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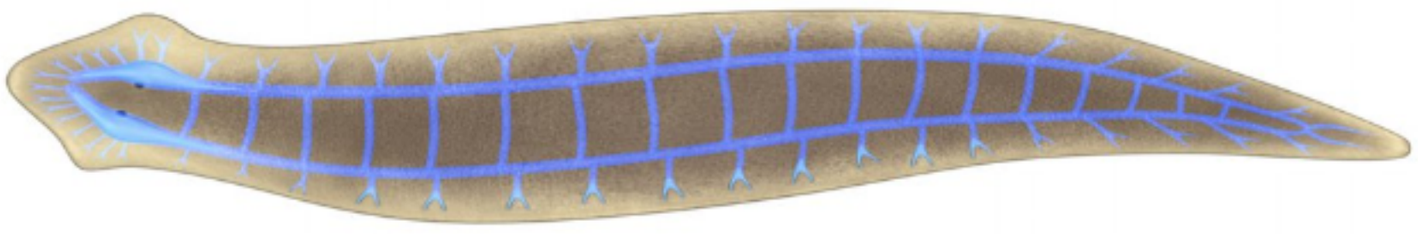

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AI 'robot scientist': Pioneer in regenerative medicine

by John Hopton

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John Hopton for redOrbit.com - @Johnfinitum

Scientific studies have spent many decades working on artificial intelligence, but now the equation is proving fruitful in reverse. The machines are paying us back. An artificial intelligence system working on a study at Tufts University has pinpointed something that eluded humans for 100 years.

The AI system reverse-engineered the regeneration mechanism of planaria - the small worms whose extraordinary power to regrow body parts has made them a research model in human regenerative medicine.

It is the first model of regeneration discovered by non-human intelligence and the first comprehensive model of planarian regeneration, which scientists had been seeking for a century.

"Our goal was to identify a regulatory network that could be executed in every cell in a virtual worm so that the head-tail patterning outcomes of simulated experiments would match the published data," said Daniel Lobo, a postdoctoral researcher in the Biology Department at Tufts University. He was working with Michael Levin from the Tufts Center for Regenerative and Developmental Biology.

The most creative aspect of a scientist's job

The work, published in *PLOS Computational Biology*, demonstrates how "robotic scientists" are increasingly helping their human counterparts, and represents a step forward in the growing field of robot science. It is proof that beyond simply crunching vast datasets quickly, AI can actually make accurate and insightful assessments of what the data is telling us.

"While the artificial intelligence in this project did have to do a whole lot of computations, the outcome is a theory of what the worm is doing, and coming up with theories of what's going on in nature is pretty much the most creative, intuitive aspect of the scientist's job," Levin said.

"One of the most remarkable aspects of the project was that the model it found was not a hopelessly-tangled network that no human could actually understand, but a reasonably simple model that people can readily comprehend. All this suggests to me that artificial intelligence can help with every aspect of science, not only data mining but also inference of meaning of the data."

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