

Rather than being a one-way street, DNA-directed RNA transcription may have profound adaptability

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The central dogma of molecular biology describes the flow of genetic information. It was first described by Francis Crick in 1956 as one-way traffic: as: "DNA makes RNA and RNA makes protein."

A recent paper published in *Mutation Research - Fundamental and Molecular Mechanisms of Mutagenesis*, however suggests that, rather than being a one-way street, DNA-directed RNA transcription may have profound adaptability. The authors of the paper showed a conceptually novel relationship between the genotype (DNA) and the phenotype (the products of the transcription of DNA).

The method the authors used to make this discovery is termed Single-Cell Transcriptogenomics (SCTG). It allows DNA and RNA sequencing to be performed concurrently on the same single cells taken from a cell population treated with the powerful mutagen ethylnitrosourea. This method allowed the authors, for the first time, to prove the tendency of the transcriptional machinery in the cell to avoid transcribing DNA strands harboring a newly induced mutation. This is likely to be a novel cellular defense mechanism to prevent genetic mutations from being expressed.

"We described a novel method to directly examine the transcription pattern of genotypic variants at single cell resolution," explained Dr. Jan Vijg, Department of Genetics, Albert Einstein College of Medicine, lead

author of the paper. "Single-cell transcriptogenomics will be instrumental in gaining a more complete understanding of how variations in the genome can lead to functional deficiencies in aging and disease."

More information: "Single-cell transcriptogenomics reveals transcriptional exclusion of ENU-mutated alleles" by Wenge Li, R. Brent Calder, Jessica C. Mar, Jan Vij, *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*. [DOI: 10.1016/j.mrfmmm.2015.01.002](https://doi.org/10.1016/j.mrfmmm.2015.01.002)

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