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'Mating' robots shed light on how human beings evolved

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Scientists are using 'mating' robot fish to verify whether early humans had flexible 'rods' instead of backbones. They say robot tadpole sex might help shed light on how our early ancestors evolved backbones, reports LiveScience.

The distant forebears of humans and other vertebrates were much squashier than their descendants. They possessed flexible rods known as notochords that served as primitive backbones, but no vertebrae.

Scientists think vertebrae evolved to help our ancient predecessors swim more powerfully by stiffening the body so attached muscles could generate more force.

"The fossil record shows vertebrae evolved independently at least four separate times. That shows they must really be functionally important," said vertebrate physiologist John Long at Vassar College in Poughkeepsie, New York.

To test this idea, Long and his colleagues built robot fish with backbones of varying strength to simulate extinct animals. They then "mated" the best swimmers to see how generations of "offspring" evolved to swim better.

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'Mating' robots shed light on how human beings evolved

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The robot tadpoles are called "Tadros". They were modelled after swimming creatures that still have notochords, the larvae of marine animals known as sea squirts.

Each Tadro had a single electronic eye, a motor, a computerised brain that controlled its motions, and tails made of gelatin of different lengths and stiffness. The robots had bodies between six and seven inches long, with tails two to four inches long, and swam along the surface.

The scientists raced three robots in eight-foot-diameter fish tanks, each zooming to and swimming around a light suspended above the tank. After seeing which fish swam best, the research team "mated" them using computer simulations that modeled the genetic mixing that occurs during sex to produce the next generation of Tadro tails.

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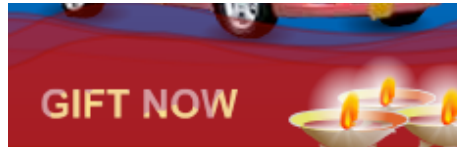
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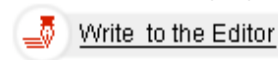
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The best swimmer was given the greatest mating success and chance to pass along its traits, while poorer swimmers had less luck. After 10 generations, Long and his colleagues found that as swimming performances improved, stiffer tails evolved.

However, Long said that their analysis showed increasing tail stiffness accounted for only 40% of the improvement in swimming performance, meaning other factors are involved, such as how well the tail turns.



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