

## **Randomness of DNA Mutation and the Possibility of Guided Evolution**

Daan van Schalkwijk,  
Physiological Genomics, Business Unit Biosciences,  
TNO Quality of Life, P.O. Box 360 (PP 8), 3700 AJ Zeist, The Netherlands,  
(Analytical Biosciences, LACDR, Leiden University)  
e-mail: daan.vanschalkwijk@tno.nl

### **Summary**

In this seminar the question is addressed of arriving at a worldview compatible with the findings of modern science, which allows for the existence of a human free will. A first step in this direction was taken by the physicists who explained the possibility of guidance at quantum level, which is possible without the violation of the stochastic laws of nature. In this presentation the applicability of this concept to biological systems is investigated.

In the philosophical introduction the discussion surrounding evolutionism is placed in the context of modern philosophical thinking. Modern rationalists have often succumbed to the temptation of constructing an entire worldview based on a single principle. Here the suggestion is made that evolutionism is an example of this, in which the evolutionary mechanisms of random mutation and natural selection serve to explain the development of life, and at times even inorganic nature completely. The criticism to this stance is that this only provides a very reduced vision of the world, in which only a subset of relevant issues is explained, while the explanation is presented as all-compassing. Good philosophy should seek a true simultaneous answer to all relevant questions and their interrelation. A second part of the introduction introduces the two fundamental mechanisms of Darwinist evolution: random mutation and natural selection. Here the random mutation aspect is focused on.

In continuation the DNA replication process is explained, and the induction mechanism of small point mutations. The main conclusion is that point mutation induction is due to a biochemical form-shift (the so-called tautomeric shift) equilibrium. If the equilibrium shift coincides exactly with the process of DNA replication, mutation can occur. The DNA can then also be repaired, but it is possible that this mechanism fails in similar fashion, although the mutation-induction probability is lowered. Since biochemical equilibrium shifts and DNA replication take place at space scales at which quantummechanical effects are very important, it is plausible that the results of the physicists' enquiry can be applied to the process of mutation induction.

Finally, these results are applied to the question whether guided randomness can exist in evolution. Because of the construction of the replication process, a small change in timing of the stochastic equilibrium shift can result in a large change in outcome. If spiritual guidance is not beforehand excluded, it would certainly not have to contradict the stochastic laws of nature, while still being able to sort decisive effect. This would not lead to a 'God of the Gaps' concept of evolutionary guidance, but rather one of a God sustaining the reality in which evolutionary processes take place. God would be implicated at evolution's very core while never violating any law of nature. I.e. not "God of the Gaps", but "God the G.A.P.S." (the Good All-Powerful Sustainer).

### **Biography**

Daan van Schalkwijk finished his Masters degree in Biology at the Free University (VU) in Amsterdam in 2006. He is currently a PhD student, investigating cholesterol metabolism using mathematical models at the TNO Quality of Life research institute, with a close link to Leiden University. Next to his scientific work, he has a lively interest in philosophy.