

Why Some Cancer Cells Are Tougher Than Others: A New Way to Fight Triple-Negative Breast Cancer

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Triple-negative breast cancer (TNBC) is a type of breast cancer that can be harder to treat. Some treatments that work for other breast cancers do not work for TNBC. It can also become resistant to treatment, meaning medicines that once worked may stop working. Scientists have been trying to understand why this happens. Most research has focused on what is happening **inside cancer cells**. Our research found another important clue: **the physical pressure around cancer cells may also help them survive.**

Cancer Cells Can Feel Pressure

A tumor is more than a group of cancer cells. Cancer cells are packed together with other cells and tissues. Some of these supporting cells can **pull, push, and stretch the tissue around the cancer**. We found that cancer cells can actually sense this pressure and stretching. When cancer cells are stretched, it can turn on certain genes. One of these genes is called **SKIL**. When SKIL is turned on, cancer cells may become better able to:

- Move to other areas
- Grow into nearby tissue
- Survive cancer treatment

Think of SKIL like a **switch**. Pressure around the tumor may help flip that switch from “**stay here**” to “**move and survive.**”

Why Some Cancer Drugs May Not Be Enough

We also studied a protein on the outside of cancer cells called **VEGFR-2**. This protein can send signals that help cancer cells survive. Usually, certain chemicals in the body turn on VEGFR-2. Some cancer treatments are designed to block those chemical signals. But we found something surprising: **physical stretching can also turn on VEGFR-2**. That means cancer cells may have another way to keep their survival signals working—even when medicines block the usual chemical pathway.

Imagine locking the front door to keep someone out, only to discover there is another unlocked door. **The physical pressure around cancer cells may be that second door.**

What Could This Mean for Cancer Treatment?

Our findings could help scientists think differently about treating triple-negative breast cancer. Instead of focusing only on the chemicals and genes that help cancer grow, future treatments may also need to block the ways cancer cells **sense and respond to physical pressure**. Understanding both could help researchers find new ways to prevent cancer cells from spreading or becoming resistant to treatment.

The Bottom Line

Cancer is not only about what happens inside a cancer cell. The environment around the cancer matters, too. By studying how cancer cells respond to pushing, pulling, and stretching, we may uncover new ways to make treatment work better. **Cancer is a chemistry problem—but it may also be a physics problem. Understanding both may help us find better ways to fight it.**