



NATURAL SELECTION IN THE 21ST CENTURY: A NEW HOMAGE TO DARWIN

Natural Selection has been under debate since its initial proposal by Darwin and Wallace 150 years ago. During more than a century its value has been enhanced by the insights of naturalists, mainly insisting in the strength of natural selection in shaping morphological adaptation (shape and function) and showing extraordinary examples of co-adaptation. Nonetheless, with the advent of molecular approaches to the basic understanding of life (mainly through evolutionary genetics), mainly in the 1980's, natural selection was relegated to an exceptional factor. The possibility of studying large amounts of genetic data, mainly since the change of century, has dramatically modified our perception of natural selection. Today, even under some debate, it is agreed as a major force for the evolution of species and for adaptation, not only for species but also for specific populations. The change is easy to understand: the footprint of past selective events (and thus not possible to be seen in action) is detectable in the DNA: the amount of differences in the genome, be it among populations in a species, be it among species, is the result of past natural selection events. Thus now we can detect in the genome examples of adaptive evolution even if we do not know which is the specific character (or adaptation) that has been evolving. The study of genes and genomes has put a new insight in Darwin's view. We are now, at the beginning of the 21st century in the most radical vindication of Darwin's proposals: now we can read the molecular basis of natural selection, opening new views not only in past evolutionary events, but also on how evolution may proceed in the future. At the very end, we have a new dimension to add to the rich view of evolution by natural selection, the very basic Darwin's concept.

Jaume Bertranpetit and **Juli Peretó**, organizers

Meeting Program

Day: May 26, 2009

Place: Sala Prat de la Riba, Institut d'Estudis Catalans, C. Carme 12, Barcelona

9.00-9.30 Introductory remarks

9.30-10.30 **Rosemary** and **Peter Grant**, Princeton University

Natural selection in Darwin's finches

10.30-11.00 **Montserrat Agudé**, Departament de Genètica, Universitat de Barcelona

Detecting the action of natural selection through sequence comparison

11.00-11.30 COFFE BREAK

11.30-12.00 **Francesc Calafell**, Institut de Biologia Evolutiva (UPF-CSIC)

Signatures of natural selection in the human genome

12.00-12.30 **Hernán Dopazo**, Centro de Investigación Príncipe Felipe, València

Selection on functionally related groups of genes

12.30-13.00 **Rafael Sanjuán**, Institut Cavanilles de Biodiversitat i Biologia Evolutiva, Universitat de València

Experimental evolution of viruses: mutation, selection and adaptation

13.00-14.30 LUNCH

14.30-15.00 **Fyodor Kondrashov**, Centre de Regulació Genòmica, CRG

Natural selection in gene copy number evolution.

15.00-15.30 **Jordi Garcia**, Universitat de Barcelona

Evo-Devo: why developmental genetics is needed for understanding evolution

15.30-16.00 **Ben Lehner**, Centre de Regulació Genòmica, CRG

Evolvability and selection in the evolution of gene expression in yeast

16.00-16.30 **Camilo José Cela-Conde**, Universitat de les Illes Balears

How function made humans?

16.30-17.00 Concluding remarks