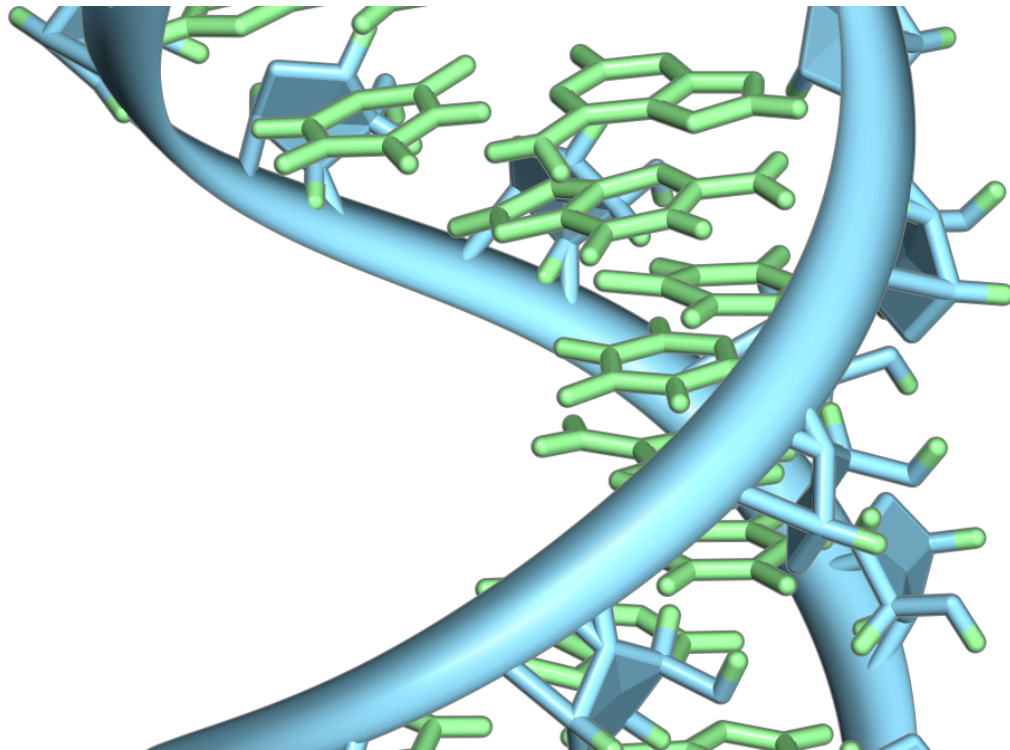


# Understanding the role of RNA methylation in cancer

July 12 2024, by Olivia Dimmer

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A hairpin loop from a pre-mRNA. Highlighted are the nucleobases (green) and the ribose-phosphate backbone (blue). Note that this is a single strand of RNA that folds back upon itself. Credit: Vossman/ Wikipedia

RNA modification could serve as a therapeutic target for certain types of cancer, according to a new study [published](#) in *Molecular Cell*, which sheds new light on the complex process underlying RNA transcription.

RNA modifications, such as 2'-O-methylation (Nm), play pivotal roles in regulating RNA processing and translation. However, exactly how Nm plays into the process is unclear, said Qi Cao, Ph.D., the Anthony J. Schaeffer, MD, Professor of Urology, who was a co-author of the study.

"Previously, we did not have the tools to study this RNA modification," said Cao, also a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. "With third-generation sequencing, we can appreciate this and detect how the electrical signals change."

In the study, Cao and his collaborators utilized nanopore sequencing combined with a novel machine learning tool called NanoNm to map thousands of methylation sites within the RNA of cultured kidney cells. The investigators found that Nm, especially when mediated by the protein fibrillarin, significantly enhanced messenger RNA stability and [expression levels](#).

Because elevated levels of fibrillarin and Nm have been found in cancer, the investigators then analyzed prostate cancer cells using the same approach. They found that increased levels of fibrillarin were associated with increased stability expression of mRNA, according to the study.

"Now that we have proven this method, later we can profile [tissue samples](#) in other cancers to detect global methylation. Because our previous studies suggest the fibrillarin is upregulated in cancer, we can use this to define how a cancer has progressed," Cao said.

The findings advance scientific understanding of RNA modifications and their role in complex cellular processes, Cao said, and may help scientists target RNA modification pathways linked to cancer in the future.

Moving forward, Cao and his collaborators will perform [drug screening](#)

to identify available compounds that could manipulate fibrillar and Nm levels, he said.

**More information:** Yanqiang Li et al, 2'-O-methylation at internal sites on mRNA promotes mRNA stability, *Molecular Cell* (2024). [DOI: 10.1016/j.molcel.2024.04.011](https://doi.org/10.1016/j.molcel.2024.04.011)

Provided by Northwestern University

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