

Insulin Resistance Is Driving 12 Types of Cancer, Researchers Say

Analysis by [Dr. Joseph Mercola](#)

April 14, 2026

STORY AT-A-GLANCE

- › Machine learning research shows insulin resistance is linked to higher risk across at least 12 cancer types, positioning metabolic dysfunction as an early warning signal rather than a late-stage problem
- › Insulin resistance often develops years before diabetes, meaning symptoms such as fatigue, abdominal weight gain, and unstable blood sugar reflect deeper changes that influence long-term disease risk
- › Metabolic health predicts cancer risk more accurately than body weight alone, highlighting the importance of tracking markers like HOMA-IR instead of relying on the scale
- › High insulin levels and chronic inflammation create conditions that favor abnormal cell growth, explaining how disrupted energy metabolism contributes to cancer development across multiple organs
- › Removing seed oils, supporting steady carbohydrate intake, restoring gut health, reducing environmental stressors and tracking HOMA-IR improves insulin sensitivity and gives you measurable control over your long-term metabolic risk

Insulin resistance — a metabolic condition characterized by fatigue, abdominal weight gain, brain fog, and unstable blood sugar — now sits at the center of cancer research. Unlike a single blood test result, insulin resistance reflects how your cells respond to insulin over time.

This means glucose struggles to enter cells efficiently. Your mitochondria – the thousands of tiny power plants inside each cell that convert food into usable energy – lose their steady fuel supply, and energy production becomes erratic.

From a clinical perspective, insulin resistance often develops years before diabetes appears, which explains why many people live with symptoms without recognition. When insulin signaling breaks down, chronic inflammation and elevated insulin levels create biological signals that encourage abnormal cell growth and disrupt normal cellular repair.

Now, a large-scale analysis has used machine learning to connect this metabolic dysfunction directly to cancer incidence – revealing which cancers are most affected, why body weight alone misses the real risk, and how insulin resistance acts as an early warning signal across multiple organs.¹

AI Model Reveals Insulin Resistance as a Cancer Risk Signal

For a study published in Nature Communications, researchers built a machine-learning model that predicts insulin resistance before diagnosable disease develop.² Instead of relying on one lab test, the model looked at everyday health data – things like age, blood sugar, and triglycerides.

It calculated whether someone's Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) score crosses a level that signals meaningful **insulin resistance**. HOMA-IR is a simple score calculated from fasting blood sugar and insulin levels that estimates how resistant your cells have become to insulin. The model was applied to the UK Biobank, which tracks long-term health data from adults ages 40 to 69.³

Among the 372,395 people who didn't have cancer at the start, 51,193 were diagnosed during follow-up. Individuals flagged as insulin resistant consistently showed higher rates of diabetes, heart problems, and several cancers. This tells you risk builds years before diagnosis – which means prevention is still possible.

- **Certain cancers showed stronger links to insulin resistance** – Researchers reported connections to 12 cancer types overall, with the largest increases seen in uterine cancer (about 134% higher risk), kidney cancer (about 56% higher risk) and esophagus cancer (about 46% higher risk).

Pancreatic cancer risk rose roughly 29%, colon cancer 18%, and breast cancer 13% – all in individuals flagged as insulin resistant. Insulin resistance was not tied to one organ – it appeared across multiple systems, shifting it from a blood sugar issue into a whole-body metabolic warning signal.

- **Metabolic health mattered more than body weight alone** – People with higher body weight but no insulin resistance didn't show the same risk pattern. Meanwhile, those with insulin resistance did – even when body weight looked similar. This means your metabolic function – how your body handles energy – provides more meaningful information than the number on a scale.

The connection between insulin resistance and cancer showed up in younger adults and older adults alike. The effect also stood out in people with a history of **smoking**, especially former smokers, where insulin resistance amplified risk. Your past exposures and current metabolic health interact, which explains why risk looks different from one person to another.

- **Insulin resistance showed clear early disease timelines** – Over several years of follow-up, people flagged as insulin resistant developed **diabetes** far more often, with more hospital admissions related to metabolic disease. One analysis showed more than seven-fold higher odds of developing diabetes during follow-up. That timeline highlights something important: insulin resistance shows up long before major disease, giving you measurable signals to act on.
- **High insulin acts like a growth signal inside your body** – When cells stop responding well to insulin, your body releases more of it to compensate. Elevated insulin then interacts with growth pathways that control how cells divide and

survive. When that signal stays high for years, it creates conditions where abnormal cells gain an advantage — one of the earliest steps in tumor development.

Specifically, elevated insulin activates the IGF-1 (insulin-like growth factor) signaling pathway, which tells cells to grow and divide faster — and suppresses the normal "self-destruct" signals that clear out damaged cells before they become dangerous.

- **Ongoing inflammation creates a favorable environment for tumors** — Insulin resistance often exists alongside chronic low-grade **inflammation**. This type of inflammation changes the environment around cells so damaged cells persist longer than they should. Metabolic stress and cancer risk move together because they share the same biological environment.
- **Machine learning creates a practical "digital biomarker" for early action** — Researchers described the concept of AI-derived insulin resistance as a digital biomarker — a single score that combines multiple metabolic signals into one risk indicator.

Instead of waiting for disease, this approach allows earlier monitoring and more targeted screening. That makes insulin resistance something visible and measurable over time, giving you a clearer way to track improvement rather than guessing about your metabolic health.

How to Remove the Drivers of Insulin Resistance

The research makes the risk clear — but it also reveals something empowering: insulin resistance is measurable and reversible. Insulin resistance develops when your cells struggle to receive glucose and mitochondria — the part of your cells responsible for producing energy — lose steady fuel. The priority is removing what blocks insulin signaling. When cellular energy production recovers, the entire disease trajectory shifts — including cancer risk.

As metabolic function improves, your cells produce more ATP (adenosine triphosphate) – the energy currency that powers virtually every cellular process – inflammatory signals drop and the reinforcing cycle between insulin resistance and mitochondrial dysfunction begins to reverse. The following steps address the root cause.

- 1. Remove damaged fats that disrupt insulin signaling** – Vegetable oils – including soybean, corn, and canola – are loaded with **linoleic acid** (LA), a polyunsaturated fat that damages your mitochondria. Over time, excess LA disrupts metabolism and fuels inflammation. The biggest sources to eliminate first are vegetable oils, salad dressings, fast foods, and processed snack foods – most of which rely heavily on soybean and canola oil.

Replace those oils with stable, nourishing fats such as grass fed butter, ghee, or tallow. Aim to keep daily LA intake under 5 grams, ideally closer to 2 grams. When my **Mercola Health Coach app** launches, the Seed Oil Sleuth feature will help you track this down to the tenth of a gram.

- 2. Consume carbohydrates your gut tolerates well** – Most adults need around 250 grams of carbohydrates daily to support cellular energy, and steady glucose availability reduces metabolic stress that drives insulin resistance.

However, if you're bloated, constipated, or gassy, jumping straight into high-fiber foods feeds certain gut bacteria that release endotoxins – inflammatory fragments that slip through a weakened gut lining into your bloodstream. This increased endotoxin load triggers systemic inflammation and worsens insulin signaling. Gentle carbohydrates such as whole fruit and white rice deliver reliable glucose without overwhelming digestion.

- 3. Progress slowly toward microbiome-supportive carbohydrates** – After digestion stabilizes, introduce resistant starch foods such as cooked-and-cooled potatoes or green bananas, then foods like onions, garlic and leeks that feed butyrate-producing bacteria. Short-chain fats such as **butyrate** help colon cells maintain an oxygen-free environment that supports insulin sensitivity and metabolic stability.

4. Reduce environmental stressors that block metabolic recovery – Plastics release **hormone-disrupting chemicals** that interfere with metabolic signaling, so shift food storage toward glass or stainless steel to lower exposure. Limiting unnecessary **electromagnetic field (EMF)** exposure by increasing distance from devices and turning them off when not in use reduces ongoing cellular stress.

Keep your phone out of the bedroom at night, use speaker mode for calls, avoid working with a laptop directly on your body, and turn off your home Wi-Fi at night. When these exposures decline, cells regain the stability required for efficient glucose use.

5. Use movement to clear glucose and retrain insulin response – Regular movement – especially walking and strength training – drives muscle cells to pull glucose from your bloodstream without large insulin spikes. This lowers insulin demand and improves sensitivity. Consistent movement expands mitochondrial capacity, helping break the cycle where insulin resistance and low cellular energy reinforce each other.

6. Track HOMA-IR – a simple test for insulin resistance – Recognizing insulin resistance early is essential, as it's a warning sign for your metabolic health – one that often precedes Type 2 diabetes. The HOMA-IR test is a valuable diagnostic tool that helps assess insulin resistance through a simple blood test, so you can spot issues early and make necessary lifestyle changes.

Created in 1985, it calculates the relationship between your fasting glucose and insulin levels to evaluate how effectively your body uses insulin. Unlike other more complex tests, HOMA-IR requires just one fasting blood sample, making it both practical and accessible. The HOMA-IR formula is as follows:

HOMA-IR = (Fasting Glucose x Fasting Insulin) / 405, where

- Fasting glucose is measured in mg/dL
- Fasting insulin is measured in μ IU/mL (microinternational units per milliliter)

- 405 is a constant that normalizes the values

If you're using mmol/L for glucose instead of mg/dL, the formula changes slightly:

HOMA-IR = (Fasting Glucose x Fasting Insulin) / 22.5, where

- Fasting glucose is measured in mmol/L
- Fasting insulin is measured in $\mu\text{U/mL}$
- 22.5 is the normalizing factor for this unit of measurement

Anything below 1.0 is considered a healthy HOMA-IR score. If you're above that, you're considered insulin resistant. The higher your values, the greater your insulin resistance. Conversely the lower your HOMA-IR score, the less insulin resistance you have, assuming you are not a Type 1 diabetic who makes no insulin.

Interestingly, my personal HOMA-IR score stands at a low 0.2. This low score is a testament to my body's enhanced efficiency in burning fuel, a result of increased glucose availability. By incorporating additional carbohydrates into my diet, I provided my cells with the necessary energy to operate more effectively.

This improved cellular function has significantly boosted my metabolic health, demonstrating how strategic dietary adjustments lead to better insulin sensitivity and overall metabolic performance.

FAQs About Insulin Resistance and Cancer

Q: What is insulin resistance and why does it matter for cancer risk?

A: Insulin resistance happens when your cells stop responding well to insulin, which forces your body to release more of it. Over time, high insulin and chronic inflammation create biological signals that support abnormal cell growth. Research

shows insulin resistance is linked to higher incidence of multiple cancers, making it an early metabolic warning sign.

Q: Which cancers are most strongly linked to insulin resistance?

A: The strongest links appeared with uterine, kidney, and esophagus cancers, with elevated risk also seen for pancreas, colon, and breast cancers. This shows insulin resistance affects the entire body rather than a single organ system.

Q: Why is metabolic health more important than body weight alone?

A: Body weight doesn't fully explain risk. People with higher weight but healthy insulin sensitivity didn't show the same risk pattern, while individuals with insulin resistance did. This means how your body handles energy provides more useful insight than the number on a scale.

Q: How does insulin resistance contribute to disease over time?

A: Insulin resistance often develops years before diabetes and other chronic diseases appear. During that time, mitochondria receive inconsistent fuel, inflammation increases, and cellular repair declines. This long timeline creates an opportunity to detect and reverse metabolic dysfunction early.

Q: What steps improve insulin sensitivity and lower long-term risk?

A: Key strategies include removing seed oils and other damaged fats, consuming carbohydrates that support steady cellular energy, restoring gut health gradually, reducing environmental stressors such as plastics and EMFs, moving regularly to

clear glucose, and tracking HOMA-IR to measure progress. These steps improve mitochondrial energy production and restore healthy insulin signaling.

Sources and References

- [1, 2, 3 Nature Communications February 16, 2026](#)