



INSTITUTE FOR
HUMAN
OPTIMIZATION

PATIENT GUIDE

THERAPEUTIC PLASMA EXCHANGE

A Patient Guide

Established Medicine.
Emerging Longevity Science.

CONTENTS

What This Guide Covers

Read It Through, or Turn to What You Need.

The guide follows the questions patients ask, in the order they usually ask them: what plasma exchange is, what the science does and does not show, how we decide whether it suits you, and what the procedure involves.

- 03** Plasma Basics: What plasma is, and what plasma exchange does
- 04** Mechanism: Why TPE is a subtractive therapy
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PLASMA BASICS

Plasma: The Circulating Environment

More Than a Transport Fluid.

Blood is composed of cellular elements (red blood cells, white blood cells, and platelets) suspended within plasma.

Plasma is much more than a transport fluid. It is a dynamic biological environment containing proteins, antibodies, cytokines, hormones, metabolites, electrolytes, lipoproteins, coagulation factors, and signaling molecules that facilitate communication between tissues throughout the body.

Changes in this circulating molecular environment occur with disease and with aging.



KEY CONSTITUENTS OF PLASMA

Proteins

Albumin, immunoglobulins, complement

Antibodies

Immune regulation

Cytokines

Inflammation and signaling

Hormones

Endocrine communication

Metabolites

Cellular metabolism

Electrolytes

Fluid and acid-base balance

Lipoproteins

Lipid transport

Coagulation factors

Hemostasis

Signaling molecules

Intercellular communication

WHAT IS THERAPEUTIC PLASMA EXCHANGE?

Therapeutic Plasma Exchange (TPE) separates plasma from the cellular components of blood. A prescribed volume of plasma is removed, an appropriate replacement fluid is administered, and the patient's blood cells are returned to circulation.



TPE is a precisely controlled medical procedure performed under physician supervision.

MECHANISM

A Subtractive Therapy

Subtraction, Not Addition.

Therapeutic Plasma Exchange (TPE) is a subtractive therapy. It removes a prescribed volume of plasma from the blood and replaces it with a selected replacement fluid, while returning the patient's cellular blood components to circulation.

Unlike a medication that targets a single molecule, TPE can reduce circulating concentrations of a range of plasma components, including:

Autoantibodies

Pathogenic immune antibodies

Immune complexes

Antigen-antibody complexes

Abnormal proteins

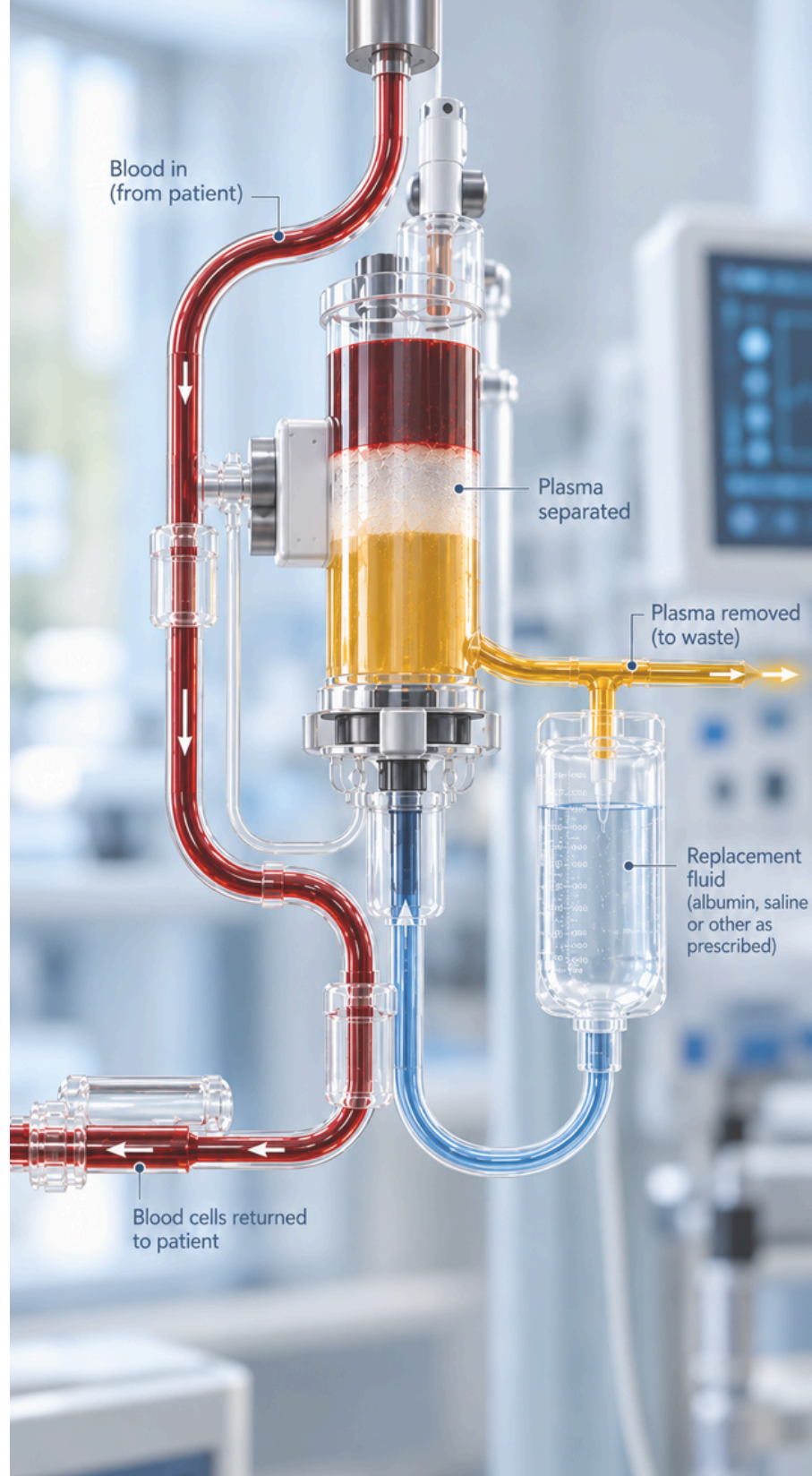
Misfolded or disease-related proteins

Inflammatory mediators

Cytokines, chemokines and other signaling molecules

Plasma-bound macromolecules

Proteins, lipoproteins and other circulating factors



TPE is not a cleanse or conventional detox.

It is an extracorporeal medical procedure that can alter physiologically important circulating proteins, electrolytes, coagulation factors, immunoglobulins, and signaling molecules.

The goal is not to remove “everything,” but to selectively modify the circulating plasma environment under physician guidance.

CLINICAL SCIENCE

Established Procedure. Emerging Application.

Two Important, Distinct Concepts.

Therapeutic Plasma Exchange (TPE) is not a new technology. It has been used for decades in conventional medicine for specific medical conditions. Its potential role in longevity and health optimization is an emerging area of investigation and is not an established indication.

At IFHO, these concepts are never treated as interchangeable.



ESTABLISHED MEDICINE

Incorporated Into Conventional Care

Therapeutic plasma exchange has been used for selected conditions in which removing or modifying circulating plasma constituents may alter a disease process, including:

Neurologic disorders

Hematologic disorders

Renal disorders

Autoimmune disorders

Other selected clinical conditions

The American Society for Apheresis (ASFA) publishes evidence-based guidance evaluating therapeutic apheresis across specific diseases and clinical indications.

EMERGING APPLICATION

Investigational in Longevity and Health Optimization

The use of TPE specifically for longevity, healthy aging, or performance optimization is not an established indication. It remains an evolving area of scientific investigation.

Preclinical and early clinical research suggests potentially relevant biological effects.

Current evidence is promising but not definitive.

Responses vary, and not all individuals will experience benefit.

Optimal protocols, patient selection, and long-term outcomes are not yet established.

At IFHO, TPE for longevity is approached with scientific rigor, individualized evaluation, physician oversight, and careful consideration of potential benefit, uncertainty, and risk.

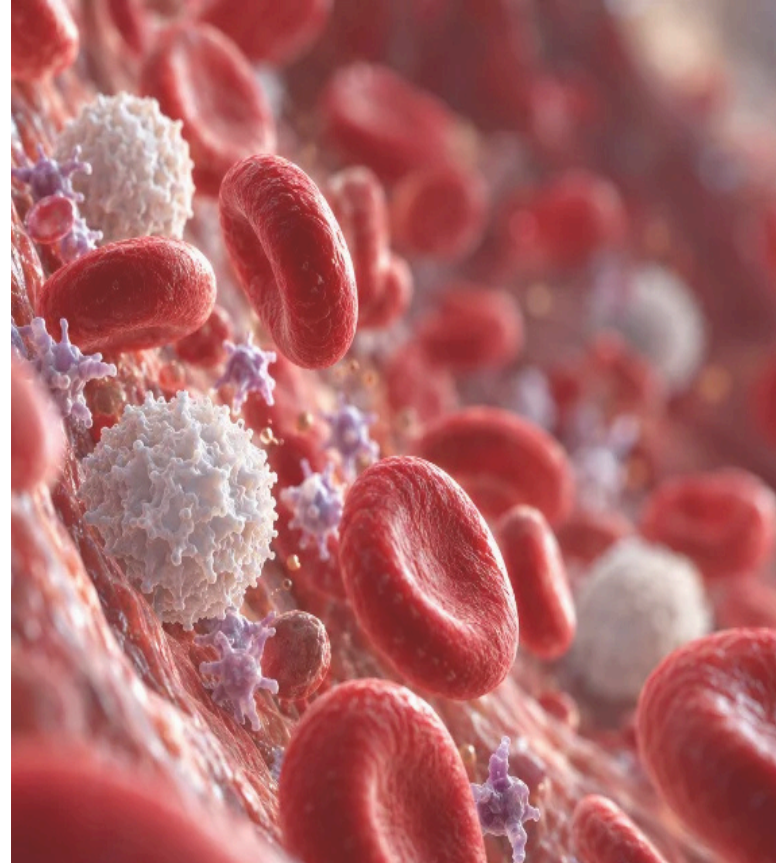
LONGEVITY BIOLOGY

Aging Is Cellular and Systemic.

Why the Circulating Environment Matters.

Aging is often described through changes occurring within cells, including genomic instability, epigenetic alterations, mitochondrial dysfunction, cellular senescence, impaired proteostasis, and other recognized hallmarks of aging.

But cells do not age in isolation. They exist within a systemic environment continuously exposed to circulating proteins, metabolites, hormones, inflammatory mediators, extracellular signals, and immune factors.



WITHIN CELLS

Key Biological Processes in Aging



- Genomic instability
- Epigenetic alterations
- Mitochondrial dysfunction
- Cellular senescence
- Impaired proteostasis
- Other recognized hallmarks of aging

IN THE CIRCULATION

A Dynamic Systemic Environment



Proteins	Electrolytes
Antibodies	Lipoproteins
Cytokines	Coagulation factors
Hormones	Signaling molecules
Metabolites	Immune factors

AN IMPORTANT SCIENTIFIC QUESTION

To what extent does the circulating environment influence the behavior of aging tissues?

Experimental work has suggested that age-associated changes in circulating factors may influence regenerative signaling and tissue function. These observations established the scientific rationale for studying plasma modification in aging biology.

EMERGING SCIENCE

The Hypothesis Has Evolved.

From Young Blood to Plasma Dilution.

Over the past two decades, experimental and early clinical research has explored how factors in the circulating environment may influence aging biology. This work has evolved from early “young blood” studies to more refined approaches such as plasma dilution and plasma exchange.



01

Young Circulation Hypothesis

Early animal studies suggested that factors in younger circulation could influence the function of older tissues.

02

Plasma Dilution Hypothesis

Subsequent research introduced the concept that dilution or removal of age-associated factors, rather than direct addition of young factors, may be beneficial.

03

Human Biomarker Research

More recent studies have evaluated changes in proteins, inflammatory markers, metabolic pathways, immune signaling, and biological-age estimates following plasma exchange in humans.

WHAT HAS BEEN STUDIED?

Proteomics

Changes in circulating proteins

Inflammation

Markers of immune and inflammatory activity

Metabolism

Metabolic signatures and nutrient sensing

Immune signaling

Immunoglobulins, cytokines, and related factors

Biological age

Epigenetic clocks and proteomic age estimates

Promising does not mean proven.

While early results are intriguing, they do not establish that TPE slows aging, extends lifespan, or improves healthspan.

EVIDENCE

The Evidence Is Emerging, and Not Uniform.

What the Research Shows Today.

A growing body of experimental and early clinical research has examined the effects of plasma exchange, plasma dilution, and related approaches on biomarkers of aging and health.

However, study designs, populations, and outcomes vary considerably, and the results are not uniform.



KEY AREAS OF VARIABILITY

STUDY POPULATION

DIFFERENT STUDIES. DIFFERENT APPROACHES.

Age, health status, and clinical characteristics differ across studies, including healthy volunteers and individuals with specific conditions.

PROTOCOL

Exchange volumes, treatment designs, and the number of sessions vary widely.

REPLACEMENT STRATEGY

Replacement fluids (e.g., albumin, saline, or other solutions) differ between studies.

FREQUENCY

Treatment schedules range from single sessions to multiple sessions over time.

BIOMARKERS

Different endpoints are used, including proteins, inflammation markers, metabolic signatures, epigenetic measures, and biological-age estimates.

OUTCOMES

Results are not uniform, and long-term clinical outcomes remain unknown.

AN IMPORTANT PERSPECTIVE

A biomarker change is not synonymous with clinical rejuvenation.

Changes in laboratory or biological-age measures do not necessarily translate into improved function, reduced disease risk, or longer lifespan.

WHERE THINGS STAND

There is currently no scientifically established universal longevity TPE protocol.

Additional well-designed, controlled human studies are needed to determine optimal patient selection, protocols, and long-term outcomes.

PRECISION BEFORE INTERVENTION

The IFHO Approach

A Personalized, Evidence-Informed Process.

TPE is not approached as a standardized anti-aging treatment. Our process is designed to determine whether TPE is appropriate for you, how it can be performed as safely as possible, and how to measure your response over time.

Every individual is different. The same intervention may carry different potential benefits and risks depending on your health status, goals, and clinical context.



OUR SIX-STEP APPROACH

INDIVIDUALIZED CARE. MEASURABLE PROGRESS.

01

ASSESS

A Comprehensive Evaluation

- Medical history
- Medications
- Laboratory data
- Vascular access
- Health objectives
- Risk factors

02

STRATIFY

Weigh Potential Benefit and Risk

- Clinical rationale
- Potential benefit
- Procedural risk
- Appropriateness

03

CONSENT

Decide With Full Information

- Benefits discussed
- Risks reviewed
- Uncertainties stated
- Alternatives offered
- Written consent

04

PERSONALIZE

Tailor the Treatment Plan

- Treatment parameters
- Exchange volume
- Replacement strategy
- Supportive care

05

MEASURE

Track Your Response

- Clinical parameters
- Laboratory response
- Biomarkers
- Tolerance

06

RE-EVALUATE

Ongoing Clinical Decision-Making

- Response
- Tolerance
- Emerging evidence
- Refinement of plan

OUR PHILOSOPHY

Data Guides Better Decisions.

We integrate clinical evaluation, advanced diagnostics, and evolving scientific evidence to make personalized recommendations. Our goal is to move beyond assumptions and toward data-informed, individualized care.

A COMMITMENT TO YOU

Thoughtful. Transparent. Patient-Centered.

We will always discuss the potential benefits, uncertainties, and risks, so you can make an informed decision that aligns with your goals.

YOUR PROCEDURE

Your TPE Experience

A Safe, Monitored, and Personalized Process.

Therapeutic plasma exchange is performed in a controlled clinical setting by an experienced team. The procedure typically takes two to four hours, depending on the prescribed exchange volume and individual factors.

Your safety, comfort, and understanding are our priorities. Your clinical team will explain each step and monitor you throughout the entire process.



THE TPE PROCESS

01

ACCESS

Blood is drawn from your body through vascular access.

02

SEPARATION

Plasma is separated from cellular components using a medical device.

03

EXCHANGE

A prescribed volume of plasma is removed from the circulation.

04

REPLACEMENT

Replacement fluid is administered as prescribed.

05

RETURN & MONITOR

Your cellular blood components are returned and you are monitored.

A STEP-BY-STEP OVERVIEW

BEFORE YOUR APPOINTMENT

How to Prepare

- Follow the individualized instructions from your care team
- Arrive well hydrated unless otherwise instructed
- Eat according to your provider's recommendations
- Provide a complete list of medications and supplements
- Inform us of any new illness or health changes
- Wear comfortable clothing that allows easy access to your vascular access site

DURING TREATMENT

What to Expect

- Duration** Typically two to four hours, depending on the prescribed exchange volume and individual factors.
- Monitoring** Your clinical team will monitor your vital signs and overall well-being throughout the procedure.
- Sensations** Some people feel cold, mildly nauseated, or notice tingling around the lips, hands, or feet. Tell your team if you do.
- Questions** Your team will explain each step and is available to answer your questions at any time.

SAFETY & PERSPECTIVE

TPE Is a Medical Procedure, Not a Benign Wellness Treatment.

Informed Decisions, Made Together.

Therapeutic plasma exchange is an established medical procedure with a well-characterized safety profile. While many people tolerate the procedure well, it is not without risks and is not a cosmetic or wellness treatment.

At IFHO, we believe in transparency. Understanding the potential benefits, limitations, and risks allows you to make an informed decision that aligns with your health goals.



POTENTIAL RISKS

Most side effects are temporary and manageable.

- Citrate-related hypocalcemia, felt as tingling or muscle cramping
- Blood pressure changes, including lightheadedness
- Vascular access complications: bruising, bleeding, or infection
- Allergic reactions to replacement fluids
- Electrolyte disturbances
- Changes in coagulation factors and immunoglobulins
- Altered levels of protein-bound medications, which may require changes to dose timing
- Bleeding or clotting complications
- Anemia
- Infection (rare)
- Other rare but serious complications

Your clinical team will review your individual risk factors and take steps to minimize risks.

IMPORTANT PERSPECTIVE

The procedure itself is established. Its application to human longevity is emerging.

Biomarker and biological-age changes are research endpoints and should not be interpreted as proof of rejuvenation, increased lifespan, or improved healthspan.

AFTER YOUR EXCHANGE

What to Expect

Many people feel well immediately after the procedure. Others may experience temporary symptoms such as fatigue, lightheadedness, or mild weakness.

Follow Your Personalized Guidance

After your exchange, your care team will provide individualized recommendations regarding:

- Hydration and nutrition
- Activity and exercise
- Medications and supplements
- Vascular access care, if applicable
- Laboratory follow-up
- When to contact your care team

ADVANCED MEDICINE. APPLIED WITH
PRECISION.

At IFHO, uncertainty is not something to hide. It is something to measure.

We are committed to evidence, individualized care, and responsible application of emerging science so you can make the best decision for your health.

This guide is educational and does not constitute a guarantee of benefit or replace individualized medical evaluation, informed consent, or medical advice. Full scientific references appear on page 14.

BEFORE YOU DECIDE

Your Decision

Candidacy, Alternatives, and How to Reach Us.

Because TPE for longevity is an investigational application rather than an established indication, the decision to proceed is always yours, made after individual evaluation and discussion with your physician.

CHOOSING NOT TO PROCEED

Declining Is Always an Option.

Longevity TPE is elective. Choosing not to undergo the procedure, or deciding to wait for further evidence, is a reasonable choice and will not affect the rest of your care at IFHO.

You may also stop treatment at any point, including between sessions, without giving a reason.

ALTERNATIVES TO CONSIDER

Other Paths to the Same Goals.

Evidence-based preventive medicine: exercise and fitness, body composition, sleep, nutrition, blood pressure, lipids, and glucose regulation

Targeted medical treatment of any diagnosed condition

Continued biomarker monitoring without intervention

Participation in a registered clinical trial, where one is available and appropriate

WHEN TPE MAY NOT BE APPROPRIATE

ASSESSED INDIVIDUALLY

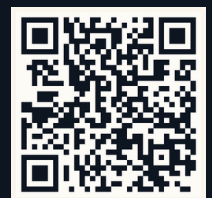
Certain circumstances make plasma exchange unsafe or inadvisable, either permanently or until they are addressed. Your physician will evaluate these during assessment. They may include:

- Hemodynamic instability or unstable cardiovascular disease
- Significant bleeding risk or a coagulation disorder
- Inadequate or unsafe vascular access
- Pregnancy, which requires specialist evaluation
- Active infection or sepsis
- Known reaction to albumin, plasma products, or the anticoagulant used
- Uncorrected electrolyte abnormality, including low calcium
- Any condition your physician judges to outweigh potential benefit

QUESTIONS ARE WELCOME

Ask us anything before you decide, including about cost. Longevity TPE is elective and is typically not covered by insurance.

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KEY TERMS

Understanding the Science

The Language of Plasma Exchange.

Apheresis Blood is temporarily removed from circulation and separated into components, so selected components can be removed, exchanged, or returned.

Biological age An estimate of biological state from molecular, physiologic, or clinical measurements. Distinct from chronological age.

Cellular senescence Cells stop dividing but stay metabolically active, still influencing surrounding tissue through signaling molecules.

Citrate An anticoagulant used during apheresis to prevent clotting in the circuit. It binds calcium and may transiently reduce ionized calcium.

Cytokines Signaling proteins that carry messages between cells, especially in immune and inflammatory pathways.

Epigenetics Molecular mechanisms that influence gene activity without changing the underlying DNA sequence.

Epigenetic clock A model using patterns such as DNA methylation to estimate aspects of biological aging.

Extracorporeal Outside the body. In TPE, blood circulates through a device before returning to the patient.

Healthspan The period of life spent in good health and functional capacity, distinct from total lifespan.

Immunoglobulins Antibodies produced by the immune system that circulate within plasma.

Ionized calcium The active fraction of calcium in blood. It may dip temporarily during plasma exchange because of citrate.

Plasma The liquid part of blood, carrying proteins, electrolytes, antibodies, hormones, metabolites, coagulation factors, and signaling molecules.

Plasma dilution A research concept: reducing the concentration of age-associated circulating factors rather than adding youthful ones.

Proteomics The large-scale study of proteins: their abundance, interactions, modifications, and changes across biological states.

Replacement fluid Fluid given during TPE to replace the plasma volume removed. Composition is selected by clinical context and protocol.

Therapeutic Plasma Exchange (TPE) An apheresis procedure: plasma is separated and removed, replacement fluid is given, and blood cells are returned to circulation.

REFERENCES

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