

Organismal biologists needed to interpret new trees of life

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Rapidly accumulating data on the molecular sequences of animal genes are overturning some standard zoological narratives about how major animal groups evolved. The turmoil means that biologists should adopt guidelines to ensure that their evolutionary scenarios remain consistent with new information—which a surprising number of scenarios are not, according to a critical overview article to be published in the August issue of *BioScience* and now available with Advance Access.

The article, by Ronald A Jenner of the Natural History Museum in London, describes how evolutionary trees inferred from genomic information have overtaken and even displaced traditional studies of animal forms. The traditional studies sought explanations for how the body plans of the three dozen or so major [animal groups](#) most likely evolved, but molecular data provide strong evidence about genealogical relationships without yielding explanations. So even though data are accumulating as researchers study more and more [animal genes](#), there remain severe limits on researchers' ability to construct satisfying accounts of how diverse animal forms evolved.

The difficulty arises because the major evolutionary changes that established the principal animal groups occurred in the remote past, and there are too few surviving intermediate forms to infer evolution's steps in detail. This has sometimes led zoologists to give imagination too free a rein when they devise their hypotheses, Jenner argues. In other cases, new data have forced biologists to accept accounts they had previously found unimaginable. Imagination will remain important in evolutionary

studies, Jenner stresses, but biologists will best advance science if they ensure their proposals are consistent with evolutionary trees that are well supported by molecular data, if they look for incompatible evidence and obvious difficulties, and if they evaluate alternative scenarios, as well as their preferred ones. They should also examine the basis of their intuitions and build their ideas of the broadest possible base of evidence, including, for example, that from newly discovered fossils and from new anatomical information. New fields of inquiry offer hope that progress will be made, but "we desperately need" well-funded organismal biologists to achieve it, according to Jenner, not just bioinformaticians and molecular evolutionists.

Provided by American Institute of Biological Sciences

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