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Understanding the anticancer effects of vitamin D3

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The active form of vitamin D3 seems to have anticancer effects. To try and understand the mechanisms underlying these effects, researchers previously set out to identify genes whose expression in a human colon cancer cell line was altered by the active form of vitamin D3.

One gene identified in this previous study was CST5, which is responsible for making the protein cystatin D. Now, a team of researchers, at the Consejo Superior de Investigaciones Científicas-Universidad Autónoma de Madrid, Spain, and the Universidad de Oviedo, Spain, has studied this protein in detail and determined that it has tumor suppressor activity that likely accounts for some of the anticancer effects of the active form of vitamin D3.

The team, led by Alberto Muñoz and Carlos López-Otín, initially established that the active form of vitamin D3 directly activates the CST5 gene in human colon cancer cell lines, increasing levels of cystatin D protein. Functionally, cystatin D was shown to inhibit the growth of human colon cancer cells lines in vitro and when they were xenotransplanted into mice. As knocking down expression of cystatin D in human colon cancer cell lines rendered them unresponsive to the antiproliferative effects of the active form of vitamin D3, the authors conclude that CST5 is a candidate tumor suppressor gene and that it mediates a large proportion of the anticancer effects of the active form of vitamin D3. These data provide rationale for clinical trials examining the preventive and therapeutic potential of the active form of vitamin D3 in colon cancer.