circulate

Plasma Exchange Reduces Microplastic Burden in Human Blood

The first human trial to demonstrate clinically significant, measurable reduction of circulating micro- and nanoplastics through Therapeutic Plasma Exchange (TPE).

174
TPE procedures analyzed

114
human subjects enrolled

~60%
average microplastic reduction at highest burden levels

p<0.001
statistical significance

The Invisible Health Crisis

Microplastic particles (MPs) are everywhere — in the air we breathe, the water we drink, and the food we eat. Once inside the body, they accumulate in the lungs, heart, liver, brain, and endocrine organ. But instead of passing through, they stay.

Microplastics have been found in human blood, heart tissue, lung tissue, and even the brain. The science is increasingly clear: MP exposure is associated with cardiovascular disease, metabolic disorders, reproductive dysfunction, neurological damage, and systemic inflammation.

Until now, there has been no clinically validated method to remove them.

About the Study

Circulate Health researchers investigated whether Therapeutic Plasma Exchange (TPE) can reduce microplastics (MPs) in human blood.

We tested patients before and after TPE using the validated Plastictox assay.

With 174 procedures across 114 subjects, this represents the largest human dataset on plasma-based microplastics removal.

Starting Burden	Pre-TPE Mean	Post-TPE Mean	p-value
0–9 MP/100 µL	4.4	14.4 †	<0.001
10–19 MP/100 µL	13.8	11.7	0.062
20–29 MP/100 µL	23.6	16.1	0.040
≥ 30 MP/100 µL	**52.2**	**21.1**	**<0.001**

† At lower baseline levels, MNP introduced by apheresis tubing and blood-warming equipment partially offset the removal effect — a confounding variable the study identifies and addresses directly.

All TPE procedures were well-tolerated with no adverse effects reported.

*"In patients with the highest microplastic burden, **a single TPE session reduced circulating MNP by nearly 60%** — from a mean of 52.2 to 21.1 particles per 100 µL (p<0.001)."*

Why This Matters

This is the first published human study to demonstrate that microplastic burden can be measurably and significantly reduced through a clinical intervention. The implications reach far beyond this trial:

Chronic disease connection. Microplastic accumulation is increasingly linked to cardiovascular events, metabolic syndrome, immune dysregulation, and systemic inflammation — conditions that affect millions of people with no clear environmental intervention available.

No other proven removal method exists. Dietary changes and avoidance strategies have limits to their effectiveness. TPE via the Circulate protocol is now the only evidence-supported approach to actively lowering circulating MPs.

Population-level urgency. Microplastics have been detected in nearly every human tissue studied — blood, heart, lung, brain, and more.

What This Means for Patients

Before this study, there was no clinically significant way to remove circulating microplastics from the bloodstream. Now, TPE can help patients:

- Establish a **baseline microplastic level** through validated blood testing
- Undergo TPE to r**educe circulating microplastics**
- Track **measurable before-and-after results**
- Work with your provider on a **personalized, data-informed care plan**

What This Means for Providers

This study provides the first peer-reviewed, human-subject evidence base for offering TPE as a proactive intervention against microplastics burden with statistically significant outcomes and a well-characterized safety profile.

Circulate Health supports partner clinics with testing infrastructure, protocol guidance, patient education materials, and ongoing clinical data.

Why Circulate

The Science of Living Better, Longer

At Circulate, our mission is to bring advanced, evidence-based longevity care to patients seeking measurable, meaningful outcomes. This study reinforces our commitment to developing safe, clinically guided therapies designed to help you feel and function your best at every stage of life.

Our clinical research program focuses on generating meaningful human data—bringing the field closer to real-world outcomes in patients.

Learn more or find a Circulate partner clinic near you:

www.circulate.health

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