

Interview with Francisco J. Ayala

Heslley Machado Silva¹

¹Centro Universitário de Formiga (UNIFOR-MG)

In this new phase of “Conexão Ciência” Journal, we are pleased to open a column that should serve as inspiration for many of our readers, who are academics or who intend to be part of this community: 10 questions to a scientist. The purpose of this column is to bring an academic personality that can introduce to us his/her vision of science, education, research and of the world. From the diverse scientific perspectives, it is expected to take lessons that allow us to critically think about these different views.

For the first edition, we had the unique opportunity and the pleasure to interview a prominent Professor and Researcher at the University of California - Irvine, Dr. Francisco J. Ayala.



Dr. Francisco J. Ayala is the evolutionary geneticist and molecular biologist, winner of the Templeton Prize 2010, as the one who most contributed in the world at the field of science and religion that year. Among other awards, this former Dominican priest received the National Medal of Science, from the hands of US President George W. Bush, as the scientific personality of 2001. Dr. Ayala is a member of the National Academy of Sciences, of the American Philosophical Society and of other associations in various countries. He is author of 40 books, including 'Darwin's Gift to Science and Religion' and more than 1,000 scientific papers. That's it, more than 1000 articles. He was the main author of the book 'Science, Evolution, and Creationism', a publication of the National Academy of Sciences of the USA, that refutes religious interference of creationism and of the intelligent design in fields of science and education. Francisco Ayala is considered one of the leading evolutionary geneticists of our time and, recently, he has demonstrated that the great apes serve as reservoirs for malaria parasites. The New York Times pointed him as "Renaissance Man of Evolutionary Biology". It would take many pages to describe shortly Dr. Ayala's curriculum vitae, but it is available on many websites. Let's present the exclusive interview of Dr. Ayala by the co-editor of "Conexão Ciência" Journal, Dr. Heslley Machado Silva.

1. Good morning, Dr. Ayala. The audience of our journal consists mainly of Brazilian researchers and future researchers from various fields of science. A common aim is to pursue an academic career abroad. You are Spanish and have developed a successful career in the United States of America. What tips would you give to a Brazilian researcher who wants to follow your professional path?

Dr. Ayala: In order to obtain a Ph.D. in genetics and evolution, I went from Spain to the United States for two reasons. First, because around 1960, Spain was in a restricted state of development, economically, socially, scientifically, and more. The country was governed by General Francisco Franco, who started a military coup in July 1936 (and who would persist as head of State until his death in December 1975), which led to a civil war that lasted nearly three years. Many scientists, artists and scholars of all sorts had left Spain after the end of the civil war in April 1939. Spain was internationally isolated, politically, economically, and scientifically. Second, on the positive side of the coin, because I had contacted Theodosius Dobzhansky, a professor at Columbia University in New York, and one of the great evolutionists of the 20th century. He would accept me as a graduate student. I did not think there would be a more attractive opportunity anywhere in the world to obtain a Ph.D. in evolutionary genetics.

It was around 1955 that I read a book that had just been published in French, called *Le Phénomène Humain*, or *The Human Phenomenon*, by Pierre Teilhard de Chardin, a paleontologist, philosopher and thinker, who had died around that time, which had sparked a general interest in his work. I read some of his books in the late 1950s and I became fascinated with the subject matter, which was Human Evolution. He attempted to answer the big questions like where did we come from and where are we going? He was very encompassing in his approach, and tried to combine philosophy, science and theology. He saw the whole process of evolution as part of the development of the providence of God, and believed that we were destined to reach the Omega Point, at the end of the world, where everything will be consummated in a kind of perfection. One of his main areas of concern was the next stage of human evolution. He speculated that humans would learn how to integrate our way of thinking, our discoveries, and mental activities, so that humans would come to form some kind of supermind in the Universe. I was fascinated by Teilhard's ideas, which made me want to study evolution. I became convinced that there would be no better mentor under whom to pursue my interests than Professor Theodosius Dobzhansky.

2. If the same question was made by a Brazilian student who seeks a Master or Ph.D. Degree

opportunity at the School of Biological Sciences of UC Irvine, what are the prerequisites? What advantages the students would get from those graduate programs?

Dr. Ayala: The prerequisites would be similar as those in other distinguished universities, including appropriate preparation through relevant undergraduate courses, good grades in the courses and, hopefully, favorable letters of recommendation from scientists and other professors. The critical steps would be to identify one or two UCI professors, who because of their specific interests could become their Ph.D. mentors. There are great scientists and other scholars at UCI, who are prepared to be mentors of future Ph.D. students. There are great professors in other universities, as well.

3. In Brazil, and in other countries, there is a great pressure on academics to publish articles and books, of high quality and in quantity. Your numbers are impressive, 40 books and over 1,000 articles, and others still to be released. What is the way to reach these numbers in a such competitive environment?

Dr. Ayala: There is no need to reach such numbers. The relevant issue is to do good science and get it published. In turn, this requires dedication and hard work. But I can assert with conviction that what counts is not the number of papers and books, but their quality.

4. The same previous question, but focusing on the high-level academic production, in journals of high impact factor. Do you have any suggestions for Brazilian academics to achieve so?

Dr. Ayala: The same answer. If the research accomplishments are relevant and of high quality, they will be accepted for publication in journals with a high impact factor.

5. Going back to our readers, especially those who are thinking about to start an academic life. What are the subjects related to Biological Sciences, and other areas of your interest, that you consider promising for them and for their future?

Dr. Ayala: I continue to be interested in human evolution; understanding the past as well as the present, and exploring the future. Genetics is one of the fields that greatly contributes to understanding human evolution and, increasingly, in providing ways to improve human health and future possibilities. The Department of Ecology and Evolutionary Biology is one of the places where such studies are pursued. But other Departments in the School of Biological Sciences at UC Irvine have also distinguished scientists and great mentors. I will mention in

particular the Department of Neurobiology and Behavior. Neurobiology is at present one of the fastest areas of biological research. The results that are coming about are amazing, fascinating in scope and increasingly opening new avenues of research.

6. Your Ph.D. and postdoctoral supervisor was a Ukrainian-American biologist, Dr. Theodosius Dobzhansky, who is quoted in almost all scientific publications on evolution, from Brazil and worldwide, and being a historical reference to Biological Sciences. What was the greatest lesson you got from his guidance for your academic life?

Dr. Ayala: Theodosius Dobzhansky was a tremendous inspiration and probably is the person that most influenced my way of thinking about science. At that time he was doing experimental science in both the laboratory and in nature, working mostly with fruit flies because they have very short life times of only a few weeks and were very easy and cheap to breed in the laboratory. He made some major discoveries but he was best as a synthesizer of knowledge. In 1937, he published a book called *Genetics and the Origin of the Species* that combined the work of Mendel and the field of genetics that had expanded very quickly in the first few decades of 20th Century, with that of Darwin. This book had a tremendous impact because up to that point evolutionists had tended to be naturalists while geneticists tended to be thought of as laboratory scientists. Dobzhansky integrated genetics as the fundamental process in the understanding of evolution. He also wrote two important books on *Human Evolution*.

Professor Dobzhansky was a great educator, what I call a true mentor. Moreover, he developed interest in my career. Once I finished my Ph.D. at Columbia University, he invited me to stay on as a postdoc, because he believed that it would be detrimental to me to go back to Spain, as there was very little there in terms of resources both in financial and in intellectual terms. Later, he arranged for me to be appointed assistant professor at Rockefeller University, a small but very distinguished university in New York where he had moved a few years before he reached Columbia's retirement age. He still felt he had a few years left in him so he had gone to a place where the retirement age was later than at Columbia University.

7. You received the John Templeton Award, as the academic who contributed most to the field of science and religion in the world in 2010, and you were the 2001 personality of American Science, receiving the National Medal of Science from President George W. Bush. Leaving aside modesty, what is the aspect your prolific academic

production that may have contributed mostly for you receiving such important awards?

Dr. Ayala: For awards of such significance you have to take into account the accomplishments of a full career. In my case, in addition to my scientific research, I contributed considerably to the activities of the National Academy of Sciences and to those of several other important institutions. One of my activities all along has consisted of maintaining a dialogue between science and religion, particularly asserting that there is no necessary contradiction between the two. It is possible to believe in God and accept evolution. The Templeton Prize surely took into consideration my activities in these matters.

8. We are witnessing successive scandals of prominent Brazilians, of all political corners, that have subtracted the scarce public funds dedicated to education and health, for their own benefit. When observing your biography, a brand found in your life is the altruism in favor of science, research and education. To mention two amazing examples for us Brazilians, your award of 1.5 million dollars from the John Templeton Foundation, was transferred to the University of California, located on the most prominent State of a developed Country. Recently, and even with more impact, is the donation to the same institution of a million dollars per year for 10 years. Please explain to us Brazilians, inspire us, what reason, what explanation of these actions?

Dr. Ayala: I have received much. I, therefore, have much to give in return. My university salary provides all what I need for my daily life and to pursue my interests. Thus, I could therefore contribute the 1.5 million dollars from the Templeton Prize to the University of California, Irvine, to support students in need. It so happened that nearly 40 years ago I learned how to cultivate wine grapes and bought a vineyard. This became a very successful business and grew over the years. The 10 million dollars that I donated to the University for the support of students and scientific research are financial benefits from my cultivation of wine grapes.

9. You were priest of the Dominican Order and, today, you are an evolutionist biologist reference. Someone connected to the Science but still, religious. How do you analyze the proposals for insertion of teaching creationism at biology and science classes, in parallel or replacing biological evolution? This is a recent phenomenon in Brazil, but old in USA.

Dr. Ayala: Teaching creationism in the schools is a very unfortunate development. It interferes with teaching science, evolution in particular. As I have

said earlier, accepting evolution is compatible with belief in God. I will go much further. Creationists who assert that humans, as well as other organisms, have been designed by God are, implicitly, committing a blasphemy. Humans are designed as expected from the evolutionary process: adapted to the world in which we live, but with innumerable defects. A human engineer could have done much better. To mention only one example among the many possible ones, although an extreme one, consider the human reproductive system. During the development of the human ovule and of the human embryo, many chromosomal abnormalities occur, with terrible consequences. At least 20 percent of all human embryos end in spontaneous abortion during the first two months of pregnancy. That is more than 20 million abortions in the world every year. Again, that is because of defects in the design of the human reproductive system. Thus, those who think we were designed by God are making God responsible for 20 million abortions per year. That is blasphemy! One of my books has the title “Darwin’s Gift to Science and

Religion.” We know we are the result of biological evolution. We don’t need to commit blasphemy against God.

10. Last question: at your age, most Brazilians (including researchers) are already retired or are not publishing and researching anymore. What is the secret for maintaining full academic activity? What still motivates you?

Dr. Ayala: I enjoy what I do: teaching and mentoring students, pursuing scientific research and writing. Fortunately, I have very good health; so, at 82 years of age, I continue doing what I enjoy.

Thank you for your attention and willingness to contribute to our journal and, on behalf of UNIFOR - MG (University Centre of Formiga - MG) and the “Conexão Ciência” Journal.

Dr. Hesley Machado Silva, co-editor of “Conexão Ciência” Journal.