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## Review of Gene editing helped crack a 100-year-old mystery about cancer

A study in July of 2023 confirmed a century-old idea concerning the role of chromosome abnormalities in cancer. In the 1900s, when scientists first observed cancer cells dividing, the cells frequently resulted with too many or not enough chromosomes. This irregularity was suspected to be play a role in cancer development, but as the decades progressed, scientists focused more on specific genes responsible for cancer. The question of chromosomal abnormalities was left largely unexplored due to the low demand and interest of it.

This study used CRISPR gene-editing technology aimed to manipulate chromosomes in present cancer cells. They removed extra chromosomes in cancer cells to find that the cells did not form additional tumors, in lab cultures or in mice. It strongly suggested that extra chromosomes are not only a side effect of cancer but may be the driving force behind certain types. It was stated that this method was not prepared for clinical use, however, it does open a door to new strategies of targeting cancer: focusing on the chromosomal abnormalities common in many cancer types. This approach could offer a new way to treat various cancer types that resist existing therapy.

This article is deemed accurate due to its citing of experts, including Uri Ben-David, an associate professor of human molecular genetics at biochemistry at Tel Aviv University and Jason Sheltzer, a cancer biologist at Yale School of Medicine, who worked on the study. Furthermore, a peer-reviewed, trustworthy document from a scholarly, open access, scientific journal called "Cell" supports the ideas of this vastly claimed study with little resources. This reference accredits the original scientist who first proposed the theory, Theodor Boveri, 1914, which The Washington Post article did not do. It discusses the aspects of chromosomal instability and its connection to cancer by first drawing a strict line between aneuploidy and chromosomal instability to better explain their findings.

Aneuploidy concerns an abnormal chromosome number, while chromosomal instability refers to ongoing chromosome segregation errors throughout consecutive cell divisions. However, the two commonly co-occur with cancerous tumors in humans. The research states it is estimated that sixty to eighty percent of human tumors present chromosomal abnormalities; chromosomal instability positively correlates with tumor stages. It is enriched in metastatic and relapsed tumor specimens. The article shares that chromosomal instability is a stamp of authentication for human cancer, revolving around poor prognosis, metastasis, and resistance to therapy. Chromosomal instability comes from errors in chromosome segregation during mitosis, which causes structural and numeral chromosomal abnormalities. It introduces double-stranded DNA into the cytosol, allowing the engagement of the cGAS-STING anti-viral pathway, which involves the immune system with its editing and evasion.

Overall, the newspaper article's claims are supported by a reputable scientific research paper in which its findings coincide with the assertions of The Washington Post.

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## Sources Cited

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