

# Novel designed molecules could stop colon cancer metastasis

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A Basque research consortium has managed to stop the development of colon cancer and its liver metastasis in an experimental model using mice. This breakthrough, which could open new avenues for the future treatment of these pathologies, has been achieved by creating molecules that interfere with the tumour cells adhering to other cells in the body. In this way, these molecules stop both the tumour growth and the spreading of tumour cells to other organs and their subsequent proliferation.

The study, published today in the renowned American magazine [Journal of Medicinal Chemistry](#), is based on a previous work by a research group of the University of the Basque Country, which described a series of molecules that reduced [metastasis](#) in melanoma (a severe type of [skin cancer](#)) in mice. That work opened the possibility of generating new molecules to act on other types of [cancer](#) by following a similar strategy. This is what the current research has achieved, applied to [colon cancer](#) and [liver metastasis](#).

The Basque research consortium is made up by the Basque research centre in bioscience, CIC bioGUNE, the University of the Basque Country (UPV/EHU), the Institute of Genetics and Molecular and Cellular Biology (IGBMC) from Strasbourg, France and the spin-off company Ikerchem. They have also received the collaboration of researchers from the Institute of Physical Chemistry "Rocasolano" (IQFR), from CSIC, and from the Novartis Institute for BioMedical Research.

"In this project we initially designed inhibitors of the cellular adhesion involved in the metastasis of murine melanoma, and then we carried out the chemical synthesis of these molecules, checking their potency and their biological activity. The surprise was that our calculations predicted that by introducing relatively small changes we could generate new molecules able to inhibit cell adhesion involved in a different type of cancer. This prediction was confirmed by the experimental results, thus suggesting that these techniques of chemical design and synthesis may be applied to other related therapeutic targets", says Dr. Fernando Cossío, professor at the UPV/EHU, co-founder of Ikerchem S.L. and president of the Ikerbasque Executive Committee.

"As well as being relevant for the control of cancer and metastasis, this work shows that in the Basque Country there are teams of researchers in academic institutions and in companies with the necessary experience and collaboration capacity to address multidisciplinary projects of biomedical relevance, by combining synthetic and computational chemistry with the structural analysis of the mechanism of action and the biological validation of the generated molecules", states Dr. Francisco Blanco, Ikerbasque Research Professor at CIC bioGUNE.

## **Impact of cancer and metastasis**

Cancer is the second highest cause of human mortality and its incidence increases with age. Thanks to the progress in early detection and the control of detected tumours, the survival rate has been steadily increased and, in this sense, it is expected that further progress in these two aspects of the disease will be achieved.

Nowadays, 90% of deaths from cancer are caused by the reappearance of the original tumour in a different part of the body, a process known as metastasis. This process takes place when a cancer cell from the original tumour migrates to another organ in the patient's body, generating a new tumour.

Colon cancer, is not among the highest mortality rate cancers, but it often develops metastasis in the liver, which it is. In fact this is the organ where most frequently the metastasis from tumours in other parts of the body appear. This happens because the liver works as a blood and lymph filter and, therefore, cancer cells in these fluids may be trapped in it. The lethal danger of cancer cells moving around the body is what pushes the researchers to find therapies to stop metastasis.

**More information:** Sebastian, E. et al. Design, Synthesis, and Functional Evaluation of Leukocyte Function Associated Antigen-1 Antagonists in Early and Late Stages of Cancer Development, *Journal of Medicinal Chemistry*. [pubs.acs.org/doi/abs/10.1021/jm3016848](https://pubs.acs.org/doi/abs/10.1021/jm3016848)

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