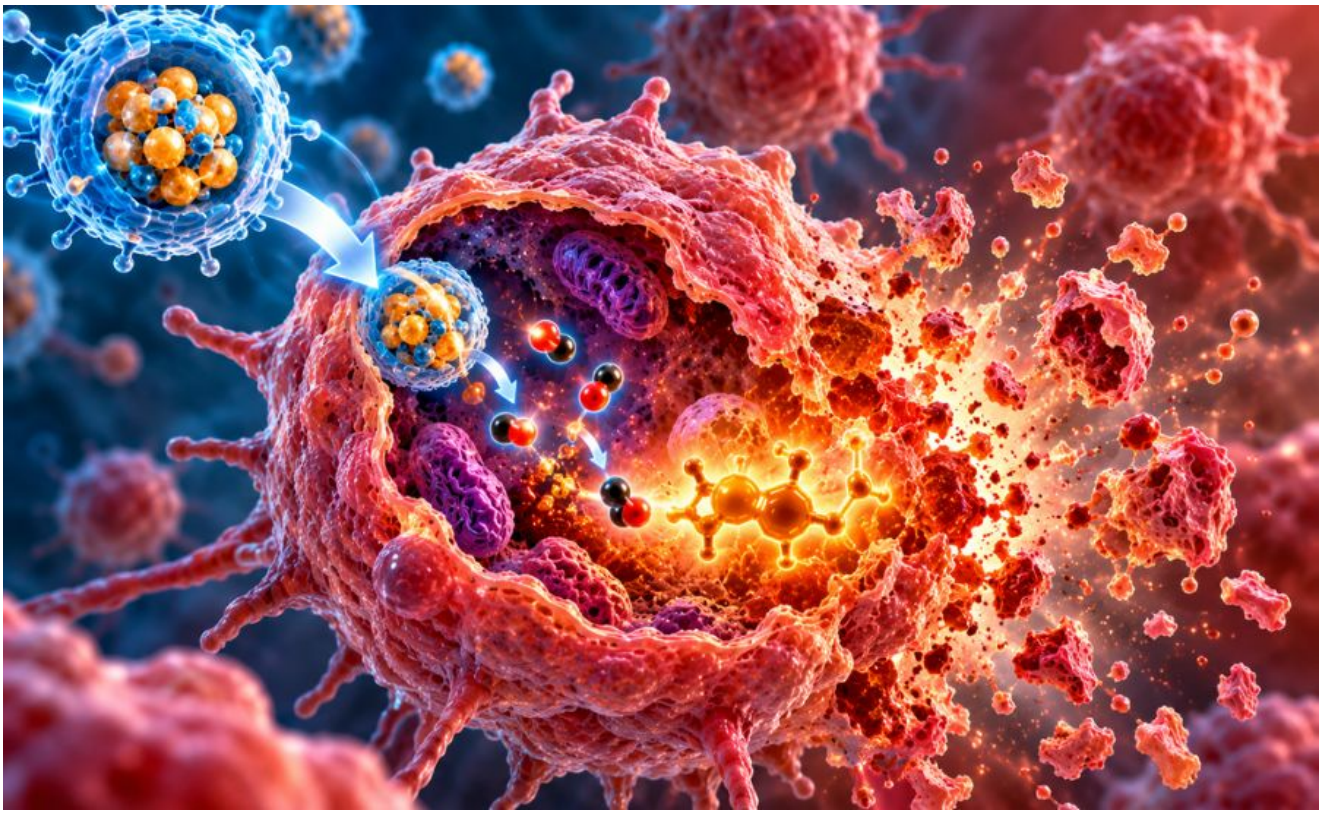
HOME

Japanese Scientists Find a Way to Make Cancer Cells Produce Their Own Poison—From the Inside

By bestfolkmedicine · 26/10/2026 · 12 min read



What if the key to destroying cancer cells was hidden inside the cancer itself? In a remarkable development from Japan, researchers have designed an experimental method that uses a chemical produced by cancer cells to manufacture toxic compounds directly inside them. The discovery could open a new chapter in precision cancer treatment.

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Imagine a cancer treatment that doesn't simply flood the body with toxic chemicals.

Instead, it enters cancer cells and uses something those cells already produce to create a substance that works against them.

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It sounds like science fiction.

But researchers at Japan's RIKEN Pioneering Research Institute have demonstrated an early version of this concept in laboratory-grown human cancer cells.

Their approach takes advantage of an unexpected substance: carbon monoxide, a gas commonly associated with poisoning.

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Although carbon monoxide is dangerous at high concentrations, the human body naturally produces small quantities of it. Certain cancer cells generate unusually high levels.

The Japanese team discovered a way to exploit that difference.

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Using a specially designed chemical system, they triggered the formation of anticancer compounds directly inside cultured cancer cells.

The findings were published in Nature Communications on September 17, 2026, and announced by RIKEN on September 29.

The discovery is promising, but it is not yet a cancer treatment. Its effectiveness and safety have not been established in animals or humans.

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Still, the underlying idea is extraordinary: What if cancer's own chemistry could become one of its greatest weaknesses?

1. The Problem With Traditional Cancer Treatments

For decades, chemotherapy has played an essential role in treating many forms of cancer.

Chemotherapy drugs can kill cancer cells, slow their growth, and prevent them from multiplying.

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But cancer cells are not always easy to distinguish from healthy cells.

Many chemotherapy medications affect rapidly dividing cells, including some normal cells in the digestive tract, hair follicles, and bone marrow.

This contributes to familiar side effects such as nausea, hair loss, fatigue, and decreased blood cell counts.

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Modern oncology has developed increasingly targeted treatments, including immunotherapies, targeted drugs, and antibody-drug conjugates.

Yet selectively destroying cancer while minimizing damage to healthy tissues remains one of medicine's greatest challenges.

The Japanese researchers approached this problem from a different direction.

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Instead of asking how to deliver more anticancer medicine to a tumor, they asked:

Could a cancer cell help manufacture the substance that ultimately harms it?

2. The Unexpected Discovery: Cancer Cells Produce a Potential Chemical Weapon

Carbon monoxide is best known as a poisonous gas produced during incomplete combustion.

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Exposure to high concentrations can interfere with oxygen delivery throughout the body and cause severe poisoning.

However, carbon monoxide also has a lesser-known biological role.

Our bodies naturally produce small amounts through processes involving the breakdown of heme, a component of several important proteins.

At these low concentrations, carbon monoxide participates in cellular signaling and other physiological processes.

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Researchers have found that certain cancer cells produce more carbon monoxide than normal cells.

This difference creates a potentially useful chemical opportunity.

If a reaction could be designed to depend on carbon monoxide, it might occur more readily inside cancer cells.

That is the principle behind the new Japanese experimental system.

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Rather than trying to poison cancer cells with carbon monoxide directly, the researchers used the gas as a raw material for manufacturing an anticancer compound.

This distinction is essential.

Carbon monoxide is not being recommended or administered as a cancer remedy. The experimental approach relies on controlled chemical reactions involving specialized molecules.

3. How the New Technique Works: Turning Cancer Against Itself

The innovation centers on a specially engineered chemical complex containing palladium, a metal capable of catalyzing certain chemical reactions.

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However, there was a major obstacle.

Inside the body, substances such as glutathione can interfere with palladium catalysts and prevent them from working properly.

To overcome this challenge, the team developed an ingenious protective system.

They placed the palladium-containing compound inside albumin, a naturally occurring protein found in human blood.

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Albumin acts as a molecular carrier and helps shield the catalyst from substances that would otherwise deactivate it.

Once introduced into the experimental cells, the protected catalyst could interact with available carbon monoxide.

This triggered a chemical reaction that produced a compound belonging to a family known as phenanthridinone derivatives.

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Some compounds in this chemical family possess anticancer activity.

The team then refined the system to produce a more toxic derivative within cancer cells.

The concept involves four key stages:

1. A specially designed molecular complex enters the cell.
2. The protected catalyst encounters carbon monoxide naturally produced by the cell.
3. A chemical reaction generates an anticancer compound.
4. The newly created compound damages the cancer cell and inhibits its growth.

The result is an intriguing reversal of conventional drug delivery.

Instead of delivering a fully formed toxic drug, the researchers demonstrated a way to manufacture an active compound inside the targeted cells.

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4. What Happened When They Tested Human Cancer Cells?

The Japanese research team tested the system using laboratory-grown human cell lines representing four types of cancer:

- Liver cancer
- Breast cancer
- Lung cancer
- Cervical cancer

After exposing these cultured cells to the experimental complex for 48 hours, researchers detected the desired chemical product in all four cancer cell lines.

Importantly, the corresponding product was barely detectable in the noncancerous cells examined.

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This indicated that the chemical reaction was responding to differences between the cancerous and noncancerous cells.

In subsequent experiments, the researchers modified the system to generate a cytotoxic compound within liver cancer cells.

The treated cells showed toxic effects and inhibited growth.

However, the observed anticancer activity was modest, and the differences in toxicity between cancerous and noncancerous cells were limited.

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These limitations are crucial: successfully producing a toxic compound inside cancer cells does not automatically mean the technique can safely eliminate tumors in a living patient.

The accomplishment was demonstrating that the chemical strategy could work under controlled laboratory conditions.

5. Why This Discovery Is Different From Ordinary Chemotherapy

The most interesting aspect of the approach is not simply that a toxic compound can damage cancer cells.

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Scientists already know many ways to kill cancer cells in a laboratory.

The difficult part is targeting malignant tissue while protecting healthy cells.

This new strategy attempts to exploit a metabolic characteristic that can distinguish certain cancer cells from normal ones.

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In principle, a treatment based on this approach could remain relatively inactive until it encounters the chemical conditions required to produce the active drug.

This is an example of a broader research concept called therapeutic in vivo synthetic chemistry.

The goal is to perform controlled chemical reactions within a living organism, ideally at the site where a treatment is needed.

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Potential advantages, if the technology proves successful, could include more localized drug production, reduced exposure of healthy tissues to toxic compounds, and opportunities to target specific tumor characteristics.

These benefits remain possibilities rather than demonstrated clinical outcomes.

6. Could This Approach Work Against Different Types of Cancer?

The initial experiments demonstrated the formation of relevant chemical compounds in several cancer cell lines.

That observation raises an intriguing possibility.

Rather than targeting a particular organ, future treatments might exploit a chemical characteristic shared by certain tumors.

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For example, if different cancers produce sufficiently elevated levels of a particular metabolite, that substance could potentially serve as the trigger for drug production.

This would represent a different approach from therapies designed around one specific tumor location.

However, cancer is not a single disease.

Tumors vary enormously in their genetics, metabolism, growth patterns, and responses to treatment.

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Even cells within the same tumor can behave differently.

The fact that researchers observed a chemical reaction in four types of cultured cancer cells does not mean the treatment would work against every cancer.

Whether the method can produce sufficiently powerful and selective effects across different tumor types remains unknown.

7. Could Healthy Cells Be Protected?

One particularly encouraging finding involved the comparison between cancerous and noncancerous cells.

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In the initial cell-culture experiments, the desired reaction product appeared much more prominently in cancer cells than in the healthy cell line examined.

The team also investigated whether carbon monoxide in blood could accidentally activate the chemical system before it reached a tumor.

In laboratory experiments involving mouse blood, they did not detect the expected reaction product.

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One possible explanation is that much of the carbon monoxide present in blood is bound to hemoglobin, making it unavailable for the reaction.

This is a useful preliminary observation.

But it does not establish that the technique is harmless to healthy tissues.

A living body contains many interacting organs, proteins, metabolites, and cellular environments.

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Scientists will need to determine how the experimental compounds distribute throughout the body, how long they remain active, and whether unwanted reactions occur in normal tissues.

The goal is selective cancer treatment. The challenge is proving that selectivity in living organisms.

8. Why This Could Become an Important New Direction in Cancer Research

One of the most exciting possibilities is that carbon monoxide may not be the only useful substance.

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Cancer cells often have altered metabolism.

To sustain rapid growth and survive difficult conditions, tumors can process nutrients and produce metabolites differently from surrounding healthy tissues.

Those differences create potential vulnerabilities.

Researchers may eventually identify additional cancer-associated molecules that can be used to activate therapeutic reactions.

Imagine a future in which a treatment is designed to respond to the unique chemical environment of an individual tumor.

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The drug might become active only when it encounters a particular molecular signature.

That is one of the ambitions of precision oncology.

The Japanese study contributes to this field by demonstrating that a substance generated by cancer cells can participate directly in the chemical production of a potentially therapeutic compound.

9. Why This Isn’t a Cancer Cure Yet

Despite the excitement surrounding the discovery, the research remains at an early stage.

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The experiments have not demonstrated that the technique can safely eliminate tumors in animals or treat cancer in humans.

Several major questions remain unanswered.

Can the chemical complex reach a tumor efficiently after administration?

Will it enter enough malignant cells to produce a meaningful effect?

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Can it generate sufficient amounts of the active compound to destroy a tumor?

Will healthy organs remain protected?

And can the system work reliably in the complicated biological environment of a living body?

These questions must be addressed through additional laboratory research, animal studies, and eventually appropriately designed clinical trials.

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Even promising approaches can fail during later development because of toxicity, insufficient effectiveness, or problems delivering treatments to the intended tissues.

For this reason, it would be premature to describe the discovery as a cure or a replacement for chemotherapy.

10. What Happens Next?

The immediate challenge is translating the laboratory demonstration into a treatment that might work in living organisms.

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Future experiments will need to investigate how the molecular complex travels through the bloodstream, accumulates within tumors, and behaves inside different tissues.

Researchers will also need to improve the strength of the anticancer effect.

A chemical reaction that produces a detectable compound is only the first step.

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A successful therapy must produce enough active drug to generate a clinically meaningful benefit while avoiding unacceptable side effects.

Animal studies would help establish whether those conditions can be achieved.

Only after sufficient evidence of safety and effectiveness could human clinical trials be considered.

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There is currently no established timetable for this technology to become an approved cancer treatment.

11. What Does This Mean for People Living With Cancer Today?

For people currently undergoing cancer treatment, the discovery offers scientific hope rather than an immediately available therapeutic option.

Existing treatments—including surgery, radiotherapy, chemotherapy, immunotherapy, and molecularly targeted medicines—remain the foundation of modern cancer care.

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Treatment decisions depend on the type of cancer, its stage, genetic characteristics, and the patient's overall condition.

The new Japanese technique is not a reason to delay or discontinue recommended therapy.

It is part of the wider effort to develop more precise and potentially less harmful treatments.

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And that distinction matters.

The history of cancer research contains many exciting laboratory discoveries, but only some ultimately become effective treatments.

Still, each successful experiment can contribute useful knowledge toward future advances.

12. A New Way of Thinking About Cancer's Weaknesses

The most fascinating part of this discovery is its underlying philosophy.

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Cancer cells are extraordinarily adaptable.

They can alter their metabolism, evade immune responses, and sometimes resist treatments that initially work.

But those adaptations may also create weaknesses.

A substance that helps distinguish malignant cells from healthy tissues could potentially become a chemical trigger for therapy.

Instead of attacking cancer indiscriminately, researchers are learning how to exploit the biological differences that make tumors unique.

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That is why this Japanese experiment deserves attention.

It demonstrates a potentially valuable new strategy: using the chemistry of diseased cells to generate an active compound at the disease site.

Whether that strategy eventually becomes a practical treatment remains to be seen.

Final Thoughts: What If Cancer's Greatest Weakness Is Hidden Inside Itself?

For decades, one of the greatest challenges in oncology has been finding ways to destroy malignant cells without causing unnecessary harm to healthy tissues.

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Researchers in Japan have now demonstrated an unconventional possibility.

By using carbon monoxide produced by cancer cells, they created an experimental chemical system capable of manufacturing anticancer compounds inside those cells.

The results are preliminary, but the concept represents a meaningful advance in experimental drug synthesis.

This is not evidence that cancer has been cured.

It is evidence that researchers are discovering increasingly sophisticated ways to turn the unique chemistry of tumors against them.

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And that may become an important part of the next generation of cancer therapies.

Perhaps the future of cancer treatment will involve more than delivering powerful drugs into the body. Perhaps, in selected cases, it will involve teaching chemistry to manufacture those drugs exactly where they are needed.

The possibility is remarkable.

The scientific work ahead is substantial.

But the question raised by this discovery is worth asking:

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What if one of the most promising weapons against cancer could be created using something cancer cells already produce?

Would you trust a future cancer treatment designed to create its active medicine only after entering cancer cells?

Share your thoughts in the comments.

Read online: https://bestfolkmedicine.com/2026/10/japanese-scientists-cancer-cells-produce-own-poison/

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