

Confirmation that vitamin D acts as a protective agent against the advance of colon cancer

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The indication that vitamin D and its derivatives have a protective effect against various types of cancer is not new. In the field of colon cancer, numerous experimental and epidemiological studies show that vitamin D3 (or cholecalciferol) and some of its derivatives inhibit the growth of cancerous cells. Researchers at the Vall d'Hebron Institute of Oncology (VHIO), in collaboration with the Alberto Sols Institute of Biomedical Research (CSIC-UAB), have confirmed the pivotal role of vitamin D, specifically its receptor (VDR), in slowing down the action of a key protein in the carcinogenic transformation process of colon cancer cells. These results are being published in the journal *PLoS One*.

This protein, known as beta-catenin, which is normally found in [intestinal epithelial cells](#) where it facilitates their cohesion, builds up in large quantities in other areas of the cells when the tumour transformation begins. As a result of these changes, the protein is retained in the [cell nucleus](#), where it facilitates the carcinogenic process, and this is the point at which vitamin D intervenes, or rather, the vitamin D receptor (VDR). "Our study has confirmed the pivotal role of the VDR in controlling the anomalous signal that sparks off the growth and uncontrolled proliferation of colon cells which, in the final instance, ends up causing a tumour to emerge", says Héctor Palmer, the coordinator of this study and head of the VHIO's Stem Cells and Cancer laboratory. He continues, "The stimulation of this receptor suppresses the action of the beta-catenin protein, intercepting the series of events

that change the intestinal cell into a malignant tumour cell".

The study was conducted on mice and human colon cancer cells. The mice were used as a model to replicate the initial phases of colon cancer. "These findings show that mice of this kind, which also lack the VDR and hence do not respond to vitamin D, present larger and more aggressive tumours than mice with the VDR", explains Dr. Palmer, and concludes: "The number of tumours is not influenced by the absence of VDR, which would indicate that this factor does not protect against the appearance of the tumour but does intervene in its growth phase, reducing its aggressiveness".

The researchers then analysed the effect of the VDR on human colon cancer cell cultures and observed that the concentration of the altered protein, beta-catenin, increased in cells without the VDR. These findings were repeated in the three types of [colon cancer cells](#) studied, and confirmed the results observed in the mice.

In two-thirds of advanced colon cancer tumours there was a lack of VDR in the [cancer cells](#), and this circumstance leads us to believe that this loss may contribute to speeding up the growth of the tumour. The findings of this study confirm this supposition.

Vitamin D: essential in the initial phases of colon cancer

In light of these findings, chronic vitamin D deficiency represents a risk factor in the development of more aggressive colon tumours. Patients in the initial stages of [colon cancer](#), the time when the VDR still has a substantial presence in the cells, could benefit from being treated with [vitamin D3](#). However, this would not be useful in the advanced stages of the disease when the presence of the VDR is very much reduced.

The study data support the development of anti-tumour medicines based on the structure of vitamin D, although their use in patients will require further research in the next few years.

The body not only obtains [vitamin D](#) from food, especially milk and fish oils, but also manufactures it from exposure to sunlight. Prolonged exposure is not necessary; just 10 minutes in the sun every day when it is not at its peak is sufficient to stimulate its production. During the summer, when we are more likely to sunbathe, it is important to use the appropriate protective measures against sunburn to avoid future sun damage. Use high-factor solar protection products and do not expose the skin to the sun in the middle of the day to protect against skin cancers.

Provided by Vall d'Hebron Institute of Oncology

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