Am I a Monkey? Six Big Questions about Evolution
by Francisco J Ayala
reviewed by Joel W Martin

The difficulty that we face in working to convince the public of the validity of evolutionary biology cannot be attributed to a paucity of information or evidence. The last few years have seen a plethora of comprehensive and excellent books, most of them aimed at a non-scientific audience, detailing the abundant and overwhelming evidence in support of evolution. Rather, our problem is how to summarize and package that information in a form that is accessible to, and even attractive to, the general public. And if we are assuming that the most resistant public sector is composed of people who feel that their religion is threatened by evolution, and we are hoping to change their minds, it is unlikely that an adversarial or condescending tone will help achieve that goal. Francisco J Ayala's latest book Am I a Monkey? is not the first to present the case for evolution to a lay audience in a genteel, inviting, and non-threatening format, but it is one of the better ones, and it should go a long way in helping move us in the right direction.

It's hard to imagine someone more qualified to write about the interaction of evolution and faith than Francisco Ayala. Ayala, an evolutionary geneticist, is currently University Professor and Donald Bren Professor of Biological Sciences, Ecology, and Evolutionary Biology (School of Biological Sciences), Professor of Philosophy (School of Humanities), and Professor of Logic and the Philosophy of Science (School of Social Sciences) at the University of California, Irvine. On the scientific side, he has served as past president of the American Association for the Advancement of Science, is a member of the National Academy of Sciences, and in 2001 was awarded the National Medal of Science. Few in the field of biology will ever scale those heights. On the religious side, he is a former Dominican priest, and in 2010 he was awarded the Templeton Foundation's Templeton Prize (formerly called the Templeton Prize for Progress in Religion), given annually to someone who “has made an exceptional contribution to affirming life's spiritual dimension, whether through insight, discovery, or practical works.” Scientists who adamantly oppose the idea of compatibility of science and faith (there are not terribly many of them, but they tend to be quite vocal) will sometimes suggest that real scientists, good scientists, would not succumb to such primitive needs and emotions; the rational, they argue, will have moved past the age where mankind depends on invisible deities to give meaning to life. Implied in this line of reasoning is that the best scientists could not possibly also be persons of faith. But this argument runs aground when someone with Ayala's credentials and accomplishments is considered, and I have always suspected a bit of envy among his most vociferous critics. Similarly, critics of evolution hoping to pin their arguments on their old nemesis “atheistic science” will have trouble brushing aside Ayala's theological background and the religious sensitivity of his writing. His credentials and accomplishments make it virtually impossible to criticize
him as being either unsympathetic to religion or a mediocre scientist; quite clearly he is neither. And this puts him in an enviable, and possibly unique, position to write about the interface of science and faith for a lay audience, something he has done often in the past (Ayala 2006, 2007).

In *Am I a Monkey?* Ayala distills the anti-evolution arguments down to “six big questions about evolution,” with each addressed in its own chapter. It’s not clear how these six were selected, but presumably they are the questions that the author feels are foremost in (or perhaps most difficult to grasp by) the mind of the public; in his words, they are questions “that arise in the minds of people who are only vaguely familiar with the notion of evolution.” Although arguments could be made for choosing other “big questions,” these six are certainly worth addressing, as several of them are posed regularly on creationist websites and blogs. At 104 pages, the book is amazingly (and appealingly) short, an important advantage for reaching a general audience.

In the introduction, Ayala makes two important points that preface his treatment of evolution and set the tone for his conclusion. First, “science is a wondrously successful way of knowing the world, but it isn’t the only way. Knowledge also derives from other sources, such as common sense experience, imaginative literature, music and artistic experience, philosophical reflection, and, for people of faith, religion and revelation” (p xiii). And second, “a scientific view of the world is hopelessly incomplete. Matters of value and meaning are outside science’s scope. In order to understand the purpose and meaning of life, as well as matters concerning moral and religious values, we need to look elsewhere” (p xiii). Thus, the introduction will be immediately appealing to those who wade into this discussion somewhat reluctantly, fearful of where science, and this book, might lead them. These issues are then tabled for the first five chapters of the book while Ayala addresses other questions about evolution in a direct and unapologetic style; his writing throughout these chapters is brief, accurate, and hard-hitting (for example, “The ‘missing link’ is no longer missing,” p 4). I liked the approach, but it did make me wonder whether persons only “vaguely familiar with the notion of evolution”—especially persons of faith looking for assistance in grappling with this subject—would make it to the end.

The first chapter (Am I a Monkey?) seemed at first an unnecessary throwback to the confusion over monkeys, apes, and their (and our) ancestors. An uninformed reader could assume that this question is indeed at the heart of the issue, when instead it is something of a canard, since apes (not monkeys) are the primates closest to humans, and I wondered why someone would choose a somewhat misleading question for the book’s title (see also the recent article by Meikle and Scott 2010). But Ayala dispenses with the monkey-ape confusion at the start, and indeed does a fine job recounting the evidence for the evolution of apes and man from a common primate ancestor. The chapter serves as a nice summary of what we know of human origins, including the fossil and molecular evidence underlying human evolution.

In chapter 2 (Why is Evolution a Theory?), Ayala attempts to clear up the seemingly ever-present confusion between scientific and everyday uses of the word theory. Like many others before him, he describes evolution as “both theory and fact,” which is understandable to those of us who study evolution but almost guaranteed to be confusing to a lay reader. His definition of a “scientific fact” as “an observation that has been observed again and
again” and as something different from our everyday use of the word seems unwieldy to me. Facts are facts, as they say.

Chapter 3 (What is DNA?) presents a concise overview of what we know about that all-important molecule. It’s up to date and well-written, possibly his best chapter. But here I found myself asking: is this really one of the six most burning questions about evolution? More to the point, is the lack of knowledge about DNA really one of the major stumbling blocks that keep people from understanding and accepting evolution? Given that most high school students can give you a decent definition of DNA, I question whether it is. Indeed, several creationist authors point to DNA as evidence of design, so most readers will be aware of it. Still, there's certainly no harm in giving the public a clear description and explanation of DNA and how it functions, and how it enhances our understanding of evolution, especially for those who have been out of high school or college for a few years (and/or slept through much of Biology 101), and Ayala has certainly done that.

Chapter 4 (Do All Scientists Accept Evolution? ) is more about the additional evidence—from embryology, molecular biology, paleontology, and so on—that supports our understanding of evolution, and only the first three sentences of the chapter have to do with the number of scientists who accept it. Stating that the overwhelming majority of biologists accept evolution, which is true, but providing very little evidence to support that statement is in some ways no more convincing than the creationist claim that there are many who doubt it. A broader discussion, admitting that there are indeed a handful of scientists (but only a handful) who are at odds with the enormous scientific community, might have been more helpful here in dispelling the notion of widespread scientific disagreement. But if I am applauding the book for its brevity, I cannot simultaneously criticize it for being too brief here.

Chapter 5 (How Did Life Begin?) struck me as out of place. It's obviously a fascinating question, but it's never been at the heart of biological evolution; traditionally it's been a question for the field of biochemistry, although there are arguments for including it in an evolution curriculum (e.g. see Lazcano and Peretó 2010). But the public seems to feel that this question is part and parcel with evolution, so I suppose its inclusion here is legitimate on those grounds. Even if it is not a question of evolutionary biology per se, it is among the most important (and potentially most troubling) from a theological perspective.

The final chapter (Can One Believe in Evolution and God?) serves as a bookend for the introduction and stresses the compatibility of science and faith. Ayala lays out his reasons for believing that science poses no threat to persons of faith, and indeed why science and faith cannot be in contradiction and are in fact complementary because of their different approaches, combining some of his personal philosophy with historical considerations, statements on the compatibility of faith and science from religious organizations, and scriptural exegesis. This chapter is his most important contribution (in part because the topics of other chapters are covered in more depth elsewhere), and it will be well received by persons of faith searching for how to reconcile science and religion. It will also, predictably, draw the most flak from those, whether creationist or evolutionist, opposed to any such reconciliation.
An index would have been nice; without it readers will have a hard time finding if and where Ayala discusses creationism or “intelligent design” (he doesn't), or Genesis, or David Hume. Similarly, references might have helped readers know where to turn for more information on, for example, *Ardipithecus*, Cech and Altman's Nobel Prize-winning work on ribozymes, *Tiktaalik*, the FOXP2 gene and its relationship to human language, or other topics. There are eight illustrations inserted between chapters 3 and 4, but although they are relevant to the text, they are not referred to or numbered, which is a bit of an inconvenience that could have been easily corrected. But these are minor quibbles. The book is well-written, accurate, and concise, and it covers the main points of biological evolution likely to be questioned by non-specialists. More importantly, it is accessible and easy to digest for the audience for whom it is written. Because of that strength, I suspect that it will, in the long run, play a larger role in promoting the acceptance of evolution than so many contemporary but longer and more detailed treatises. And that is its most important contribution.

**References**


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