

Bacterial degradation of the MYC oncogene: A new cancer treatment strategy?

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Scientists at Lund University have discovered how *E. coli* bacteria target and degrade the well-known oncogene MYC, which is involved in many forms of cancer. The study is now published in *Nature Biotechnology*.

Cancer cells grow too fast, outcompete [normal cells](#) and spread to distant sites, where they cause metastases. Understanding what makes [cancer](#) cells so efficient and threatening is critically important and stopping

them has always been the goal of cancer research. Early studies identified oncogenes, genes that normally control cell growth, but which can cause mutations responsible for the creation of [cancer cells](#) and explain their competitive advantage.

The pleiotropic transcription factor MYC has been named "the quintessential oncogene" and is hyperactive in the majority of human cancers. Targeting MYC is therefore highly desirable. Still, finding c-MYC inhibitors for therapeutic use has been problematic and MYC itself has long been viewed as undruggable.

Researchers at Lund University have made the surprising discovery that uropathogenic *E. coli* deplete c-MYC protein from infected cells and tissues as a result of accelerated c-MYC protein degradation and attenuated MYC expression.

The discovery was made after observing that children with acute pyelonephritis have decreased MYC expression. By screening molecules released by the bacteria, Lon protease was identified as the main effector of MYC degradation, with selectivity for MYC. The bacterial strategy was then translated into [cancer therapy](#), showing prominent effects of Lon treatment in two different cancer models. Potent treatment effects on [tumor growth](#) and increased survival support the therapeutic potential of this molecule.. Surprisingly, the Lon protease was shown to mainly affect cells where MYC is overactive, suggesting limited toxicity. These findings have now been published in *Nature Biotechnology*

The next step is to understand this molecule in more detail and to develop the project for future clinical trials.

More information: Daniel S. C. Butler et al, A bacterial protease depletes c-MYC and increases survival in mouse models of bladder and

colon cancer, *Nature Biotechnology* (2021). DOI: [10.1038/s41587-020-00805-3](https://doi.org/10.1038/s41587-020-00805-3)

Provided by Lund University

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