

Inhaled Microplastics Impair Lung Immunity and Spread to Organs

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STORY AT-A-GLANCE

- › Inhaling microplastics disrupts your lung's immune defenses within 24 hours by disabling macrophages, the cells that normally clear out pathogens and waste
- › Once inhaled, plastic particles travel beyond your lungs and accumulate in your liver, brain, kidneys, and colon, raising your risk for inflammation and chronic disease
- › Your body's immune cells cannot break down microplastics and instead hold onto them, causing ongoing immune dysfunction and toxic buildup
- › Researchers are now working to identify early warning signs of microplastic-induced lung damage, including biomarkers that signal rising cancer risk
- › You can lower your daily exposure by filtering your air and water, switching to plastic-free kitchen tools and balancing related hormonal disruption with natural progesterone if needed

You breathe in thousands of particles each day, including dust, pollen, and fumes, but one of the most dangerous is something you can't see, taste, or feel: microplastics. These microscopic fragments, shed from synthetic clothing, packaging, and polluted air, have become a constant part of the air around you. Whether you're indoors or out, you're inhaling them with every breath.

What makes this especially concerning is how little attention this invisible threat gets. You won't notice symptoms right away. There's no cough, no wheeze, no obvious irritation to warn you something's wrong. But inside your lungs, a much quieter breakdown is happening – one that impacts how your body defends itself, how it manages inflammation, and how it responds to everyday pathogens.

Over time, this silent overload of plastic waste builds up in your immune system and starts to affect organs far beyond your lungs. If you've been struggling with fatigue, strange inflammatory symptoms or issues that no one seems able to explain, microplastic exposure could be one piece of the puzzle. The latest research points to a disturbing reality: these plastic particles aren't just building up in your body; they're interfering with the very cells meant to protect you.

Tiny Plastics Shut Down Your Lung's Defense System Fast

A study presented at the 2025 American Thoracic Society International Conference, led by Adam Soloff of the University of Pittsburgh, explored what happens when you [breathe in microplastics](#) – tiny particles shed from synthetic clothing, packaging, and polluted air.¹

The research focused on pulmonary macrophages, a type of immune cell in your lungs that normally clears out bacteria, toxins, and dead tissue. These cells are essential to your respiratory health because they keep inflammation in check and protect you from infection.

- **Even short exposure causes major immune suppression** – The study exposed mice to microplastics through inhalation and also tested the effects of different particle sizes and concentrations on cultured macrophages in the lab. Within just 24 hours, the macrophages were no longer able to perform the basic function of surrounding and digesting harmful invaders.

According to Soloff, “I was really surprised to see that not only did the macrophages struggle to break down the plastics in vitro, but macrophages in the lung retained these particles over time as well.”²

- **The plastic didn't just stay in the lungs** – Researchers found that after inhalation, microplastic fragments migrated to other major organs. Trace levels of these particles showed up in the liver, spleen, colon, and even in the **brain** and kidneys. This means the plastics you breathe don't stay in your lungs. They spread through your entire body, increasing your risk of disease far beyond your respiratory system.
- **Plastic exposure caused lingering, not temporary, immune damage** – Macrophages didn't recover their function on their own. Instead, they held onto the plastic particles, which interfered with their normal job of clearing out cellular waste and infectious particles. When those functions are impaired, your risk of chronic inflammation rises sharply, and with it, the risk of tissue damage and cancer.

Your Immune System Holds Onto Microplastics, Spreading the Damage

When macrophages tried to process the **microplastic particles**, they failed to break them down. These particles aren't biodegradable, and the cells became overloaded and dysfunctional. The researchers were surprised by the degree of impairment. The longer the macrophages retained the plastics, the more their immune function declined.

- **Immune system's cleanup process disrupted by microplastics** – Phagocytosis is your immune system's cleanup process. It's how your cells grab, engulf, and digest harmful invaders. Disrupting this one action disables your ability to mount a defense against everyday threats like airborne bacteria, viruses, and pollutants. When this happens in your lungs, inflammation builds, pathogens linger and healing slows.

- **Systemic effects of microplastics could explain widespread inflammation** – The study revealed that the body not only fails to remove inhaled plastic but actually distributes it through the bloodstream to sensitive tissues. This helps explain rising rates of inflammatory diseases that don't always have a clear origin. Because plastic particles resist breakdown and removal, the damage accumulates over time.
- **Macrophages are central to maintaining lung health** – These immune cells act as environmental sensors, waste removers, and regulators of inflammation. Without their proper function, the lungs can't stay clean. This leads to persistent irritation, tissue damage and an increased risk of disease.
- **Researchers now aim to use this data to develop early warning tools** – The next step is to examine lung tissue from human patients to confirm the presence of plastic particles. The research team hopes to identify biomarkers to detect early signs of microplastic-induced lung damage and cancer risk. That way, people who are unknowingly exposed could be screened earlier and take proactive steps to protect their health.

Use an Air Filter and Ditch Plastic to Stop the Damage at Its Source

You're not powerless against airborne microplastics. Once you understand how they infiltrate your lungs and disrupt your immune system, the next step is to stop the exposure at its root. That means making small but strategic shifts in your environment, especially where you live, breathe, eat, and sleep.

Every move you make to limit contact with plastic particles helps lighten the burden on your lungs, immune system and every organ downstream. I've laid out five specific changes that target your biggest sources of exposure and give your body a better shot at protecting itself.

1. Upgrade your air filter so your lungs stop doing all the work — If you live near traffic, manufacturing, or even just wear synthetic clothes indoors, you're inhaling plastic fibers. Invest in a high-efficiency particulate air (HEPA) purifier that specifically filters microplastics and ultrafine dust.

Place it in your bedroom and main living space. These are the areas where you breathe the most. If you already have respiratory symptoms or chronic inflammation, this is one of the fastest ways to lower your internal plastic load.

2. Switch to a water filter that removes microplastics, and ditch plastic bottles for good — Drinking water, whether from the tap or in bottled form, is a constant source of microplastic ingestion. Choose a filter that's tested for microplastic removal, not just heavy metals and other contaminants. If you have hard water, boiling it first before filtering helps break down microplastic fragments and improves filtration.³ Use glass bottles for storage and drinking.

3. Stop heating food in plastic; it's contaminating every bite — Plastic wrap and takeout containers release microplastics and plastic chemicals directly into your meals when heated. If you're storing leftovers, skip the plastic containers and grab a glass or stainless-steel option instead. Microwaving or oven-heating in plastic is one of the worst offenders. If you use meal prep services, look for ones that use natural compostable or paper-based packaging.

4. Replace plastic kitchen tools with long-lasting alternatives — Your plastic cutting board, spatula, or soup ladle leaches plastic fragments into your food. Plastic boards degrade every time your knife scrapes across them. Switch to a wood or tempered glass cutting board, and replace any plastic utensils with stainless steel. If you cook daily, this one move eliminates thousands of microplastic particles each year from entering your body.

5. Balance estrogenic damage with natural progesterone if needed — Microplastics often mimic estrogen in your body. This disrupts your hormonal balance and increases inflammation. If you're struggling with symptoms like bloating, fatigue,

irritability, or stubborn belly fat, these may be signs of **estrogen dominance**. In these cases, natural progesterone helps restore balance. It acts as a countermeasure to the hormonal confusion that plastic exposure creates.

How to Use Progesterone

Before you consider using progesterone, it is important to understand that it is not a magic bullet, and that you get the most benefit by implementing a Bioenergetic diet approach that allows you to effectively burn glucose as your primary fuel without backing up electrons in your mitochondria that reduces your energy production. My book, "Your Guide to Cellular Health: Unlocking the Science of Longevity and Joy," covers this process in great detail.

Once you have dialed in your diet, an effective strategy that can help counteract estrogen excess is to take transmucosal progesterone (i.e., applied to your gums, not oral or transdermal), which is a natural estrogen antagonist. Progesterone is one of only three hormones I believe many adults can benefit from. (The other two are DHEA and pregnenolone.)

I do not recommend transdermal progesterone, as your skin expresses high levels of 5-alpha reductase enzyme, which causes a significant portion of the progesterone you're taking to be irreversibly converted primarily into allopregnanolone and cannot be converted back into progesterone.

Ideal Way to Administer Progesterone

Please note that when progesterone is used transmucosally on your gums as I advise, the FDA believes that somehow converts it into a drug and prohibits any company from advising that on its label. This is why companies promote their progesterone products as "topical."

However, please understand that it is perfectly legal for any physician to recommend an off-label indication for a drug to their patient. In this case, progesterone is a natural hormone and not a drug and is very safe even in high doses. This is unlike synthetic progesterone called progestins that are used by drug companies, but frequently, and incorrectly, referred.

Dr. Ray Peat has done the seminal work in progesterone and probably was the world's greatest expert on progesterone. He wrote his Ph.D. on estrogen in 1982 and spent most of his professional career documenting the need to counteract the dangers of excess estrogen with low-LA diets and transmucosal progesterone supplementation.

He determined that most solvents do not dissolve progesterone well and discovered that vitamin E is the best solvent to optimally provide progesterone in your tissue. Vitamin E also protects you against damage from LA. You just need to be very careful about which vitamin E you use as most supplemental vitamin E on the market is worse than worthless and will cause you harm not benefit.

It is imperative to avoid using any synthetic vitamin E (alpha tocopherol acetate – the acetate indicates that it's synthetic). Natural vitamin E will be labeled "d alpha tocopherol." This is the pure D isomer, which is what your body can use.

There are also other vitamin E isomers, and you want the complete spectrum of tocopherols and tocotrienols, specifically the beta, gamma, and delta types, in the effective D isomer. As an example of an ideal vitamin E, you can look at the label on our vitamin E in our store. You can use any brand that has a similar label.

You can purchase pharmaceutical grade bioidentical progesterone as Progesterone Powder, Bioidentical Micronized Powder, 10 grams for about \$40 on many online stores like Amazon. That is nearly a year's supply, depending on the dose you choose.

However, you will need to purchase some small stainless steel measuring spoons as you will need a 1/64 tsp, which is 25 mg and a 1/32 tsp, which is 50 mg. A normal dose is typically 25 to 50 mg and is taken 30 to 60 minutes before bed, as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

If you are a menstruating woman, you should take the progesterone during the luteal phase or the last half of your cycle, which can be determined by starting 10 days after the first day of your period and stopping the progesterone when your period starts.

If you are a male or non-menstruating woman, you can take the progesterone every day for four to six months and then cycle off for one week. The best time of day to take progesterone is 30 to 60 minutes before bed as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

This is what I have been personally doing for over a year with very good results. I am a physician so do not have any problems doing this. If you aren't a physician, you should consult one before using this therapy, as transmucosal progesterone therapy requires a doctor's prescription.

FAQs About Inhaled Microplastics

Q: What happens when I inhale microplastics?

A: When you breathe in microplastics, they weaken your lung's immune cells – specifically pulmonary macrophages – within just 24 hours. These cells normally clear out harmful bacteria and waste, but exposure to plastic particles shuts down that function.

Q: Do microplastics stay in my lungs or spread throughout my body?

A: Microplastics don't just affect your lungs. Once inhaled, they spread through your bloodstream and accumulate in other organs like your liver, spleen, colon, kidneys, and brain, where they contribute to inflammation and long-term health problems.

Q: Why is this dangerous to your health?

A: When macrophages can't remove toxins, your immune system gets overwhelmed. This leads to chronic inflammation, tissue damage and greater risk for conditions like lung disease, hormone imbalance and even cancer.

Q: How do microplastics end up in my body in the first place?

A: You're exposed to microplastics through more than just the food you eat or water you drink. They're in the air around you, especially if you live near heavy traffic, industrial zones, or wear synthetic fabrics indoors. These plastic particles break off from tires, clothing, packaging, and dust, then enter your lungs with every breath. Once inhaled, they travel through your bloodstream and settle in other organs, including your brain and liver.

Q: What steps can I take to protect myself from microplastics?

A: Lower your exposure by using HEPA air filters, drinking filtered water stored in glass, avoiding plastic containers for food storage and heating, replacing plastic utensils with stainless steel and using natural progesterone if you show signs of estrogen imbalance due to microplastics exposure.

Sources and References

- [1, 2 News Medical May 19, 2025](#)
- [3 Environmental Science & Technology Letters February 28, 2024](#)