

Gene found in worms could play a role in human cancer

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(Medical Xpress) -- Scientists at The University of Nottingham have identified a gene, in a simple water-dwelling worm, that might play an important role in the development of cancer.

The researchers, funded by the Medical Research Council (MRC), found that removing the SMG-1 gene in [planarian worms](#) caused their normal cell division to go out of control, leading to lethal growths that display many of the hallmarks of human tumours.

The study, led by Dr Aziz Aboobaker, in the School of Biology, suggests that SMG-1 may act as a ‘brake’ on animal growth which, if confirmed in humans, could be exploited to develop new treatments for [cancer](#) and other conditions related to ageing. It also suggests that these simple [worms](#) could be used as a widely accessible new animal model for studying human disease. The research was funded by the MRC and the Biotechnology and Biological Sciences Research Council (BBSRC) and is published in the journal [PloS Genetics](#).

Dr Aboobaker said: “There is growing evidence to suggest that some of the same [genes](#) regulate wound healing and regeneration, ageing and cancer. Planarian worms provide an excellent model to study all of these conditions as they seem to bypass the normal ageing process and have an incredible ability to regenerate any part of their body — even their head — from stem cells that are always dividing, but under strict control.

“Now we’ve discovered that the SMG-1 gene and the mTOR signalling

pathway, a well-known regulator of animal growth, act in harmony to exert tight control over growth and regeneration in planarians. Crucially, if this control is removed we see hyperactive cell division and the formation of tumours, which eventually kill the worms. This suggests that SMG-1 is a potential tumour suppressor gene we were previously unaware of.”

The researchers believe that SMG-1 acts by suppressing the mTOR signalling pathway, which is known to drive the development of many human cancers as well as other conditions related to ageing. If this is the case, they would expect to see mutations of the human SMG-1 gene in cancer patients.

There is already some evidence to suggest that mutated versions of SMG-1 are present in some breast cancer cells. Further research is now needed to investigate whether these mutations themselves result in the abnormal cell growth that contributes to the development of cancers.

Paul Colville-Nash, MRC programme manager for stem cell research, developmental biology and regenerative medicine, said:

“This study is a great example of how research on a simple worm can provide powerful new insights that inform future research into human health and disease. Eventually this could form the basis of new therapies for diseases such as cancer.”

Planarians are free-living non parasitic flatworms distributed widely in nature. They have some remarkable properties — they regenerate indefinitely by growing new muscles, skin, guts and even entire brains again and again — which have led them to be dubbed “immortal” by scientists.

Provided by University of Nottingham

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