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Environment affects an organism's complexity

Press release from PLOS Computational Biology

Scientists have demonstrated that organisms with greater complexity are more likely to evolve in complex environments, according to research published this week in *PLOS Computational Biology*. The researchers, based at École Polytechnique Fédérale de Lausanne and University of Vermont, created a programme that simulated the evolution of virtual creatures in a variety of landscapes.

Each virtual organism was made using a particular form of genetic encoding to create three-dimensional models and then simulated in a physically-realistic virtual world. Creatures that evolved in flat landscapes had a simple shape, but could not adequately navigate more complex environments. Later environments were designed with elevated "ice blocks". These obstacles were constructed so that each organism had to reach inside the gaps between the blocks to move forwards.

Overall, the researchers found that the investigated environments actively induced selection on the body plans and nervous systems of the simulated creatures. More complex landscapes led to more complex organisms than simpler environments due to the cost inherent in morphological complexity: evolution only produces complex body shapes in environments that demand them.

Study author Joshua Auerbach comments:

"Our work supports the idea that the morphological complexity of organisms is influenced by the complexity of the environments in which they evolve. While our work does not prove anything about biological complexity, it does provide a new methodology for investigating questions about the evolution of complexity in silico."

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