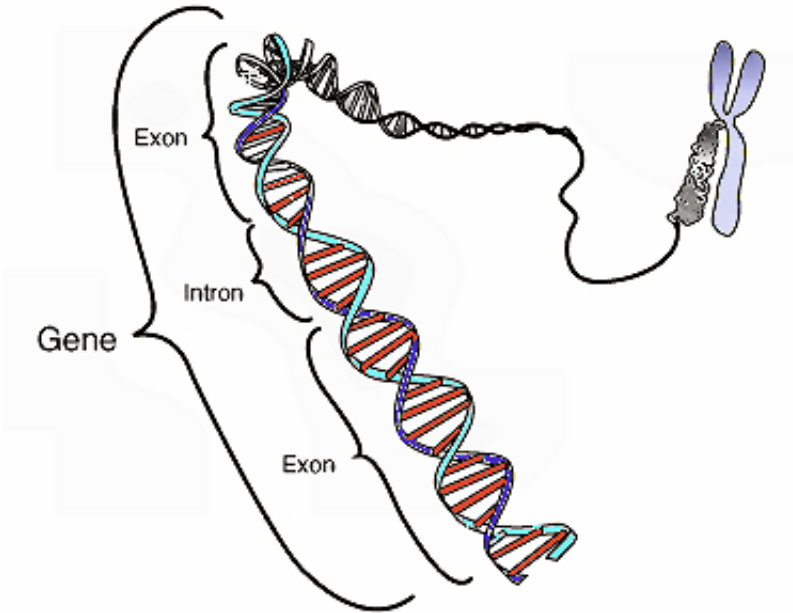


Organisms can keep gene expression in check

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This image shows the coding region in a segment of eukaryotic DNA. Credit: National Human Genome Research Institute

York University researchers have learned how living beings can keep gene expression in check—which might partly explain the uncontrolled gene expression found in many cancers.

"Using yeast as a [model organism](#), we studied the Tup1 protein, a negative regulator of gene expression," says Biology Professor Emanuel Rosonina, adding, "This protein binds to some [genes](#) and blocks their expression, helping to ensure genes that shouldn't be turned on remain

inactive."

The current study, jointly conducted by York University and Columbia University researchers, suggests that Small Ubiquitin-like Modifier (SUMO) modifies proteins bound to [active genes](#), in order to prevent unfettered gene over-expression that can be harmful to the organism. "One of the ways SUMO does this is by promoting the binding of Tup1 to active genes, which then acts to reduce their expression to appropriate levels," explains Rosonina, in the Faculty of Science at York U.

"Sumoylation controls the timing of Tup1-mediated transcriptional deactivation" published today, March 13, 2015 in *Nature Communications* is a follow up to a previous study which found SUMO in every gene examined.

"As a result of the previous study, we reported that SUMO is probably important for controlling expression of active genes because we found it on every gene we looked at, but only when they were turned on," notes Rosonina.

Considering that many tumours have abnormal levels of SUMO, it will be important to examine whether inappropriate SUMO modifications in these tumours are related to the uncontrolled [gene expression](#) that is observed in most cancers, the research concludes.

More information: *Nature Communications*,
www.nature.com/ncomms/2015/150...full/ncomms7610.html

Provided by York University

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