

## The Circulate Trial

# Reducing Biological Age with Therapeutic Plasma Exchange

*The first human study to show measurable reductions in biological age after plasma exchange.*

### A Breakthrough in Longevity Science

As we age, molecular changes in the blood can contribute to inflammation, immune decline, and slower recovery.

Therapeutic Plasma Exchange (TPE) — a well-established medical procedure that replaces plasma to help restore a healthier balance in circulation — has long been used to treat immune and metabolic conditions.

Circulate conducted the first clinical trial in humans to evaluate how TPE, with and without IVIG (intravenous immunoglobulin), may influence **biological age** and **immune system markers** associated with longevity.

The peer-reviewed study<sup>1</sup>, conducted over two years and featured in The New York Times, was carried out in collaboration with leading academic institutions and longevity experts.

### Researchers measured:



**38** biological age clocks (DNA methylation and aging markers)



**3,000+** immune and metabolic biomarkers



**Physical performance metrics** such as strength and balance

Group	Treatment	Duration
Group 1	TPE + IVIG twice a month	~3 months
Group 2	TPE twice a month	3 months
Group 3	TPE once a month	6 months
Control	No TPE or IVIG	—

<sup>1</sup> Aging Cell (2025). Study by Fuentealba et al., "Multi-omics analysis reveals biomarkers that contribute to biological age rejuvenation in response to therapeutic plasma exchange."



## KEY FINDINGS

### 1 Biological Age Decreased by an Average of 2.6 Years

Participants receiving TPE with IVIG showed the most significant biological age reduction — an average decrease of 2.6 years after just three sessions.<sup>1</sup>

All TPE groups demonstrated a measurable shift toward a younger biological profile.

### 2 Immune Health Indicators Improved

The study observed increases in beneficial immune cells (CD4 and CD8 naïve T cells) and decreases in inflammatory cells such as NK cells and monocytes — suggesting a more balanced, resilient immune system.

### 3 Cellular and Metabolic Markers Shifted Toward Youthful Patterns

TPE with IVIG led to favorable changes in molecular pathways related to inflammation, immune response, and cellular repair — all key factors in healthy aging.

### 4 Benefits Observed Across Health Levels

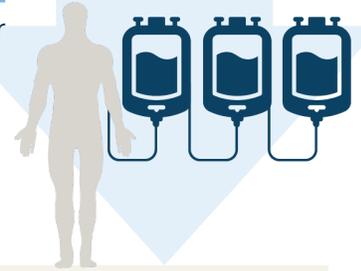
Both healthy participants and those with higher inflammatory or metabolic markers showed measurable improvements in biological age and physical performance indicators.

participants receiving TPE + IVIG showed an average

# 2.6-year reduction

in biological age after three sessions<sup>1</sup>

<sup>1</sup>Source: Aging Cell (2025). Study by Fuentealba et al., "Multi-omics analysis reveals biomarkers that contribute to biological age rejuvenation in response to therapeutic plasma exchange."



## What This Means

The Circulate Trial provides the first clinical evidence in humans that therapeutic plasma exchange particularly when combined with IVIG helps:

- ✓ Reduce markers of biological aging
- ✓ Support immune balance and resilience
- ✓ Promote healthier aging at the cellular level

While additional research is needed to assess long-term outcomes, these findings represent a major step forward in the scientific understanding of how therapeutic plasma exchange can influence longevity.

**LEARN MORE** Speak with your healthcare professional to discuss whether Therapeutic Plasma Exchange could be right for you.

Inquire today or schedule your treatment consultation to begin your personalized longevity plan.

## 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.

