Computer solves 120-year-old mystery of worms in three days

BY JAMES WALKER JUN 6, 2015 IN TECHNOLOGY

A computer has solved a mystery that has been puzzling scientists for over 120 years in just three days. Using complex predictive simulation software, the system managed to explain how sliced-up worms turn into independent organisms.

A well-known and unique quality of worms, sliced-up flatworms can evolve into new, fully-functioning and independent organisms despite having been effectively cut in half. The genes simply evolve the cut cells into new organisms.

A team of biologists at Tufts University have now used a computer to explain this behaviour. Wired reports how the system could reverse-engineer a solution to the intriguing mystery.

The computer was fed vast amounts of data from all of the currently-existing experiments into worm regeneration. It then simulated the network formed by the worm's genes until the results matched the data it had access to. When the two matched, the computer would modify its own random genetic network until it matched the results of all of the existing studies after three days of computing.

The conclusion, a representation of "the most comprehensive model of planarian regeneration found to date", was that three known molecules and two unknown proteins are required to facilitate the behaviour and regrow an organism from a collection of cells.

TechRadar reports that Michael Levin, senior author on Tufts' research paper, said: "This represents the most comprehensive model of planarian regeneration found to date. 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."

The result could have taken years of cross-referencing and trial-and-error field studies to be replicated by humans. Levin thinks that the artificial intelligence and big data could help "with every aspect of science" as the algorithm delivered not only quickly but also meaningfully with a "reasonably simple" model that humans could interpret.

The discovery could help scientists to engineer human organs in the future. It means that we now know more of how organisms are made to be the correct size, shape and orientation when formed on a body, a crucial step towards being able to build new organs in a lab.

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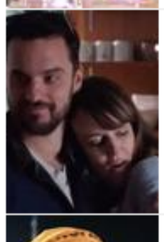
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