



On-Line Debate

Round 3A (Final round of 3)

"Comparisons of molecules (proteins, DNA) of various species provide independent and compelling support for the hypothesis of biological macro-evolution"

For the Affirmative, [David E. Thomas](#)

Round 3, Posted February 17th, 2003

INTRODUCTION

Do molecular comparisons support the hypothesis of biological macro-evolution? I contend that they do indeed. In Round 1, I noted "'Macro-evolution' means that over time, descent produces new species, genera, families, orders, classes, phyla, and kingdoms." In Round 2, I reiterated that "We're not talking about the origin of Life itself, but we are talking about development of new life forms from existing ones, from bacteria all the way to bunnies."

While the topic of bio-*genesis* (**molecules to microbes**) is a valid scientific area of study, it is not the same as the formal topic of this debate, *biological* macroevolution (**microbes to man**). Biogenesis, while interesting, is simply outside the scope of this debate. Instead, I've argued for a different, yet equally interesting topic: *given* primitive, reproducing cells, can these *microbes* evolve into *Man*? *Germs* into *giraffes*? After two rounds, I'm still curious where Walter ReMine stands on this question.

Nothing brings more clarity to the general question of biological macroevolution than one special case - *human evolution*. Therefore, I challenge ReMine to give a simple answer to this simple question in his Round 3 response: "*Does Walter ReMine think humans and chimpanzees descended from a recent common ancestor?*" I think they *have*, and that the resultant close genetic kinship between humans and chimps exemplifies what I've been discussing in these essays: evidence for *biological macroevolution*.

PROCESS AND PATTERN

Biological macroevolution posits that a key mechanism - *heredity* - is responsible for the overall patterns of life. Darwin himself described "propinquity of descent" - how closely organisms are related - as "the only known cause of the similarity of organic beings." (Darwin 1859)

If macroevolution really happens, nature should show systematic *patterns* indicating related groups. **Closely related creatures will have more in common than distantly related creatures.** Phylogenies (ancestral *histories*) can be calculated based on molecular comparisons alone (as described in detail in Thomas 2002A), and these calculations provide *real information* about ancestors - the order in which they appeared, what their actual genetic sequences were, and more. Accurate descriptions of ancestral features have been confirmed in the lab. ReMine dismissed these studies as mere "microevolution" in Round 2, but *these molecular techniques have been shown to supply valid information about ancestral features and relationships.* (Hillis 1992 and 1994)

As we examine phylogenies, we can see *patterns of inheritance* in ancestors and their descendents. For example, many members of the Hapsburg family shared a feature - a prominent lip - that they inherited from their recent common ancestor. As we move to more inclusive groups, similar *hierarchical* patterns appear - primates share features like hands, mammals all have hair, vertebrates share backbones, and so forth. Where do these patterns come from? What do they mean?

If the basic varieties of life were created *independently*, there is *no obvious reason* why these separate creations should be organized hierarchically. Yes, a hypothetical designer *might* have created them that way, but might have created them in a thousand *different* ways. ReMine claimed in Round 1 that "Message Theory requires such patterns [hierarchies]," but I find his justifications for this idea to be illogical and unconvincing.

ReMine claims that evolution *doesn't* predict a hierarchical taxonomy; however, hierarchy is the obvious *natural result* of descent with modification (biological macroevolution). In Futuyma's words, "...for example, the four-legged condition evolved in amphibians, and is retained by most of their descendants. Among these, the ancestors of the mammals evolved a single-boned lower jaw. Among some of their descendants, the rodents developed gnawing incisors, and so on. *There is a nesting of groups within groups, as a consequence of common ancestry. Objects like minerals that are not descended from common ancestors cannot be arranged in this way.*" (Futuyma 1995). (See Thomas 2002B re Darwin's comments on hierarchies.)

Whether the focus is on history (*phylogenies*) or classification (*hierarchies*), the important question is: do the patterns appear as we would expect if species indeed evolve? Again and again, the answer is yes. Comparisons of *multiple* genes or proteins result in the *same* overall patterns, exactly as evolution demands.

Here is one example: scientists have studied biomolecules to answer the vital question "What species is closest to Man?" Tens of thousands of bits of DNA and proteins consistently yield the same answer, again and again and again: Humans are closest to chimpanzees, and both share a recent common ancestor with gorillas. In Round 2, ReMine quoted the late Colin Patterson remarking that "Congruence between molecular phylogenies" is "elusive." (Patterson 1993) But Patterson was talking about drawing

conclusions from *insufficient data*. What did Patterson think about biomolecules and *human* evolution? He called the molecular evidence "impressive," writing, for example, "Comparison of another huge set of sequences, the entire DNA of the mitochondria - about 15,000 bases ... also puts chimpanzees as our closest relatives, with confidence greater than 99.9%." (Patterson 2001)

TRANSPOSITION - ReMine has repeatedly brought up *transposition* - direct gene transfer between species - as an example of an evolutionary "explanation." However, transposition is *exceedingly rare*, especially among advanced creatures like vertebrates. It might perturb evolutionary patterns between *microbes*, but these perturbations are largely absent from higher creatures. If transpositions were *common*, you might grow horns after eating a cheeseburger! Since transposition is so rare, it has *negligible* impact on studies of, say, vertebrate evolution. Furthermore, transposition is one of several peripheral processes that happen to occur *in addition to evolution*. Should scientists ignore such processes because they might go against the prevailing view? Of course not! Scientists have put transposition on the table, not because it provides yet another plastic evolutionary explanation, but because it actually *happens*. Evolution happens, and so too does Transposition, only *much* less frequently. Syvanen's point was simply that he thinks there may be more horizontal transfer than we realize, because he thought, even at higher levels, transposition wouldn't perturb evolutionary patterns too much.

BIOLOGICAL UNIVERSALS - ReMine notes that Francis Crick was surprised at the degree of uniformity in Life, and claims that such unity was never predicted by evolution. However, it's obvious that, if creatures *can* evolve into new forms, then there must be *some* commonality (unity) between these forms. And what Crick was referring to was this basic, root-level unity: "...all living things use the same four-letter language to carry genetic information. All use the same twenty-letter language to construct their proteins..." (Crick 1981) Crick's point was that the newly-observed unity was even better than biologists had *dreamed* of discovering.

Incidentally, Cairns-Smith didn't mention "lifeforms" all around us. He was referring to *non-living prerequisites to evolution*. (Cairns-Smith 1985)

INDEPENDENT EVIDENCE - I've explained why molecular comparisons - completely novel methods appearing decades after previous work - provide *independent* and *compelling* support for macroevolution. ReMine objects they aren't independent *because* I compared molecules to fossils and morphology, but this is as wrong as labelling incriminating DNA evidence as not "independent" because a suspect's *fingerprints* were also available. While molecular evidence can stand alone, there's a reason it corroborates fossil and morphological data - evolution really happens.

ReMine declared in Round 2 that "Message Theory does not explain biodiversity through appeals to 'creativity.'" For the record, here's what ReMine says in The Biotic Message (ReMine 1993): "The designer intentionally created life to look unlike the result of naturalistic processes. Therefore, the

designer was constrained from using the same design again indiscriminately." [Emphasis added] That seems close to creative activity ("creativity").

In Round 1, ReMine described Message Theory and its assertions, including one positing Life as being Designed so as to "resist Darwin's explanation." I have argued that molecular comparisons support evolution, and do *not* appear to "resist" Darwin. ReMine's counter - apparently, that multiple-requirement design constraints significantly limit the Designer's options - is not convincing to me.

REPEATED CONCORDANCE - ReMine quoted Lynch as saying that phylogenies based on different genes can be conflicting, but did not include Lynch's statement that such single-gene discordances are *unsurprising*, "given the substantial evolutionary time separating the animal phyla...." (Lynch 1999) I've explained in Rounds 1 and 2 that the simultaneous study of *many* genes can resolve this problem (Kumar and Hedges 1998).

MICROEVOLUTION/MACROEVOLUTION - ReMine claims that evolutionary theory provides no structure for extrapolating microevolution to macroevolution, and that punctuationists insist these are substantially different processes. He cites Gould's The Structure of Evolutionary Theory (Gould 2002), but Gould actually says just the opposite: "... punctuated equilibrium merely takes a standard microevolutionary model and elucidates its expected expression when scaled *into geological time*." Moreover, scientists have recently discovered *how* simple genetic mutations - typical in microevolution - can also produce radically new body plans. (Ronshaugen 2002, McDonald 2002).

CONCLUSION

To me, ReMine's explanation - that the patterns of life are apparently explained by multiple-requirement engineering trade-offs which limit the Designer - is unconvincing. I contend that the patterns found in comparisons of proteins like cytochrome c, and in the genes coding for these proteins, and in studies of hundreds of genes, and in shared inherited errors in DNA between species, even in the genetic code itself - provide independent and compelling support for biological macroevolution.

REFERENCES

- (Darwin 1859) Charles Darwin, The Origin of Species by Means of Natural Selection, 1859.
- (Cairns-Smith 1985) A.G. Cairns-Smith, 1985, Seven Clues to the Origin of Life, pages 3, 100.
- (Crick 1981) F. Crick, 1981, Life Itself, page 47.
- (Futuyma 1995) Douglas J. Futuyma, Science on Trial, p. 53, (1982, 1995):
- (Gould 2002) S.J. Gould, 2002, The Structure of Evolutionary Theory, page 778.

- (Hillis 1992) David M. Hillis, et. al., "*Experimental Phylogenetics: Generation of a Known Phylogeny*," Science, Vol. 255, 31 January 1992, 589-592. [[PubMed](#)]
- (Hillis 1994) David M. Hillis, et. al., "*Application and Accuracy of Molecular Phylogenies*," Science, Vol. 264, 29 April 1994, 671-677. [[PubMed](#)]
- (Kumar 1998) S. Kumar and S. Hedges, "*A molecular timescale for vertebrate evolution*," Nature, Vol. 392, 30 April 1998, pp. 917-920. [[PubMed](#)]
- (Lynch 1999) M. Lynch, "*The Age and Relationships of the Major Animal Phyla*," Evolution, 53(1999);319-325, esp. page 323.
- (McDonald 2002) Kim McDonald, "*First Genetic Evidence Uncovered Of How Major Changes In Body Shapes Occurred During Early Animal Evolution*," UCSD Press Release, February 6, 2002, <http://ucsdnews.ucsd.edu/newsrel/science/mchox.htm>
- (Patterson 1993) C. Patterson, et al, "*Congruence Between Molecular and Morphological Phylogenies*," Annual Review Ecological Systematics, 24(1993), pp.153-188.
- (Patterson 2001) Colin Patterson, Evolution, Second Edition, Cornell Univ. Press, Ithaca, NY, ISBN 0-8014-8594-0, page 113.
- (ReMine 1993) Walter J. ReMine, 1993, The Biotic Message: Evolution versus Message Theory, St. Paul Science/publishers, P.O. Box 28006, Saint Paul, Minnesota 55128, ISBN 0-9637999-0-8, <http://www1.minn.net/~science>, page 353.
- (Ronshaugen 2002) M. Ronshaugen, N. McGinnis et. al. "*Hox protein mutation and macroevolution of the insect body plan*," Nature 2002 Feb 21;415(6874):914-7. [[PubMed](#)]
- (Thomas 2002A) David Thomas, "*Example Calculation of Phylogenies: The UPGMA Method*," October 2002, <http://www.nmsr.org/upgma.htm>
- (Thomas 2002B) David Thomas, 2002, "*Charles Darwin et. al. on Hierarchies and Phylogenies*," October 2002, <http://www.nmsr.org/darwin.htm>

NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR*NMSR

This document was last modified on 9/26/2003

<http://www.nmsr.org/round3a.html>

Hits from Inception thru August 1st, 2003: 481