

# Changing concepts of evolution

Dr Michael Jarvis



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**The above is the Front cover of New Scientist Journal of 24 January 2009 (Extracts from this are given later in this review)**

During the past 15 years and especially within the past 5 years, biologists have been looking again at our traditional understanding of how evolution works. This re-think has come from two main fields of study:

1. A more critical look at the fossil record.
2. From analysis of the DNA genetic ‘fingerprint’ of an increasing number of living creatures.

For those of you not familiar with the New Scientist journal, it gives good reviews of scientific discovery in many fields of science. Since publication of the issue shown above, there have been other articles showing that the concept of how evolution works, is undergoing a major rethink.

Until very recently biologists explained that the main driving force of evolutionary change within animals, was a combination of the following main factors:

1. Each individual animal within any one species normally differs from other individuals because how we look and function is determined by the DNA genetic code in each of our body cells. For instance, each of our parents have slightly different DNA in their reproductive cells and there are even differences

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2. in the DNA between each spermatozoon in our father and each ovum in our mother. As a result each child within a family differs from the other, not only in regard to their sex, but also these differences show up between brothers or between sisters.
3. In addition to these variables, sudden and seemingly chance genetic changes can occur within animals. We call these mutations. Large mutations are normally fatal but smaller ones are often viable.
4. These variables, of whatever origin, are acted upon by the environment, resulting in some offspring being more suited to survive than others. Those that have a better chance of survival tend to produce offspring with an increased chance of carrying the same sorts of genetic advantages. For instance, creatures living in very cold climates, that have a slightly better tolerance to cold than their neighbours, will be selected for by the environment and have a better than average chance of passing on this advantage to their own offspring.

Evolution theory considered that a combination of these factors enables groups of animals to adapt to changing conditions, often leading to development of new species, especially when groups of these animals become isolated from others of the same species.

Most biologists will agree that we have many examples of such variability leading to new species. As one example,

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within Lake Victoria (a lake system less than a million years old) there are about 200 species of cichlid fishes. However, a genetic analysis has shown that these species vary only very slightly from each other in their DNA. Tiny changes have led to large differences in colour and reproductive behaviour. As a result, all these species can live within the same lake system without interbreeding.

**Because evolutionary changes have been demonstrated within closely related animals, it has been assumed by most biologists that larger changes result from the same basic processes, through a much longer sequence of very small changes.** These larger changes are, for instance, between soft bodied creatures like jellyfish, to those with external skeletons like crayfish, to those with internal skeletons like fishes, to land forms like amphibians and reptiles and finally to mammals.

**Each of these major advances has involved greater genetic complexity.** Normally, more complex creatures have more DNA in each of their body cells than do less complex creatures. For instance, each of our body cells contains 1000 times more DNA than the average single celled bacterium. The total amount of DNA in each of our body cells contains the equivalent amount of information as is contained in 200 telephone directories each 500 pages long! If you stretch out all the coiled DNA strand in any one of our cells, it measures about 1.5 meters. All of this is so tightly coiled up that it is contained within a body cell so

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small that we can only see it with a microscope! Our DNA strand is composed of about 3,1 billion base pairs (pieces of genetic information).

**On the other hand, changes from one species to another similar species does not involve any increase in DNA. It only involves a re-organisation of existing DNA.**

Since our traditional understanding of evolution has stated that the process of change has involved a long sequence of very small changes over very long period of time, a critical examination of the fossil record is now raising serious questions. For instance, we find many invertebrate animal fossils and many vertebrate fossils and so we would expect an even greater array of intermediary fossils between these two groups of animals.

In fact, instead of finding the expected vast array of intermediary fossils, between each major advance in life's genetic complexity, we struggle to find more than a handful of possible examples of intermediates. We would expect literally millions of intermediaries between each major advance in complexity. This almost total lack of intermediate fossils is one of the realities that is causing a radical rethink about how the evolutionary processes work.

The embarrassing situation has now been reached where many biologists are having to admit that a radical rethink is necessary.

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**This is embarrassing because the general public have been led to believe that our understanding of the evolution of life has been pretty much finalized.**

So, what are some of these embarrassing new trends in the biological understanding of evolution?

As examples, I quote from this issue of New Scientist Journal:

*It is clear that the Darwinian tree is no longer an adequate description of how evolution in general works. **“If you don’t have a tree of life, what does it mean for evolutionary biology/”**, asks Baptiste. “At first it’s very scary...but in the past couple of years people have begun to free their minds”. Both he and Doolittle are at pains to stress that downgrading the tree of life doesn’t mean that the theory of evolution is wrong – just that evolution is not as tidy as we would like to believe.*

*Some evolutionary relationships are tree-like; but many others are not. “We should relax a bit on this,” says Doolittle, “We understand evolution pretty well – it’s just that it is more complex than Darwin imagined. The tree of life isn’t the only pattern”*

***Others, however, don’t think it is time to relax. Instead, they see the uprooting of the tree of life as the start of something bigger. “It’s part of a revolutionary change in biology”** says Dupre. “Our standard model of evolution is under enormous pressure. We’re clearly going to see*

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*evolution as much more about mergers and collaboration than change within isolated lineages”*

*Rose goes even further. “The tree of life is being politely buried, we all know that”, he says. **“What’s less accepted is that our whole fundamental view of biology needs to change”.** Biology is vastly more complex than we thought, he says, and facing up to this complexity will be as scary as the conceptual upheavals physicists had to take on board in the early 20<sup>th</sup> century.*

*If he is right, the tree concept could become biology’s equivalent of Newtonian mechanics: revolutionary and hugely successful in its time, but ultimately too simplistic to deal with the messy real world. “The tree of life was useful”, says Baptiste. “It helped us to understand that evolution is real. But now we know more about evolution, it’s time to move on”*

(New Scientist: 24 January 2009: page 39)

Since publication of the above article, various journals, including New Scientist, have published other similar confirmations, regarding the need to face a major revolution in our understanding of biological evolution.

For instance:

Holmes B. 2009. The idea that evolution is all about genes looking out for themselves is increasingly under fire: New Scientist 7 March.

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Buchanan M 2010: Another kind of evolution: New Scientist 23 Jan.

Holmes B 2010: Accidental origins: New Scientist 13 March.

Bennet K. 2010: The chaos Theory of Evolution: New Scientist 16 October.

I suggest that this new revolution, in thinking about biological evolution, should teach us some important lessons:

1. That science is not static and theories that seem to be fully understood and almost conclusively proven, often have to give way to radically new understanding, as science uncovers new details about the complexity of our world.
2. That the way that science is explained to the general public is sometimes misleading, especially when the impression is given that 'Science has proved' something.

With regard to these fundamental changes taking place in evolutionary theory, there are still many major unknowns. Furthermore, although evolutionary processes have been clearly demonstrated within any one level of biological complexity, **it is clearly wrong to have told the public that these same processes apply to the whole history of life on earth.**

To those biologists, who believe in the God who initiated the universe and planned the outcome of biological evolution and still guides outcomes by inputs from his creative Mind, these new developments within biology increase our wonder and amazement. This is because our existence on planet earth is clearly the result of many inputs, far more complex than merely being the result of blind chance acted upon by the selective pressures of the environment.

As I outline in my webpage [www.factandfaith.co.za](http://www.factandfaith.co.za) and in my book 'God by Evolution', a belief in the Creator can be reconciled with all of scientific discovery, provided our concept of God is big enough. He has to be operating within the Timeless Dimension that is the foundation of our time-locked universe (as revealed by studies of quantum mechanics). He has to be 'in all things, through all things and by him all things hold together'. He has to be able to direct the seemingly random and unpredictable events within the quantum world, that forms the matter of our universe. **He needs to be able to continually guide developments, by imposing small inputs of energy, that direct the processes of nature towards pre-calculated outcomes.**

To the Theistic Evolutionist, there is no need to fear the discoveries of science, that are progressively uncovering how God has brought our amazing universe and earth into

being. The discovery of mechanisms and processes does not disprove the need for a designer of those processes.

To my mind, as a Theistic Evolutionist, one thing that does sometimes frustrate and annoy me, is when some scientists go out of their way to promote an atheistic agenda by suggesting that this is the most logical conclusion from scientific discovery. The facts of science cannot prove the existence of God, nor can they disprove his existence. However, the statistical probability that we are here due to pure chance, is minutely small.

**The famous cosmologist, Stephen Hawking, calculated that, if our universe is the only one, then the probability that it came into existence is less than 1 in  $10^{55}$ .**

Those who do not like to face this overwhelming probability against chance, have to opt for the Multiverse Theory. This proposes that there may be an infinite number of other possible universes and we just happen to be in the only one suited for human life. Therefore, we think it is designed when it is not.

**However, opting for the Multiverse Theory is rather like dodging the issue. It is like a ‘theory of the gap’, created to replace the lack of any sound evidence against a Designer of the universe.** As a result, to my mind, it takes far more faith to believe there is no God than to believe that he does exist.

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Fortunately, in addition to a discussion of scientific discoveries, many people have had other inputs in their lives that have convinced them that God really does exist.

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