

METABOLIC HEALTH: THE FOUNDATION OF HEALTH AND LONGEVITY PART 3 — [RESTORING METABOLIC HEALTH: A PRACTICAL ROADMAP](#)

Your Weekly Newsletter

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Welcome to the final installment of our series on metabolic health—one of the greatest health challenges facing not only the United States, but the entire world.

In Parts 1 and 2, we explored the metabolic health continuum: the gradual progression from optimal metabolic health to mild metabolic dysregulation, insulin resistance, metabolic syndrome, advanced metabolic disease, and ultimately type 2 diabetes and its complications.

This progression is occurring across societies worldwide, particularly as populations increasingly adopt the highly processed, carbohydrate-heavy Western diet that has become so commonplace in the United States.

THE METABOLIC HEALTH CONTINUUM

From Optimal Health to Diabetes



The consequences extend far beyond blood sugar and body weight. Poor metabolic health can affect nearly every organ system and contribute to cardiovascular disease, fatty liver disease, chronic kidney disease, hormonal dysfunction, cognitive decline, chronic inflammation, impaired immune function, loss of muscle, accelerated biological aging, and several forms of cancer.

The full impact would be far too extensive to cover in a single newsletter, but the following figure illustrates just how broadly metabolic dysfunction can influence health, quality of life, and longevity.



In Parts 1 and 2, we introduced Patient X, a real patient at **Ageless Solutions** who recognized that he was moving in the wrong direction along the metabolic health continuum—and was determined to change his trajectory.

We evaluated his personal and family history, lifestyle, body composition, medications, symptoms, and advanced metabolic biomarkers. With the biomarker data and personal history, we initiated a comprehensive metabolic health plan:

Ageless Solutions Customized Metabolic Intervention

Focus	Intervention	Primary Goal
Nutrition	Low-glycemic, anti-inflammatory diet with <50 g carbohydrate/day; emphasize lean protein, healthy fats, leafy greens, and other non-starchy vegetables; eliminate refined carbohydrates and ultra-processed foods.	- reduce glucose and insulin demand - improve satiety - reduce inflammation - improve body composition
Resistance Training	Weight training 2–3 times weekly with adequate protein and amino-acid support.	- preserve/build muscle - increase insulin-mediated glucose disposal
Aerobic Exercise	Walk daily, gradually progressing toward Zone 2 training.	<u>Improve:</u> - cardiovascular fitness - mitochondrial function - insulin sensitivity - metabolic flexibility
Glucose Monitoring	Begin FreeStyle Libre continuous glucose monitoring and track responses to meals, exercise, and treatment.	- identify glucose patterns - guide dietary and treatment adjustments
Medication	GLP-2: Tirzepatide 7.5 mg subcutaneously weekly.	- improve glycemic control - enhance weight loss - regulate appetite - reduce cardiometabolic risk
Hormone Therapy	Testosterone 80 mg IM weekly, with laboratory and clinical monitoring.	- correct androgen deficiency support muscle mass - increase strength - enhance libido - improve body composition and well-being

Focus	Intervention	Primary Goal
Nutraceutical Support	Individualized supplement program summarized below.	- correct deficiencies - support glucose regulation - improve cardiovascular health - build muscle - optimize cellular energy
Cardiovascular Assessment	Obtain a coronary artery calcium CT scan; consider cardiology referral if significant coronary disease is identified.	- detect subclinical atherosclerosis - reduce cardiovascular risk
Blood Pressure	Check blood pressure morning and evening every other day.	reduce blood pressure medication requirements
Follow-Up	Repeat fasting labs after 90 days: CMP, glucose, HbA1c, glycated serum protein, insulin, hs-CRP, testosterone panel, and IGF-1.	- measure response - guide the next phase of treatment

Patient X Nutraceutical Support

Supplement Group	Intended Support
PhytoMulti- Multi-Vitamin Vitamin D3/K2 OptiMag- Magnesium supplement	- address nutritional gaps - support vitamin D status - glucose metabolism - bone health - blood pressure - cellular function/mitochondrial health
OmegaGenics- Omega-3 supplement	- increase omega-3 status - support triglyceride control - cardiovascular health - anti-inflammatory support
Berberine Alpha-Lipoic Acid	- supports glucose utilization - Increase insulin sensitivity - improve mitochondrial function - boost antioxidant defenses

Supplement Group	Intended Support
• Prime Strength- creatine, glutamine, peptides, leucine, taurine • Amino Complex- all 9 essential amino acids + leucine, isoleucine, valine • Glycine- amino acid	• support lean-muscle preservation • expedite recovery from exercise or injury • glutathione production • glucose disposal • collagen synthesis • liver detoxification • nervous system support for relaxation and sleep
• CoQ10	• support mitochondrial energy production • boost antioxidant defenses • reduce triglycerides • lower blood pressure • supports endothelial and cardiovascular function
• Pregnenolone • DHEA	Individualized hormonal support for endogenous Testosterone production
• Methylated B12/folate	• support methylation • red blood cell production • neurologic health • homocysteine metabolism • cellular energy

It has now been 90 days.

Let's see what happened.

Patient X: Initial vs. 90-Day Laboratory Results

Side-by-side laboratory comparison with absolute changes and a concise summary of the most notable 90-day findings.

Category	Laboratory test	Initial result	90-day result	Change
Nutrition	Vitamin D, 25-OH <i>Reference: 30–100 ng/mL</i>	34.3 ng/mL	60.3 ng/mL	↑ 26.0 ng/mL
Glycemic control	Glucose <i>Reference: 70–99 mg/dL (fasting)</i>	315 mg/dL	116 mg/dL	↓ 199 mg/dL
Glycemic control	Hemoglobin A1c <i>Reference: 4.0–5.6%</i>	14.8%	7.0%	↓ 7.8 percentage points
Glycemic control	Glycated serum protein <i>Reference: 200–285 μmol/L</i>	720 μmol/L	291 μmol/L	↓ 429 μmol/L
Insulin resistance	Insulin <i>Reference: 2.6–24.9 μU/mL (fasting)</i>	10.6 μU/mL	10.2 μU/mL	↓ 0.4 μU/mL
Cardiovascular	HDL cholesterol, direct <i>Reference: ≥40 mg/dL (adult male)</i>	32.8 mg/dL	48.3 mg/dL	↑ 15.5 mg/dL
Cardiovascular	Apolipoprotein B <i>Reference: <90 mg/dL (desirable)</i>	101 mg/dL	73 mg/dL	↓ 28 mg/dL
Cardiovascular	Lipoprotein(a) <i>Reference: <30 mg/dL</i>	43.9 mg/dL	41.2 mg/dL	↓ 2.7 mg/dL
Inflammation	Homocysteine <i>Reference: 5–15 μmol/L</i>	9.9 μmol/L	10.9 μmol/L	↑ 1.0 μmol/L
Inflammation	High-sensitivity CRP <i>Reference: <3.0 mg/L (lower CV risk <1.0)</i>	1.5 mg/L	0.5 mg/L	↓ 1.0 mg/L
Inflammation	Ferritin <i>Reference: 30–400 ng/mL (adult male)</i>	252 ng/mL	45 ng/mL	↓ 207 ng/mL (82% reduction)
Metabolic panel	Sodium <i>Reference: 135–145 mmol/L</i>	134.1 mmol/L	141 mmol/L	↑ 6.9 mmol/L
Metabolic panel	Chloride <i>Reference: 98–107 mmol/L</i>	93.2 mmol/L	104 mmol/L	↑ 10.8 mmol/L
Thyroid	Reverse T3 <i>Reference: 9.2–24.1 ng/dL</i>	39.5 ng/dL	17 ng/dL	↓ 22.5 ng/dL
Hormonal	SHBG <i>Reference: 19.3–76.4 nmol/L (adult male)</i>	102.0 nmol/L	95.5 nmol/L	↓ 6.5 nmol/L
Hormonal	Pregnenolone <i>Reference: 0.22–2.37 ng/mL</i>	0.20 ng/mL	1.77 ng/mL	↑ 1.57 ng/mL
Hormonal	Testosterone, total <i>Reference: 264–916 ng/dL (adult male)</i>	688.0 ng/dL	705.0 ng/dL	↑ 17 ng/dL
Hormonal	Free testosterone <i>Reference: 3.67–13.9 ng/dL (male, 60–69 yr)</i>	6.33 ng/dL	9.27 ng/dL	↑ 2.94 ng/dL
Growth / metabolic	IGF-1 <i>Reference: 33–220 ng/mL (age 61–65 yr)</i>	58.9 ng/mL	114 ng/mL	↑ 55.1 ng/mL
CBC	RDW-SD <i>Reference: 37–54 fL</i>	45.0 fL	48.5 fL	↑ 3.5 fL
Adipokine	Leptin <i>Reference: 0.5–12.5 ng/mL (adult male)</i>	19.2 ng/mL	12.7 ng/mL	↓ 6.5 ng/mL
Fatty acids	Omega-3 Index <i>Reference: ≥5.5% (low-risk target)</i>	4.11%	6.7%	↑ 2.59 percentage points

• Improvements by Category:

1. Nutrition

- **Vitamin D, 25-OH:** Adequate levels support calcium absorption, bone strength, and muscle function.
- **Ageless Solutions** target level: **60 to 100 ng/mL**

2. Glycemic control

- **Fasting glucose:** Improvement reduces glucotoxicity, dehydration, infection risk, impaired healing, and long-term damage to the kidneys, eyes, nerves, and cardiovascular system.
- **Hemoglobin A1c:** A lower A1c reflects reduced average glucose exposure over approximately three months and lowers the risk of diabetic microvascular complications.
- **Glycated serum protein:** Improvement reflects better glucose control over the preceding 2–3 weeks and can identify progress sooner than A1c.

3. Insulin resistance

- **Fasting insulin:** Lower insulin accompanied by improved glucose suggests reduced hyperinsulinemia and better metabolic efficiency. Low insulin with high glucose may instead indicate pancreatic dysfunction.

4. Cardiovascular health

- **HDL cholesterol:** A higher HDL lowers risk of heart attack and stroke & improves insulin sensitivity.
- **Apolipoprotein B:** Lower ApoB means fewer artery-penetrating lipoprotein particles and directly translates into lower cumulative risk of atherosclerosis, heart attack, and stroke.
- **Lipoprotein(a):** Lower Lp(a) may reduce inherited cardiovascular risk.

5. Inflammation

- **Homocysteine:** Normalization may indicate improved B-vitamin status and methylation while reducing a bio-marker associated with endothelial dysfunction, thrombotic risk, and cognitive risk.
- **High-sensitivity CRP:** A sustained reduction suggests lower systemic and vascular inflammation and reduced residual cardiovascular risk.
- **Ferritin:** When initially elevated from inflammation, fatty liver, or metabolic dysfunction, normalization suggests improved inflammatory and hepatic health.

6. Metabolic panel

- **Sodium:** Normalization supports fluid balance, brain function, and neuromuscular activity and can occur as severe hyperglycemia and dehydration resolve.
- **Chloride:** Normalization supports hydration, electrolyte balance, and acid–base regulation and can occur as severe hyperglycemia and dehydration resolve.

7. Thyroid

- **Reverse T3:** A decline to normal range suggests recovery from illness, inflammation, excessive emotional stress, and uncontrolled diabetes.

8. Hormonal health

- **SHBG:** Lower SHBG allows more active “Free” Testosterone for Androgen Optimization.
- **Pregnenolone:** A normal/higher value indicates adequate steroid-hormone precursor availability.
- **Total testosterone:** Correcting a deficiency improves libido, muscle mass, bone density, anemia, and energy. More importantly is the increase in the % of Total Testosterone available as “Free” Testosterone.
- **Free testosterone:** An appropriate free testosterone level supports sexual function, muscle, and bone health.

9. Growth and metabolism

- **IGF-1:** Moving a low level into the age-appropriate range reflects improved nutrition and anabolic signaling that support muscle and bone health. IGF-1 is a measure of endogenous Growth Hormone production.

10. Complete blood count

- **RDW-SD:** Normalization indicates more uniform red-cell size and may reflect improved iron, vitamin B12, folate, and reduced systemic inflammation.

11. Adipokine health

- **Leptin:** In an obese patient, lower leptin usually reflects reduced fat mass and improved leptin sensitivity, better appetite regulation, reduced inflammation, and improved insulin sensitivity.

12. Fatty-acid status

- **Omega-3 Index:** A higher level indicates greater EPA and DHA incorporation into cell membranes and is associated with better cardiovascular health.

Estimated 10-year Cardiovascular Risk Reduction for Patient X (American Heart Association *PREVENT*™ cardiovascular risk calculator)

Patient X <i>PREVENT</i> outcome	Before treatment	After 90 days	Absolute reduction	Relative reduction
Total cardiovascular disease	31.8%	11.3%	↓ 20.5 points	64% lower
ASCVD: heart attack or stroke	17.3%	5.8%	↓ 11.5 points	66% lower
Heart-failure hospitalization	36.4%	8.7%	↓ 27.7 points	76% lower

- These risk calculations are estimates—not guarantees—but they demonstrate how profoundly improving glucose control, blood pressure, body weight, and HDL cholesterol can alter a patient's projected health trajectory.
- Data was derived from **6,612,004 U.S. adults aged 30–79 without known cardiovascular disease**. About **3.28 million people across 25 datasets** were used to derive the equations, and another **3.33 million across 21 separate datasets** were used for external validation.
- 2023 Nov 10;149(6):430–449. doi: [10.1161/CIRCULATIONAHA.123.067626](https://doi.org/10.1161/CIRCULATIONAHA.123.067626)

RESTORING METABOLIC HEALTH: IT CAN START IN 90 DAYS

Could a lifelong trajectory toward metabolic dysfunction and type 2 diabetes truly begin to change in only 90 days?

Yes.

Ninety days cannot erase decades of metabolic risk, but it can produce meaningful improvements in **blood sugar, insulin sensitivity, weight, blood pressure, inflammation, cardiovascular risk factors, energy, strength, and overall well-being.**

Patient X's transformation did not come from a single medication, supplement, or diet. It came from identifying the major drivers of his metabolic dysfunction and addressing them **together.**

THE SEVEN PILLARS OF METABOLIC RESTORATION

1. **Diet** — A low-glycemic, anti-inflammatory diet emphasizing protein, healthy fats, vegetables, and minimally processed foods helped stabilize glucose, improve satiety, reduce visceral fat, and preserve muscle.
2. **Exercise** — Resistance training, walking, and Zone 2 exercise helped build muscle—one of the body's largest sites for glucose disposal—while improving insulin sensitivity and cardiovascular fitness.
3. **Sleep** — Improving sleep and addressing factors such as sleep apnea supported glucose regulation, appetite control, recovery, and hormonal health.
4. **Stress** — Practical stress-management strategies helped reduce the metabolic consequences of chronic stress and improve recovery.
5. **Nutraceuticals** — Targeted supplementation corrected deficiencies and supported glucose regulation, mitochondrial function, cardiovascular health, and muscle preservation.
6. **Pharmaceuticals** — Carefully selected medications were used strategically to improve glycemic control, promote fat loss, and reduce cardiometabolic risk—not as a substitute for lifestyle change, but as part of it.
7. **Determination** — Ultimately, Patient X had to implement the plan. Information and medical guidance matter, but **consistency turns a treatment plan into results.**

Patient X's 90-day improvement was neither magic nor an accident. It was the biological response to a **coordinated, personalized plan implemented consistently and guided by measurable data.**

His story demonstrates an encouraging truth: **your metabolic trajectory is not necessarily fixed.**

The earlier metabolic dysfunction is identified and addressed, the greater the opportunity to prevent disease and extend both lifespan and health span.

Fact: Based on U.S. population health statistics, more than 9,200 of this newsletter's 10,000-plus readers likely fall somewhere along the continuum of

metabolic dysfunction. This is not someone else's problem—it affects nearly all of us.

SPECIAL PROMO!

FREE Metabolic Test:

**Get your fasting insulin and HbA1c levels
checked at Ageless Solutions.**

OR

**20% OFF Wolverine Peptide Treatment for
Accelerating Recovery and Reducing
Inflammation**

Expires 9/15/26.

Call to Book!

STAY TUNED!

**Be on the lookout for next week's newsletter:
*"More Than a Cosmetic Procedure: How Breast
Reduction Surgery Improves Daily Life."***



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