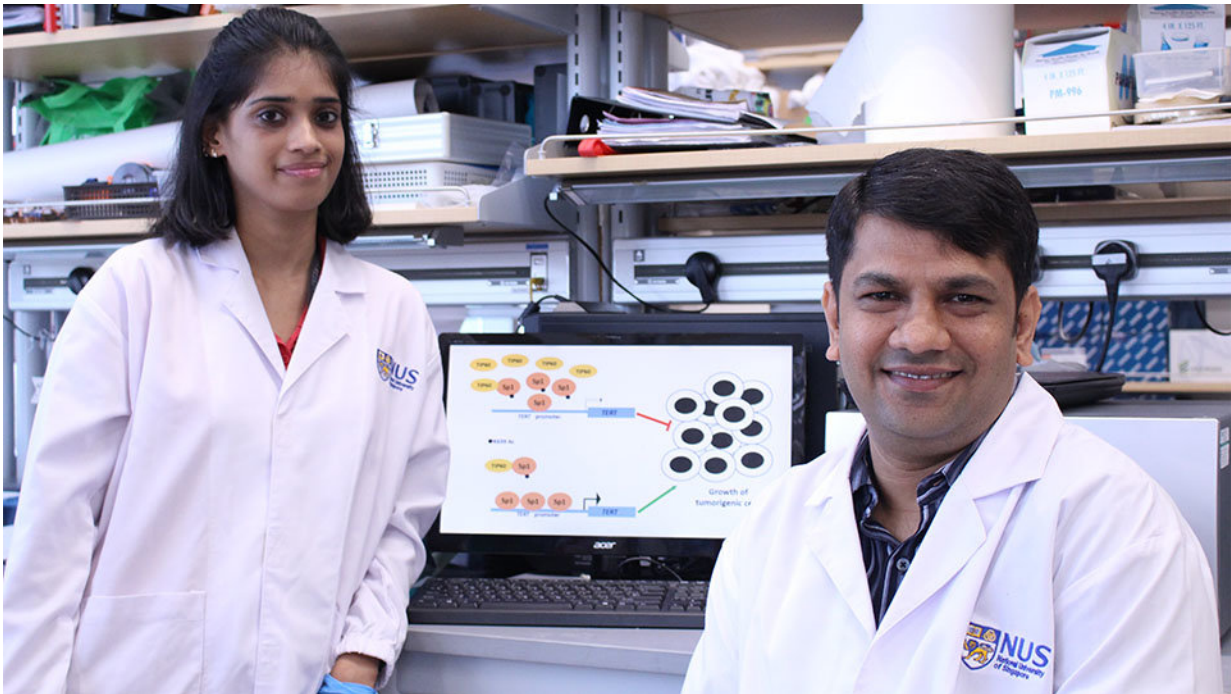


Researchers uncover novel pathway to suppress virus-induced cancers

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Dr Sudhakar Jha, Principal Investigator at the Cancer Science Institute of Singapore (right) and Deepa Rajagopalan, PhD student at NUS (left), identified a novel molecular pathway by which a tumour suppressor, TIP60, inhibits the growth of cancer cells. Credit: National University of Singapore

Researchers at the Cancer Science Institute of Singapore (CSI Singapore) at the National University of Singapore (NUS) have identified a novel molecular pathway by which a tumour suppressor,

TIP60, inhibits the growth of cancer cells. The study led by Dr Sudhakar Jha, Principal Investigator at CSI Singapore and Deepa Rajagopalan, PhD student at NUS, paves the way for the development of new therapeutic strategies that could impede the spread of virus-induced cancers.

The findings of the study were published in prestigious scientific journal *PLOS Pathogens* on 18 October 2017.

TIP60, which exists in regular [cells](#), is known to play a vital role in suppressing virus-induced cancers such as [cervical cancer](#), which typically develops from an infection by the human papillomavirus (HPV). While several anti-cancer roles of TIP60 have been discovered, the mechanism through which the protein inhibits telomerase in [cancer cells](#) was unknown.

Telomerase is an enzyme that functions to add on telomeres, which are protective caps, to the ends of chromosomes. In normal cells, telomeres shorten each time a cell divides, and the cell eventually stops dividing when the telomeres become too short. Cancer cells, however, are known to bypass this limit by activating mechanisms to keep their telomeres long, thereby allowing them to extend their lifespan indefinitely.

In this in-depth study, the team of researchers employed an array of cutting-edge molecular biology tools to examine the regulation of telomerase by TIP60 in virus-induced cancer cells. The team discovered that TIP60 inhibits telomerase by interacting with and modifying a partner molecule, Sp1, which aids in producing more telomerase protein. The modified Sp1, which can no longer bind to the regulatory sequences of the [telomerase gene](#) to activate it, reduces the expression of telomerase thereby preventing the cancer cells from continuous division.

The identification of this novel molecular pathway opens a new window

of hope for therapeutic interventions against cancers.

Dr Jha said, "Our findings hold exciting potential in the fight against a range of virus-induced cancers including cervical cancer, liver cancer and Burkitt's Lymphoma. Given that 85 per cent of cancers are triggered by high amounts of telomerase, our study, which lends a deeper insight into the inhibition of [telomerase](#) by TIP60, could also be applied to other groups of cancer such as breast, colorectal and ovarian cancer. Our next step is therefore to investigate the new pathway in these groups of [cancer](#)."

More information: Deepa Rajagopalan et al. TIP60 represses telomerase expression by inhibiting Sp1 binding to the TERT promoter, *PLOS Pathogens* (2017). [DOI: 10.1371/journal.ppat.1006681](https://doi.org/10.1371/journal.ppat.1006681)

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