

# Researchers discover a substance against the 'dark genome' of cancer

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A research study coordinated by Manel Esteller, researcher at Bellvitge Biomedical Research Institute (IDIBELL) has identified a substance that inhibits cancer growth by activating the so-called "dark genome" (or non-coding DNA) and micro-RNA molecules. The study appears this week in the journal *Proceedings of the National Academy of Sciences (PNAS)*.

Human body cells have a genome (the set of our DNA) encoding our proteins such as keratin in the skin or haemoglobin in blood. This genome with encoding DNA represents only the 5% of our genetic material. The remaining 95% is called the 'dark genome' or non-coding DNA and its role is largely unknown. Part of this DNA produces small charged molecules called micro-RNAs that activate or deactivate genes. In recent years it has been shown that alterations in these molecules are related to tumour onset.

Researchers have shown that a small-molecule called enoxacin, used in antibacterial compounds, binds to the protein that builds micro-RNA and stimulates their inhibitory activity of the tumour growth. According to researcher Manel Esteller, that "is like if we have a second hand car and we put on a new engine".

The molecule has been tested both in laboratory cells and in animal models and now its behaviour should be studied in humans. Esteller stresses that the advantage of this compound is that we know its metabolism and its human security. Esteller adds that "although the use

of this molecule may not be approved in [cancer](#) treatment, this finding opens the door to design new drugs that use microRNA as a therapeutic target. We show the pharmaceutical industry a new direction where to direct their efforts in anti-tumour therapy."

**More information:** Sonia Melo, Alberto Villanueva, Catia Moutinho, Verónica Davalos, Ricardo Spizzo, Cristina Ivan , Simona Rossi, Fernando Setien, Oriol Casanovas, Laia Sio-Riudalbas, Javier Carmona, Jordi Carrere, August Vidal, Álvaro Aytes, Sara Puertas, Santiago Ropero, Raghu Kalluri, Carlo M. Croce, George A. Calin, Manel Esteller. The small molecule enoxacin is a cancer-specific growth inhibitor that acts by enhancing TRBP-mediated microRNA processing. Proceedings of the National Academy of Science USA (PNAS), Early Edition, February 28th 2011.

Provided by IDIBELL-Bellvitge Biomedical Research Institute

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