

# Team identifies oncogene regulated by nutrients

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Scientists from the Growth Factors, Nutrients and Cancer Group at the Spanish National Cancer Research Center (CNIO), led by Nabil Djouder, have discovered that the MCRS1 protein, in response to an excess of nutrients, induces an increase in the activity of mTOR (the mammalian/mechanistic Target of Rapamycin); a protein that is altered in human diseases such as cancer and diabetes, processes associated with ageing, as well as in certain cardiovascular and neurodegenerative pathologies. The finding, published in the journal *Developmental Cell*, opens up new possibilities for the development of drugs that block MCRS1 to treat cancer and diabetes.

Under normal conditions, mTOR regulates essential cellular functions, such as [protein synthesis](#) and [cell growth](#) and proliferation. However, an overactive stimulation of mTOR in response to nutrients and [growth factors](#) —metabolic processes that are crucial in tumor biology— leads to an increase in cell growth and proliferation.

## Correlation with prognosis in colorectal cancer

CNIO researchers have now discovered how the MCRS1 protein —a protein associated with gene regulation and cell death processes— is capable of activating mTOR, and thus, stimulate [cell proliferation](#). In this way, in human [colorectal cancer](#) samples, a correlation was found between increased MCRS1 activity and tumours with a high proliferation rate, as well as with a worse prognosis of the disease.

"Although in our study we published the results obtained from these colorectal samples, we are also studying the relationship between this protein and diseases of the liver, the primary metabolic organ," explains Djouder.

## **One distinctive feature of cancer**

The incidence of cancer and other related diseases has increased considerably in Western societies; this is partly due to an increased caloric intake and a more sedentary lifestyle. Therefore, unravelling the cellular processes that act in response to an excess of nutrients can contribute to achieve a better understanding of the biology of cancer and, consequently, is key to the fight against this disease.

"We will continue to study this gene using different genetically modified mouse models, where we can study what occurs when there is a gain- or loss-of-function. We are already obtaining interesting results, but further research is necessary."

Provided by Centro Nacional de Investigaciones Oncologicas

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