

Dinosaurs did already hear the birds sing

New study unravels early evolution of birds

Münster (mfm/lwl) - Falcons are not birds of prey - at least phylogenetically - but are close relatives of parrots and passerine birds. The mutual ancestor of parrots and passerines was probably able to learn birdsong at the time when dinosaurs roamed our planet – some 30 million years earlier than had been assumed so far. This can be concluded from a new study carried out by a group of researchers at the University of Münster and settles some long-standing controversies regarding the early evolution of birds.

‘We have solved one of the most controversial parts of the genealogical tree of birds’, says Alexander Suh, Ph.D. student at the Centre for Molecular Biology of Inflammation (ZMBE) of the University of Münster. Together with his supervisors, group leader Dr. Jürgen Schmitz, Prof. Jürgen Brosius (both: ZMBE) as well as Dr. Jan Ole Kriegs of the LWL-State Museum of Natural History, Suh has published these results in the August issue of the renowned scientific journal “*Nature Communications*”.

‘Passerines or perching birds - comprising more than half of all bird species, e.g., songbirds and tyrant flycatchers - can now be confidently placed within the avian tree of life’, explains Suh, who carries out research at the Institute of Experimental Pathology of the ZMBE. ‘Traditionally, passerines had been considered to be closely related to woodpeckers or cuckoos. Now, there is strong support that parrots are the closest living relatives of passerines.’

These findings imply interesting neurobiological consequences because parrots and most passerine birds are able to learn their vocalizations - a capability which is rather rare among other bird groups. Passerine birds such as the zebra finch or parrots such as the budgerigar are therefore important model organisms for studying how such learning processes work in the brain. The researchers conclude that due to the very close affinity of these two bird groups, vocal learning probably emerged in the mutual ancestor of passerine birds and parrots. Learned birdsong would then have evolved some 30 million years earlier than assumed all along – apparently before the extinction of dinosaurs.

Another conclusion of the study funded by the Deutsche Forschungsgemeinschaft is that falcons are the closest relatives of passerines and parrots, instead of being related to other birds of prey such as buzzards, eagles and vultures. Not only the above branches of the avian tree of life were studied using retroposons or “jumping genes”, but also most other events of early bird evolution, as early as approximately 100 million years ago in the late Mesozoic Era. This was possible because “jumping genes” remain recognizable as “molecular fossils” in the genome for millions of years. Such “contemporary witnesses” of evolution therefore serve as strong and clear-cut phylogenetic markers.

Article online:

<http://dx.doi.org/10.1038/ncomms1448>

or

<http://www.nature.com/ncomms/journal/v2/n8/full/ncomms1448.html>

Subtitles to the pictures:

- 1) The study's main authors (from left to right) Prof. Jürgen Brosius, Dr. Jürgen Schmitz, Alexander Suh (University of Münster) and Dr. Jan Ole Kriegs (LWL-Museum für Naturkunde) (photo: Oblonczyk/LWL)
- 2) Passerine birds, here a Corn Bunting, are the closest relatives of parrots (photo: Kriegs/LWL)
- 3) Parrots, here a Scarlet Macaw, are the closest relatives of passerine birds (photo: Kriegs/LWL)
- 4) Passerine birds and parrots share a common ancestor in the avian tree of life. The falcons, here a Lesser Kestrel, are their closest relatives (photo: Kriegs/LWL)