

Cancer treatment: mechanism for cell division discovered at Ceinge

Tumor treatment: the mechanism by which cancer cells divide the genome in mitosis was discovered at the Ceinge in Naples

A mechanism for the breakdown of the genome in daughter cells, which opens up new implications in the fight against

tumors and other diseases, has been identified since Ceinge Advanced Biotechnology from Naples. Identification was obtained with the support of Airc Foundation. The result of the identification, published in the scientific journal "Cell Reports", is the result of the study coordinated by the research group led by the professor Domenico Grieco.

In particular, scholars have focused on the activity of Cdk1 enzyme, already known to be instrumental in mitosis, and have discovered that not all enzymes of this type have to "work". Indeed, a small amount must necessarily remain inactive for cell division to take place correctly. In particular, the fidelity and precision of the mechanisms that allow the replication of the genetic material and the separation of the two copies of DNA thus obtained in the daughter cells are fundamental for the health of the cells themselves, of the organs and of the organism. Alterations of the processes that guarantee the fidelity of cell division can, in fact, cause numerous pathological conditions including cancer.

Tumor treatment: "The discovery will allow us to identify new targets dependent on the control of i-Cdk1 to selectively target cancer cells"

"The information we found is important because it makes us better understand how duplicate DNA is broken down during cell division", he explains. Domenico Grieco full professor of Clinical Biochemistry of the University of Naples Federico II at the Department of Pharmacy and Principal Investigator of Ceinge. "This will allow us in the future to identify any factors that may interfere with the amount of inactive Cdk1 enzymes, which we have called i-Cdk1, and which can disrupt this mechanism, altering the correct segregation of DNA. With this further knowledge it will perhaps be possible to block or avoid these factors".

"All the cells of our organs – Grieco continues – possess the same identical DNA within their nuclei. This is the biochemical structure that contains all the information, encoded in the genes, and necessary to build the proteins that perform all cellular functions. For this to be guaranteed there is a need for extreme fidelity of the cell division mechanisms. The phase of cell division in which the DNA is replicated is defined phase S, of DNA synthesis in fact, while the one in which the two copies of the DNA are separated and divided into two separate areas of the mother cell is called phase M or mitosis. At that

point the two separate copies of the DNA will be wrapped in a nuclear membrane to form the nucleus of the daughter cells. In this study, our group discovered a biochemical mechanism necessary for the formation of mitotic spindlethe structure that cells build during mitosis to physically separate and distribute the two copies of DNA replicated in the daughter cells “.

And that’s not all: this discovery could also have decisive implications for cancer therapy. “Thanks to the results of this study it will perhaps be possible to identify new targets dependent on the control of i-Cdk1in order to selectively target cells in which the DNA segregation mechanisms are already altered as occurs in many types of tumors ”, adds Grieco.

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