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Respiratory viruses can awaken dormant cancer cells

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A recent study reports that, in breast cancer survivors, lung infections caused by influenza and COVID-19 viruses can promote the development of metastases by awakening residual cancer cells that have survived treatment.

One of the most formidable properties of cancer is its ability to survive current treatments, whether chemotherapy, radiation therapy, or more targeted therapies.

While these treatments usually succeed in eliminating almost all cancer cells, a tiny proportion of them can develop resistance and remain in the body in a dormant form, undetectable and seemingly harmless, but which remains very dangerous.

These cells have retained the characteristics that allowed the initial tumor to invade a region of the body and can form metastases that are now resistant to anticancer treatments.

Moreover, the majority of cancer patients do not die from the initial tumor (especially when it is located in tissue that is not essential for survival, such as the skin or the breast), but rather from metastases that develop in essential organs such as the lungs, liver, or brain.

DORMANT BREAST TUMORS

This problem posed by residual cancer cells is particularly striking in the case of breast cancer. Patients who have been treated for this type of cancer can be in remission for a very long period (sometimes more than 10 years), which can give the impression of a complete cure, only to see the tumor suddenly reappear in the form of aggressive metastases that threaten their lives.

According to a recent study, one of the factors responsible for this risk of metastasis in breast cancer survivors may involve respiratory viruses such as those responsible for COVID-19 and influenza (1).

The researchers first examined whether respiratory viruses could influence the survival rate of people affected by cancer in general. The COVID-19 pandemic provides a unique opportunity to study this phenomenon because, unlike influenza, data on viral infections were systematically collected during the early years of the pandemic.

By examining the mortality rates of cancer survivors participating in the UK Biobank and who had been diagnosed at least five years before the COVID-19 pandemic, the team found that those who tested positive had almost twice the risk of dying from cancer compared to cancer patients who tested negative. The results are even more striking when the analysis is restricted to the initial period of the pandemic (December 2020 to January 2022), with an 8-fold higher risk of cancer mortality among patients infected with the virus.

A similar phenomenon is observed among breast cancer survivors: an analysis of 36,845 women affected by the disease indicates that those who contracted COVID-19 after their initial cancer diagnosis had an approximately 40% increased risk compared to uninfected women.

VIRAL INFLAMMATION

The researchers observed in the laboratory that, in mice with latent breast cancer cells in their lungs, infection with the COVID-19 or influenza virus caused a dramatic (up to 1,000-fold) and very rapid increase in the number of cancer cells, with the appearance of metastases just two weeks after infection.

The awakening of these dormant cells was induced by interleukin-6 (IL-6), an inflammatory protein released by immune cells, strongly suggesting that the intense inflammation caused by the viral infection is primarily responsible for this awakening of dormant cancer cells.

For people with a history of cancer, particularly breast cancer, vaccination against respiratory viruses, whether influenza, COVID-19, or respiratory syncytial virus, therefore appears to be a valid strategy to reduce the risk of disease recurrence.

(1) Chia SB et al. «Respiratory viral infections awaken metastatic breast cancer cells in lungs». Nature. 2025, Jul 30. doi: 10.1038/s41586-025-09332-0. Epub ahead of print. PMID: 40739350.

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