REPORT

Cope's rule in the evolution of marine animals

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Science 20 Feb 2015:
Vol. 347, Issue 6224, pp. 867-870
DOI: 10.1126/science.1260065

Getting bigger all the time

In today's world, many animal species are large, with even larger species only recently extinct, but the first animals to evolve were tiny. Was this increase in size due to active selection or to some more random process? Heim *et al.* test the classic hypothesis known as Cope's rule, which posits that there is selection for increasing body size. They analyzed a data set that spans over 500 million years and includes more than 17,000 marine animal species. In support of Cope's rule, body volumes have increased by over five orders of magnitude since the first animals evolved. Furthermore, modeling suggests that such a massive increase could not have emerged from a random process.

Science, this issue p. **867**

Abstract

Cope's rule proposes that animal lineages evolve toward larger body size over time. To test this hypothesis across all marine animals, we compiled a data set of body sizes for 17,208 genera of marine animals spanning the past 542 million years. Mean biovolume across genera has increased by a factor of 150 since the Cambrian, whereas minimum biovolume has decreased by less than a factor of 10, and maximum biovolume has increased by more than a factor of 100,000. Neutral drift from a small initial value cannot explain this pattern. Instead, most of the size increase reflects differential diversification across classes, indicating that the pattern does not reflect a simple scaling-up of widespread and persistent selection for larger size within populations.

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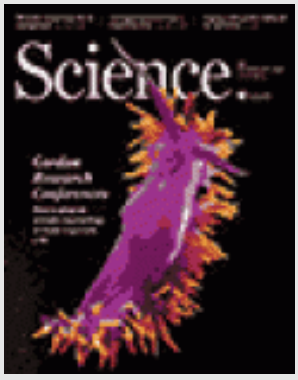

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20 February 2015

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