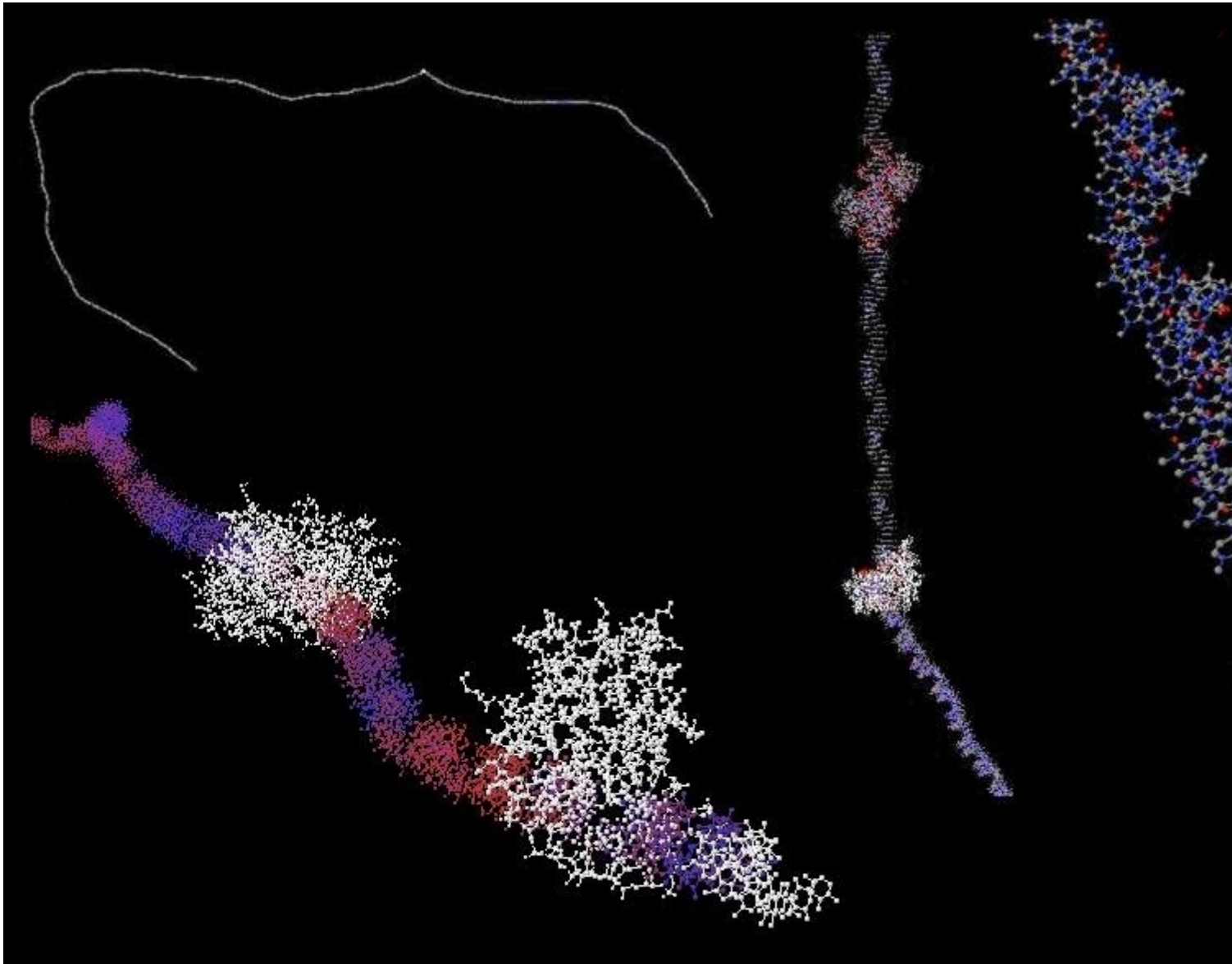


[Inici](#) > Discovered a DNA hidden physical code that modulates genome expression

Discovered a DNA hidden physical code that modulates genome expression

Researchers from the IRB Barcelona - BSC joint program, together with scientists at CRG, publish an article on novel insights on gene expression in *Nucleic Acids Research* journal.



Researchers with the joint program Institute for Research in Biomedicine (IRB Barcelona)- Barcelona Supercomputing Center (BSC) on Computational Biology, together with scientists at Centre for Genomic Regulation (CRG) have discovered a hidden DNA structural code that provides novel insights on gene expression. The results are available in the electronic version of [Nucleic Acids Research](#).

Gene expression is a complex process regulated by many different molecular mechanisms; the location of promoters is key to understand it. In particular, one of the biggest challenges is the location of promoters such as the transcription start sites (TSSs) – sequences of DNA that code for a particular protein with a certain function in the cell. Traditionally, the specific DNA sequence on promoter regions has been considered as the most important regulatory element in transcription (the first step leading to gene expression).

But a new paradigm is proposed in the study: promoters can be defined, not only by their sequence, but also by their structure, characterized by distinctive physicochemical properties that will bring an unusual physical deformability (shift, slide, twist, tilt, roll) which might favour protein recognition and regulation.

Scientists have used theoretical methods to characterize physical properties of DNA, using them to localize “de novo” promoters that were then validated experimentally.

“A strikingly large number of theoretical predictions, which were considered ‘false positives’ based on previous knowledge, have been proved after experiments true promoters that are transcriptionally active despite the lack of specific sequence,” says Modesto Orozco, director of the joint program IRB-BSC on Computational Biology . The project illustrates the possibility for fruitful collaborations between theoretical and experimental groups based in different institutions.

This study has shown that not only DNA sequence is important but also its structure. So, scientists can use DNA physical signalling which is able to detect promoter activity beyond conventional prediction methods

Reference article:

Unravelling the hidden DNA structural/physical code provides novel insights on promoter location

Elisa Duran, Sarah Djebali, Santi Gonzalez, Oscar Flores, Josep Maria Mercader, Roderic Guigo, David Torrents, Montserrat Soler-Lopez and Modesto Orozco

Nucleic Acids Research 2013; doi: 10.1093/nar/gkt511

[Nota en castellano](#)

[Nota en català](#)

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

Source URL (retrieved on 19 oct 2024 - 09:43): <https://www.bsc.es/ca/news/bsc-news/discovered-dna-hidden-physical-code-modulates-genome-expression>