

## Study: Telomerase causes inflammation in cancer

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**Singapore:** A\*STAR scientists have identified the enzyme, telomerase, as a cause of chronic inflammation in human cancers. Chronic inflammation is now recognized as a key underlying cause for the development of many human cancers, autoimmune disorders, neurodegenerative diseases, and metabolic diseases such as diabetes. This enzyme, which is known to be responsible for providing cancer cells the endless ability to divide, is now found to also jump-start and maintain chronic inflammation in cancers.

Although many safe and effective anti-inflammatory drugs such as aspirin are currently available on the market, these drugs sometimes have side effects because blocking inflammation is typically detrimental to normal physiology. Hence there exists a need for the development of cost-effective drugs that are targeted, so as to minimize side effects.

This collaborative research was conducted by scientists at A\*STAR's Institute of Molecular and Cell Biology (IMCB) led by associate professor Vinay Tergaonkar, A\*STAR's Genome Institute of Singapore (GIS) and National University of Singapore. Other clinical collaborators include Cancer Science Institute of Singapore and Duke-NUS Graduate Medical School.

The team identified that telomerase directly regulates the production of inflammatory molecules that are expressed by NF- $\kappa$ B, a known master regulator of chronic inflammation. These molecules are critical for inflammation and cancer progression. By inhibiting telomerase activity in primary cancer cells obtained from patient samples, the scientists found that levels of IL-6, an inflammatory molecule known to be a key driver of human cancers, was reduced in expression as well. This is an important breakthrough that shows how targeting telomerase with drugs could potentially reduce inflammation, and hence get rid of cancer cells.

Dr Tergaonkar said, "These findings provide a unifying explanation for a decade worth of observations from leading

laboratories in the field. The findings show that chronic inflammation and telomerase hyperactivity co-exist in over 90 percent of human cancers. What we show is that these two activities are actually inter-dependent. They also may lead to potentially novel drugs that will target a range of human ailments with inflammation as an underlying cause, which range from arthritis to cancer."