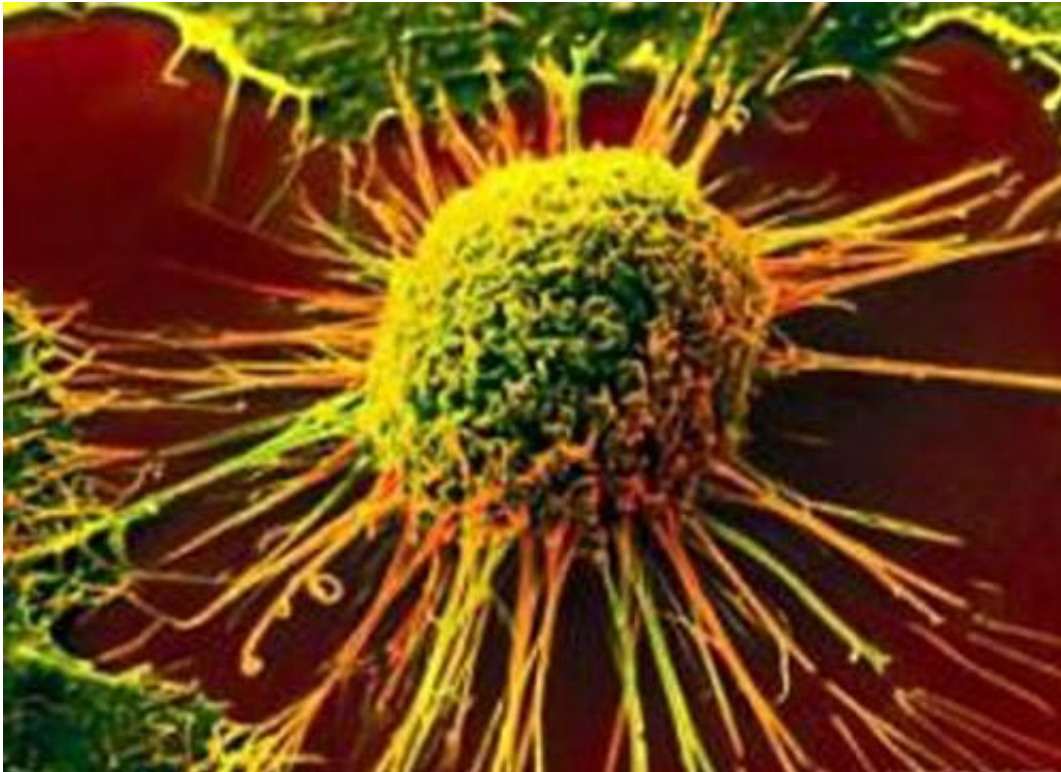


New theory turns cancer on its head

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A new theory of how cancer works could lead to the next generation of treatments of the disease. The theory suggests that cancer forms when recently evolved genes are damaged, and cells have to revert to using older, inappropriate genetic pathways.

Astrobiologists Dr Charley Lineweaver from The Australian National University and Professor Paul Davies from Arizona State University

teamed up with oncologist Dr Mark Vincent from the University of Western Ontario to develop the [new model](#).

"The rapid proliferation of [cancer cells](#) is an ancient, default capability that became regulated during the evolution of multicellularity about a billion years ago," says Dr Lineweaver.

"Our model suggests that [cancer](#) progression is the accumulation of damage to the more recently acquired genes. Without the regulation of these recent genes, cell physiology reverts to earlier programs, such as unregulated cell proliferation."

In 2012 about 14.1 million new cases of cancer occurred globally, yet an underlying cause of the many forms of the disease has not yet been identified. To understand the disease better the team turned to the wealth of knowledge being revealed in the genome sequences from a large range of our distant relatives, including fish, corals and sponges.

This new knowledge has allowed scientists to establish the order in which genes evolved and is the basis of the new therapeutic implications of the model, said Dr Lineweaver.

"The adaptive immune system that humans have has evolved relatively recently, and it seems cancer cells do not have the ability to talk to and be protected by it. The new therapeutic strategies we are proposing target these weaknesses," he said.

"These strategies are very different from current therapies, which attack cancer's strength – its ability to proliferate rapidly."

Professor Davies says the new model will not provide an overnight cure.

"It is a work in progress but we think it gives a more consistent

interpretation of what is currently known about cancer than other models do," he said.

Dr Lineweaver says that his research in astrobiology led him to look at cancer.

"Paul and I have always been interested in trying to answer big questions. This led us to astrobiology and trying to answer the question 'Are we alone?' To answer that, you need to know about how life got started and evolved on this planet, and that involves understanding the evolution of multicellularity. That is an obviously missing piece from our current models of cancer."

More information: The research is published in *BioEssays*.

Provided by Australian National University

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