Behe knew this, and thus stated during his cross examination about the immune system: "In many of [the papers] they're not actually discussing mutation. They're discussing similarities and sequences between parts of the immune system in

<sup>39</sup> *Darwin's Black Box*, p. 86 (1996).

<sup>40</sup> [Day 11 AM testimony, pp. 25-28.](#)

<sup>41</sup> *Only a Theory*, p. 74 (2008).

vertebrates and some elements of transposons."<sup>42</sup>

The plaintiffs' attorney wouldn't give up. In another exchange Behe was asked "Now, these articles rebut your assertion that scientific literature has no answers on the origin of the vertebrate immune system?" and he replied:

"A. No, they certainly do not. My answer, or my argument is that the literature has no detailed rigorous explanations for how complex biochemical systems could arise by a random mutation and natural selection and these articles do not address that.

Q. So these are not good enough?

A. They're wonderful articles. They're very interesting. They simply just don't address the question that I pose."<sup>43</sup>

The relentless plaintiffs' attorney then pestered Behe again with nearly the same question "Is that your position today that these articles aren't good enough, you need to see a step-by-step description?" and Behe clearly replied, "These articles are excellent articles I assume. However, they do not address the question that I am posing. **So it's not that they aren't good enough.** It's simply that they are addressed to a different subject."<sup>44</sup>

The plaintiffs' attorney continued pressing Behe, and later Behe again emphasized this point: "Most of them have evolution or related words in the title, so I can confirm that, but what I strongly doubt is that any of these address the question in a rigorous detailed fashion of how the immune system or irreducibly complex components of it could have arisen by random mutation and natural selection."<sup>45</sup>

Does Behe say, as Miller characterizes it, "It's not good enough for me," or in Judge Jones' words, the papers are "not 'good enough'"? Not at all, because Behe actually says: "These articles are excellent articles I assume. However, they do not address the question that I am posing. **So it's not that they aren't good enough.** It's

simply that they are addressed to a different subject."

In other words, Behe said precisely the opposite of what Miller claims Behe said. Of course Miller copied the error from Judge Jones, who copied the error from the ACLU's "Findings of Facts and Conclusions of Law" brief,<sup>46</sup> but unfortunately this false account of Behe's testimony continues to be perpetuated by Miller in his books and lectures about Dover.

More important than all of this is the fact that Behe's response to these papers was right on target: the papers dumped on Behe during cross-examination made for a nice display of courtroom theatrics, but they did not establish a step-by-step Darwinian explanation of the origin of the immune system. Instead, the papers made comparisons of DNA sequences—a type of evidence that doesn't refute irreducible complexity, making the same mistake discussed earlier in Section III, "Confusing Evidence for Common Ancestry with Evidence for Darwinian Evolution."

***I. Truth or Dare:** What did Michael Behe really say in response to the plaintiffs' literature dump bluff purporting to show scientific papers that explained the evolution of the immune system? Did Behe really say the papers are "not good enough"? What do these papers actually show about the evolution of the immune system? Do they offer rigorous step-by-step explanations of how the immune system evolved, or do they make sequence comparisons between genes involved in the immune system and genes elsewhere in biology?*

### Conclusion

The purpose of this guide was to give you an alternative viewpoint on many of Ken Miller's arguments and to help you critically evaluate his claims. We hope that by the end of this guide, you have learned more about the debate over ID and evolution and have been able to think critically about Professor Miller's arguments.

The Darwinian educational establishment doesn't make it easy for you to become objectively informed on

the topic of evolution and intelligent design, but with a little work on your own, it can be done. If you want to base your views on a full and complete understanding of the scientific evidence, you will need to pro-actively research and investigate the pro-ID arguments that many of your faculty may be opposing, misrepresenting, or perhaps even outright censoring. Yes, take courses advocating evolution. But also read material from credible Darwin skeptics to learn about other viewpoints. Only then can you truly make up your mind in an informed fashion.

With a little proactive self-education, critical thinking, and patience, you can keep yourself informed in this debate. Many of the websites listed below contain helpful information and resources about evolution and intelligent design.

I hope this guide is helpful and wish you the best as you explore this exciting and challenging debate.

Sincerely,

Casey Luskin, M.S., J.D.  
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### Websites for More Information:

- **Intelligent Design:**  
[www.intelligentdesign.org](http://www.intelligentdesign.org)
- **Evolution News Blog:**  
[www.evolutionnews.org](http://www.evolutionnews.org)
- **ID the Future Podcast:**  
[www.idthefuture.com](http://www.idthefuture.com)
- **Discovery Institute:**  
[www.discovery.org](http://www.discovery.org)
- **IDEA Student Clubs:**  
[www.ideacenter.org](http://www.ideacenter.org)
- **The College Student's Back to School Guide to Intelligent Design:**  
[www.evolutionnews.org/BacktoSchoolGuide.pdf](http://www.evolutionnews.org/BacktoSchoolGuide.pdf)
- **Truth or Dare with Dr. Ken Miller Lecture Guide Online:**  
[www.evolutionnews.org/KenMillerLectureGuide.pdf](http://www.evolutionnews.org/KenMillerLectureGuide.pdf)

<sup>42</sup> [Day 12 PM testimony, p. 12.](#)

<sup>43</sup> [Day 12 PM testimony, p. 16.](#)

<sup>44</sup> [Day 12 PM testimony, pp. 18-19](#), emphasis added.

<sup>45</sup> [Day 12 PM testimony, pp. 20-21.](#)

<sup>46</sup> See "A Comparison of Judge Jones' Opinion in *Kitzmiller v. Dover with Plaintiffs' Proposed 'Findings of Fact and Conclusions of Law'*," at [discovery.org/a/3829](http://discovery.org/a/3829)