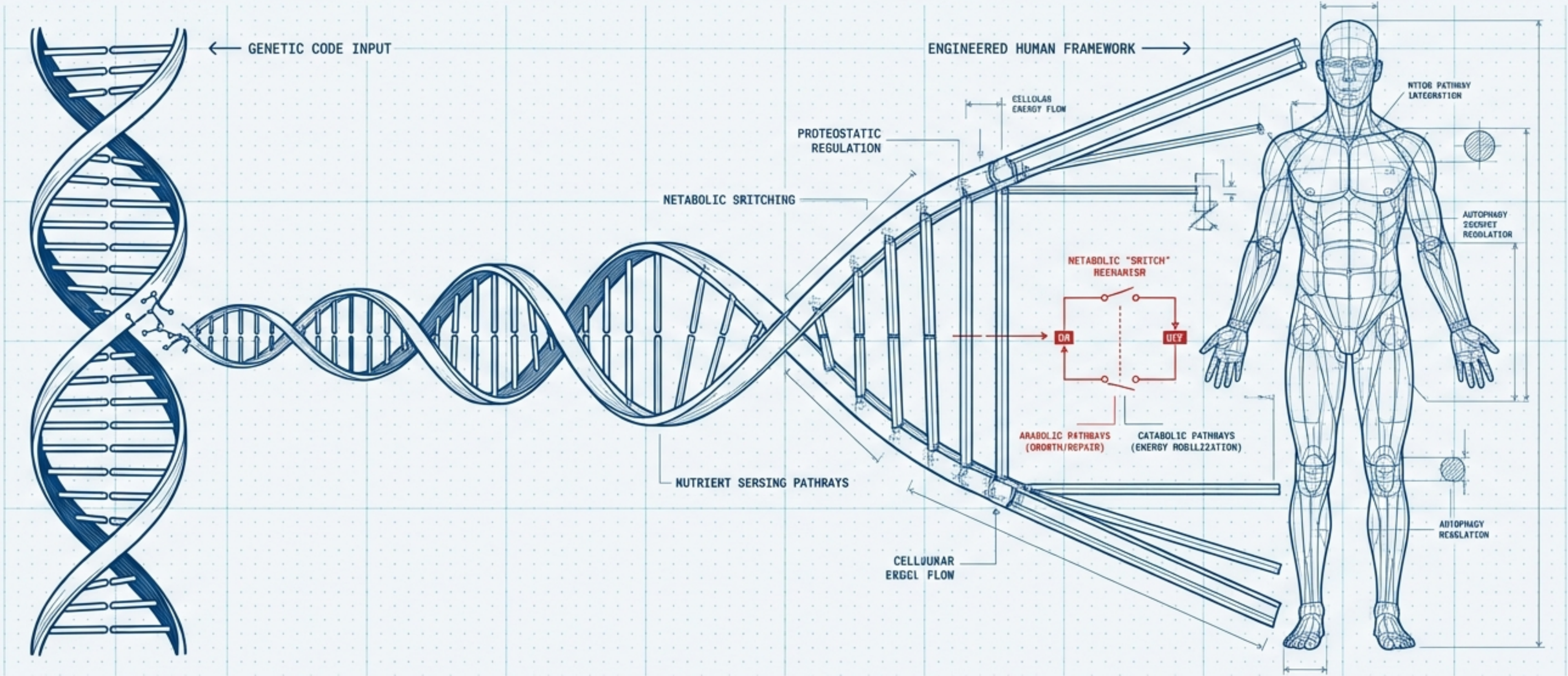
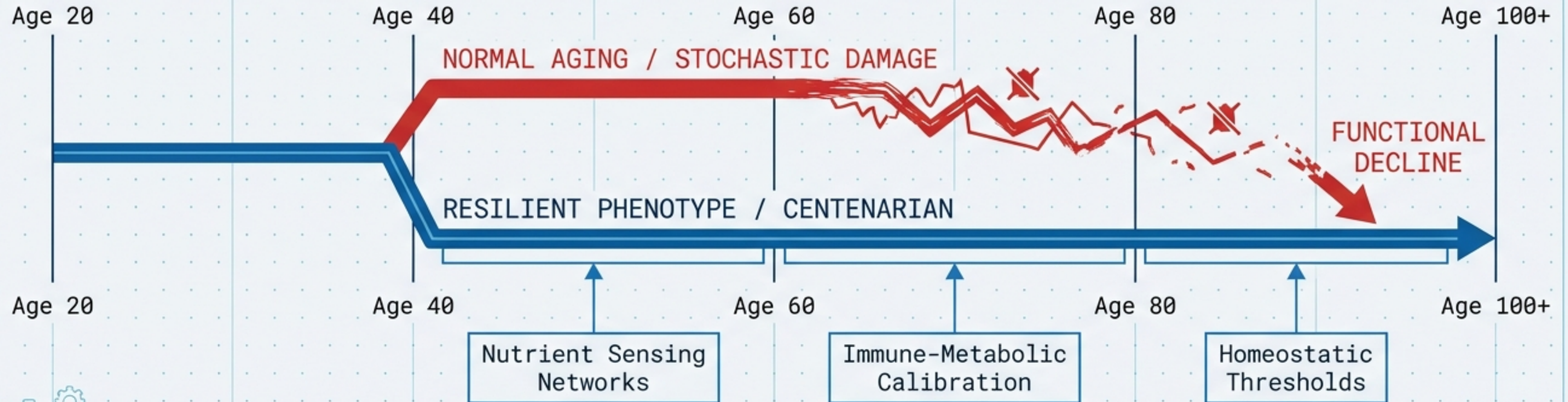


# The Nutritional Architecture of Longevity

## Nutrient Sensing, Proteostasis, and the Metabolic “Switch” in Human Aging



# AGING IS NOT RANDOM DECAY; IT IS A REGULATED PROGRESSION



AGING IS GOVERNED BY A "SWITCHBOARD" OF NUTRIENT-SENSING NETWORKS. THE GOAL OF PRECISION GERONUTRITION IS MANAGING THE CONFLICT BETWEEN **ANABOLIC GROWTH (YOUTH)** AND **PROTEOSTATIC MAINTENANCE (AGE)**.

# THE MASTER SWITCHBOARD: mTOR INTEGRATION

Energy Status

Growth Factors

Amino Acids



**HYPERACTIVE  
IN LATE LIFE**

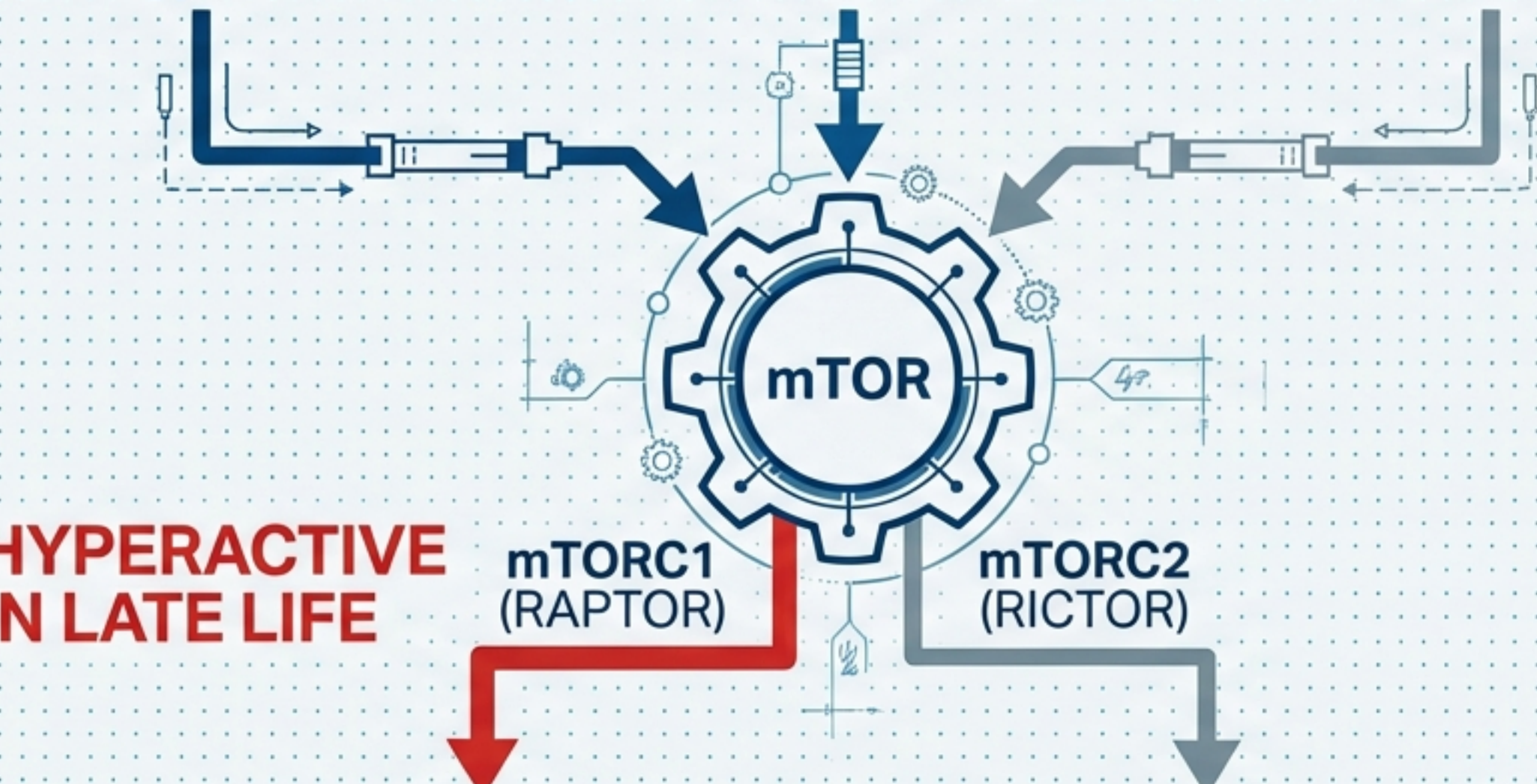
mTORC1  
(RAPTOR)

mTORC2  
(RICTOR)

**GROWTH:**  
Protein Synthesis  
(S6K1 & 4E-BP1)

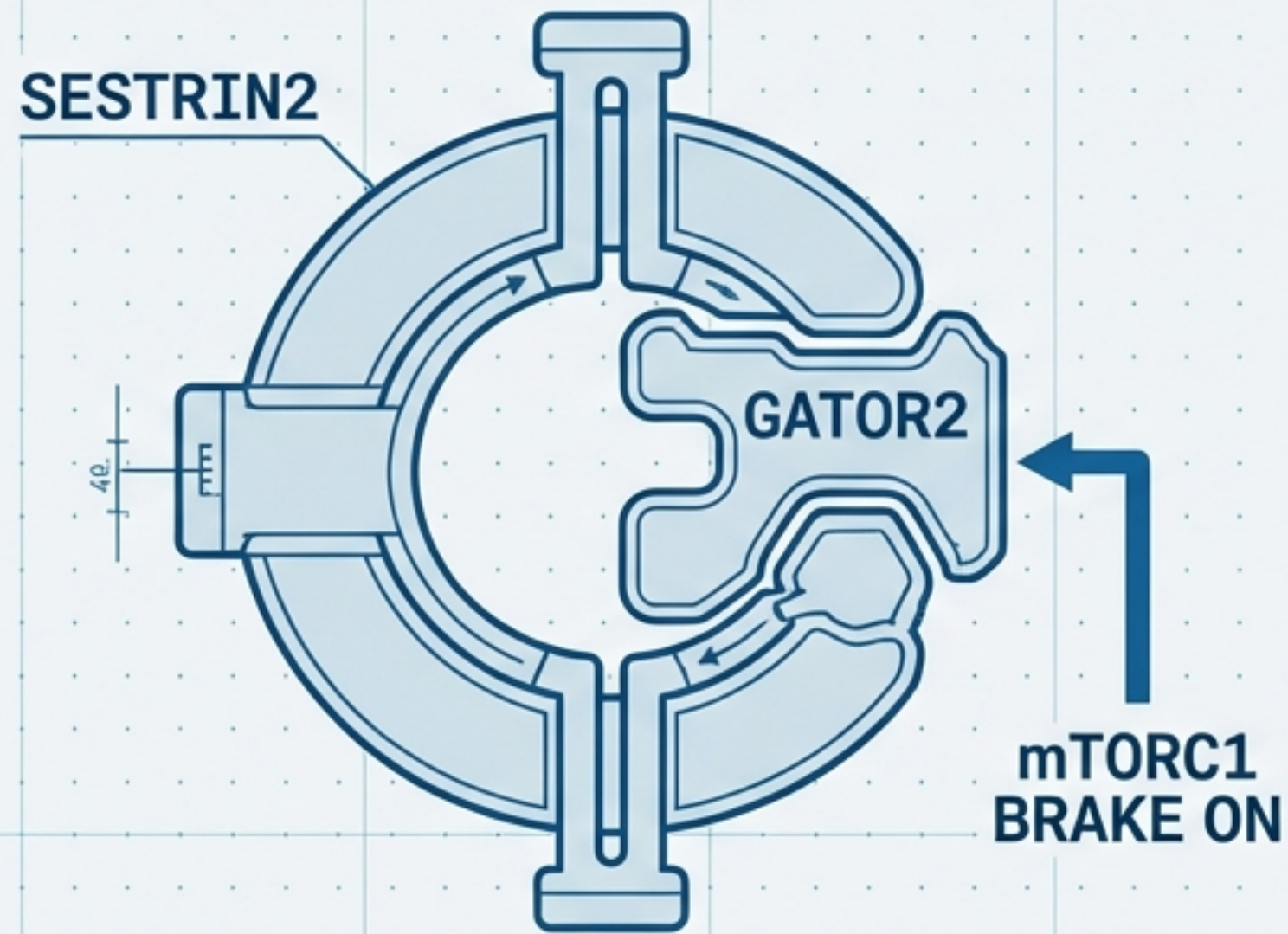
**REPAIR:**  
Autophagy  
& Mitophagy

Hyperactive mTORC1 suppresses autophagy, causing the cell to 'clog' with misfolded proteins and damaged organelles, accelerating senescence.

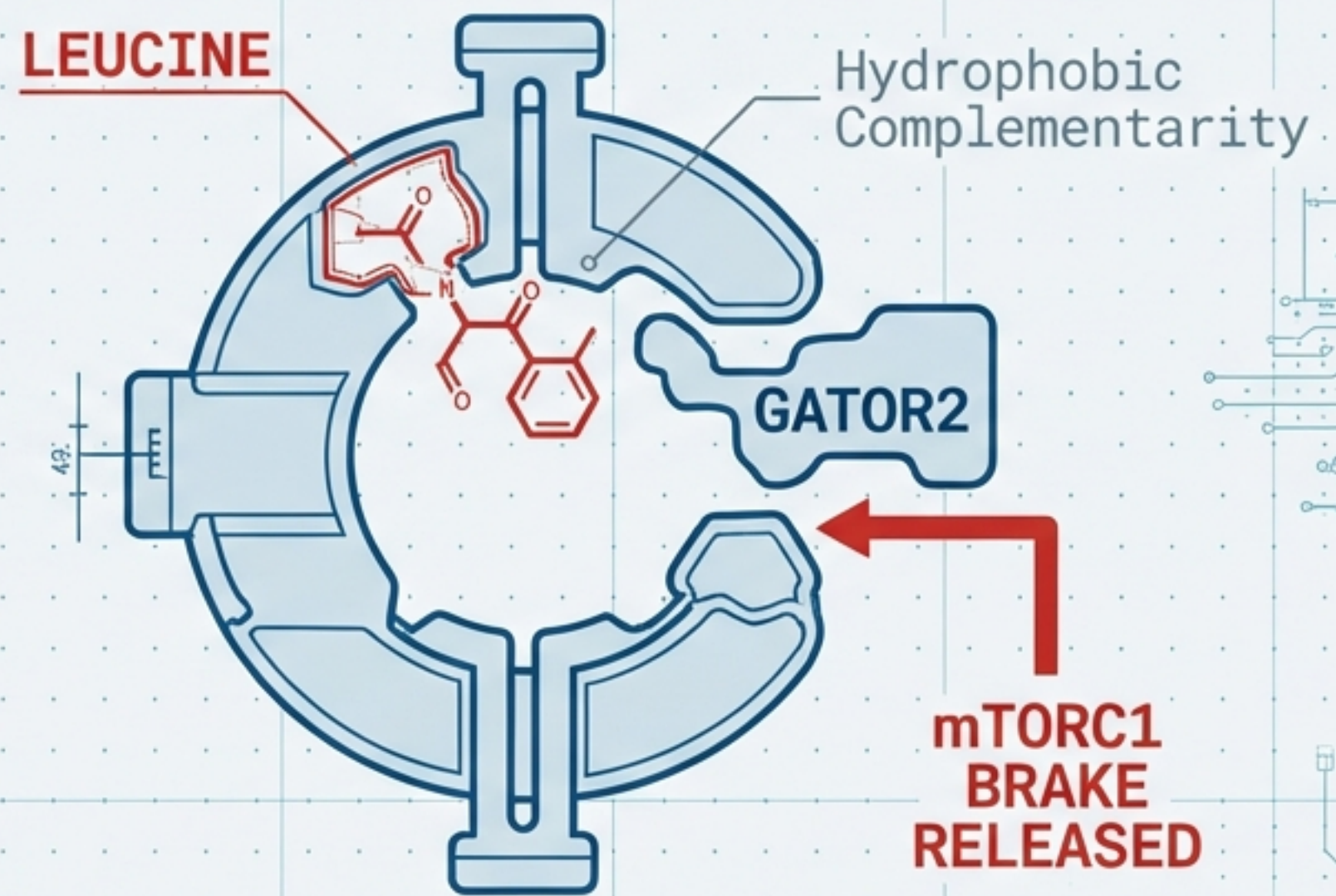


# HOW THE CELL 'HEARS' PROTEIN: THE SESTRIN2 SENSOR

**FASTING (Low Leucine)**

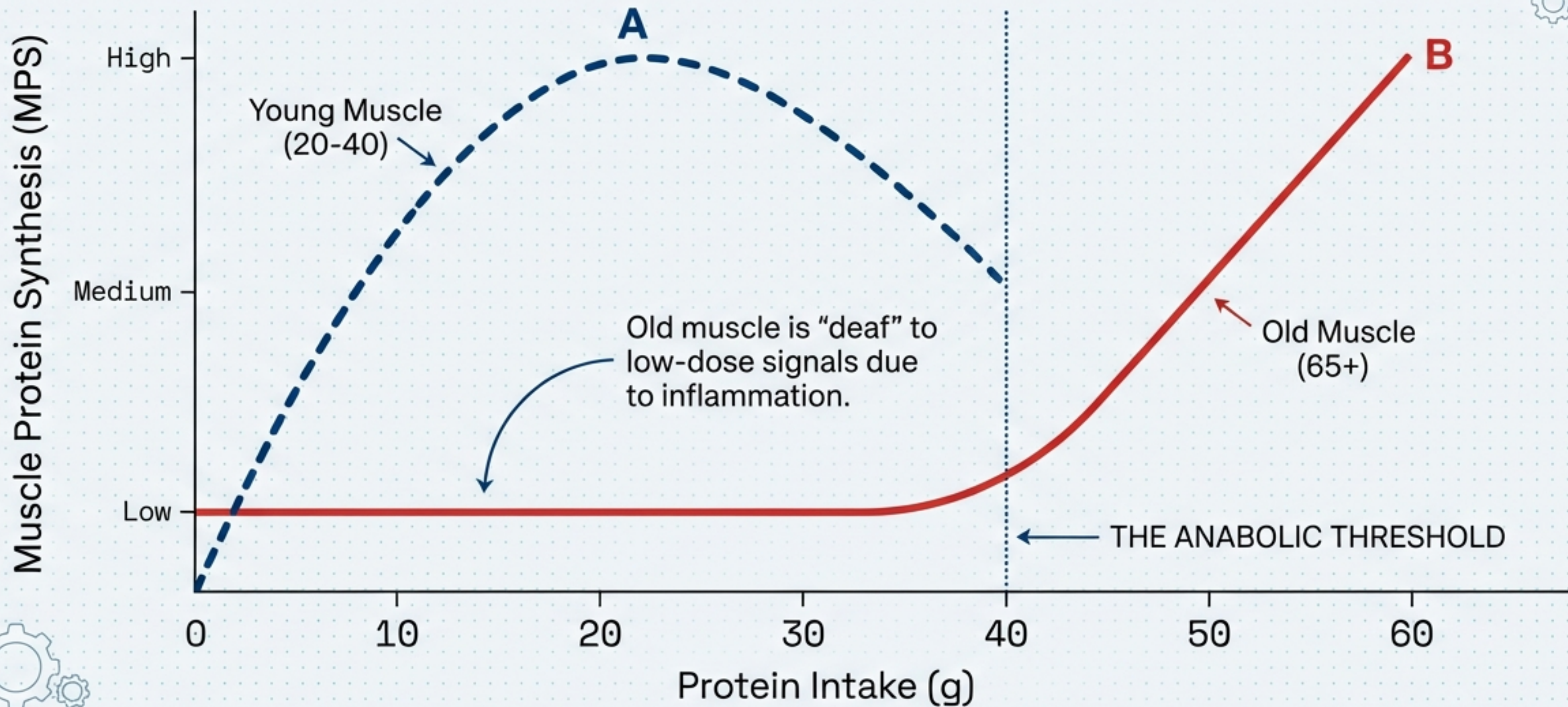


**FEEDING (High Leucine)**

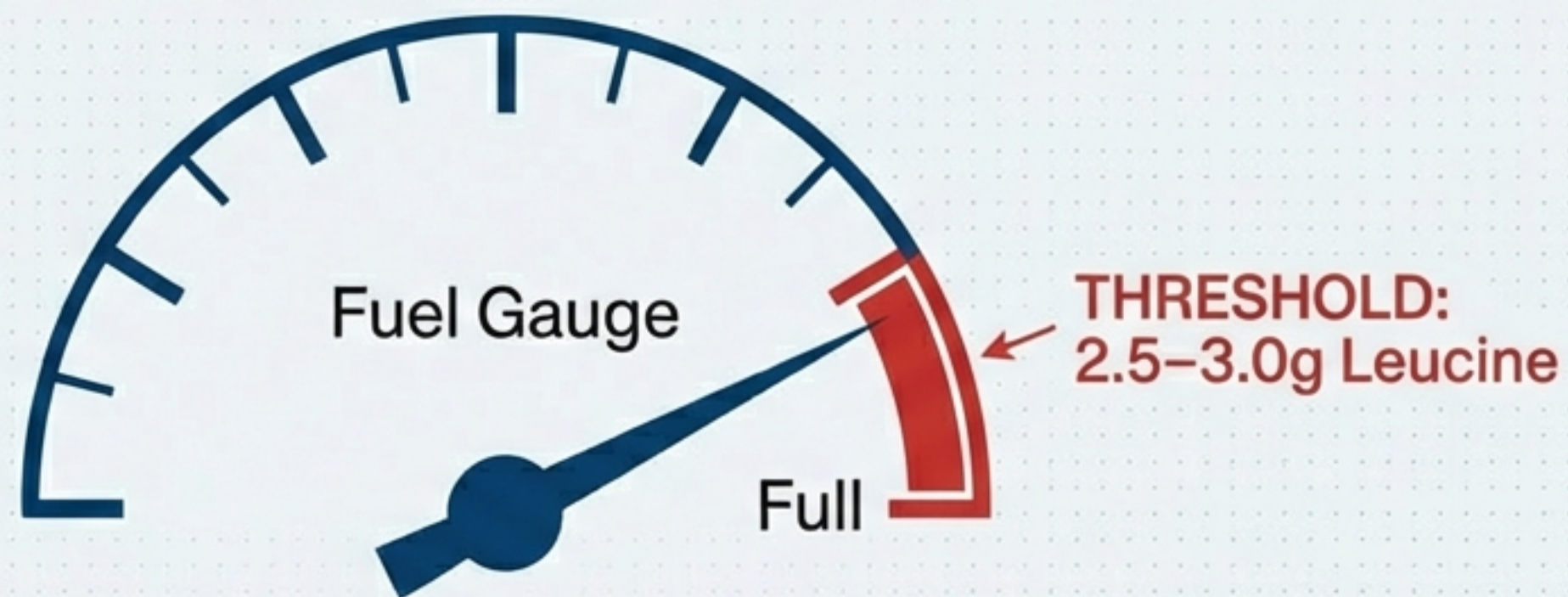


Sestrin2 is a precision sensor. It specifically detects Leucine concentrations to permit growth signaling.

# THE ANABOLIC RESISTANCE CONTINUUM



# OVERCOMING RESISTANCE: THE LEUCINE THRESHOLD



**2.5g**  
Leucine

=



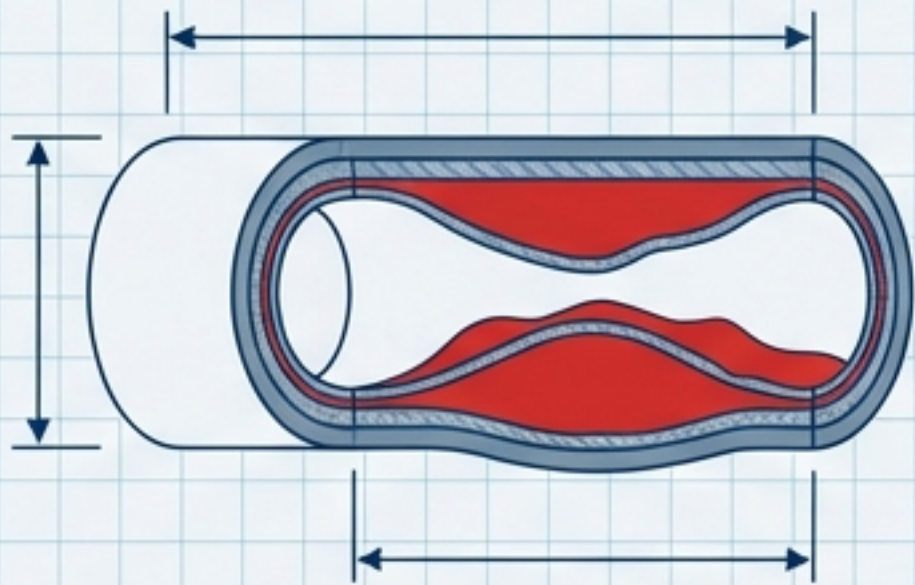
**25–40g**  
High-Quality Protein

To disrupt the Sestrin2-GATOR2 interaction in older age, molecular concentration must exceed the resistance threshold.

Global Daily Target:	7.6–8.0 g Leucine/day
Bodyweight Equivalent:	~110–115 mg/kg/day

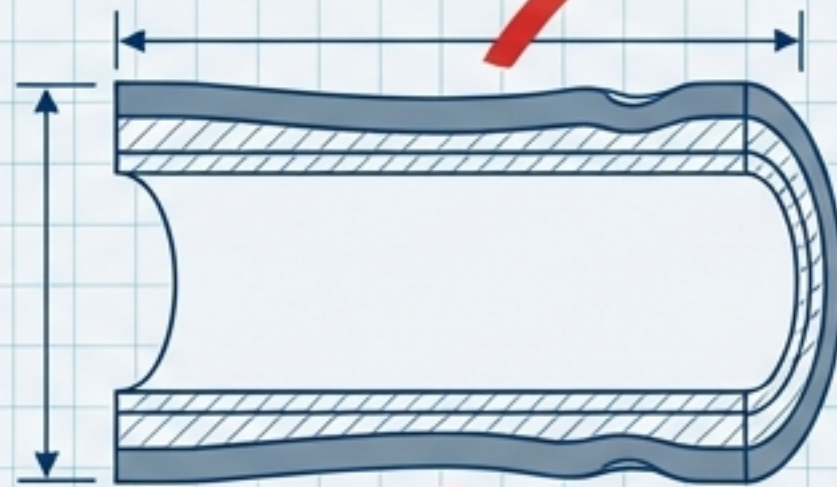
# VASCULAR TRANSITIONS: FROM CLOGGED PIPES TO PUMP FAILURE

## PHASE 1



**Age 70s:**  
Subclinical Atherosclerosis  
(CAC Accumulation)

## PHASE 2



**Late Life:**  
Arterial Stiffness  
(Loss of Elasticity)

## PHASE 3

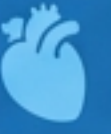




**Outcome:**  
Endothelial Senescence  
& Cognitive Decline

Vascular stiffness is a mechanobiological driver of aging. The loss of elasticity creates a pro-inflammatory loop.

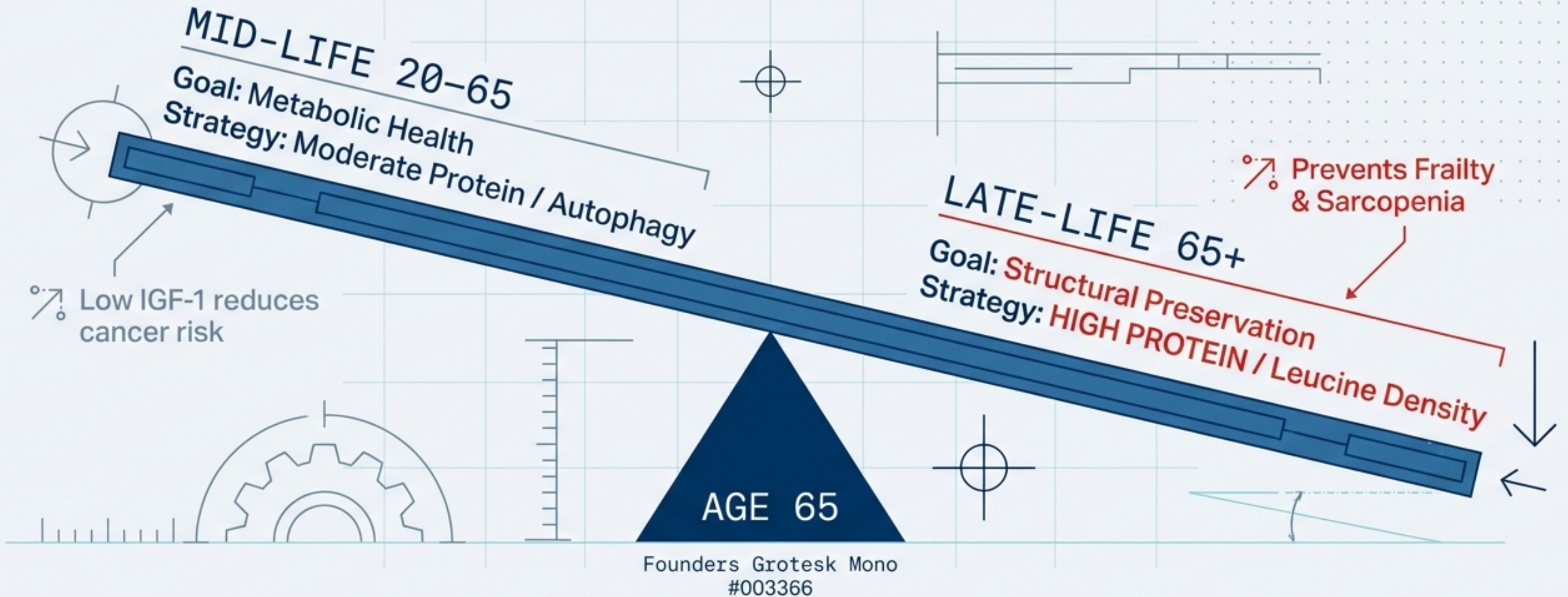


# THE RESILIENT PHENOTYPE: BIOMARKERS OF THE 'OLDEST OLD'

	STANDARD AGING (80s)	CENTENARIANS (100+)
NT-proBNP (Heart Stress)	Elevated	<b>LOWER</b> (Myocardial Resistance) 
Albumin (Physiologic Reserve)	Declining	<b>HIGHER</b> (Preserved Reserve) 
Coronary Calcium (CAC)	High Burden	Variable / Lower (Brain Resilience) 

Centenarians do not escape aging; they compress morbidity and delay heart failure.

# THE GREAT PIVOT: THE AGE 65 'SWITCH'

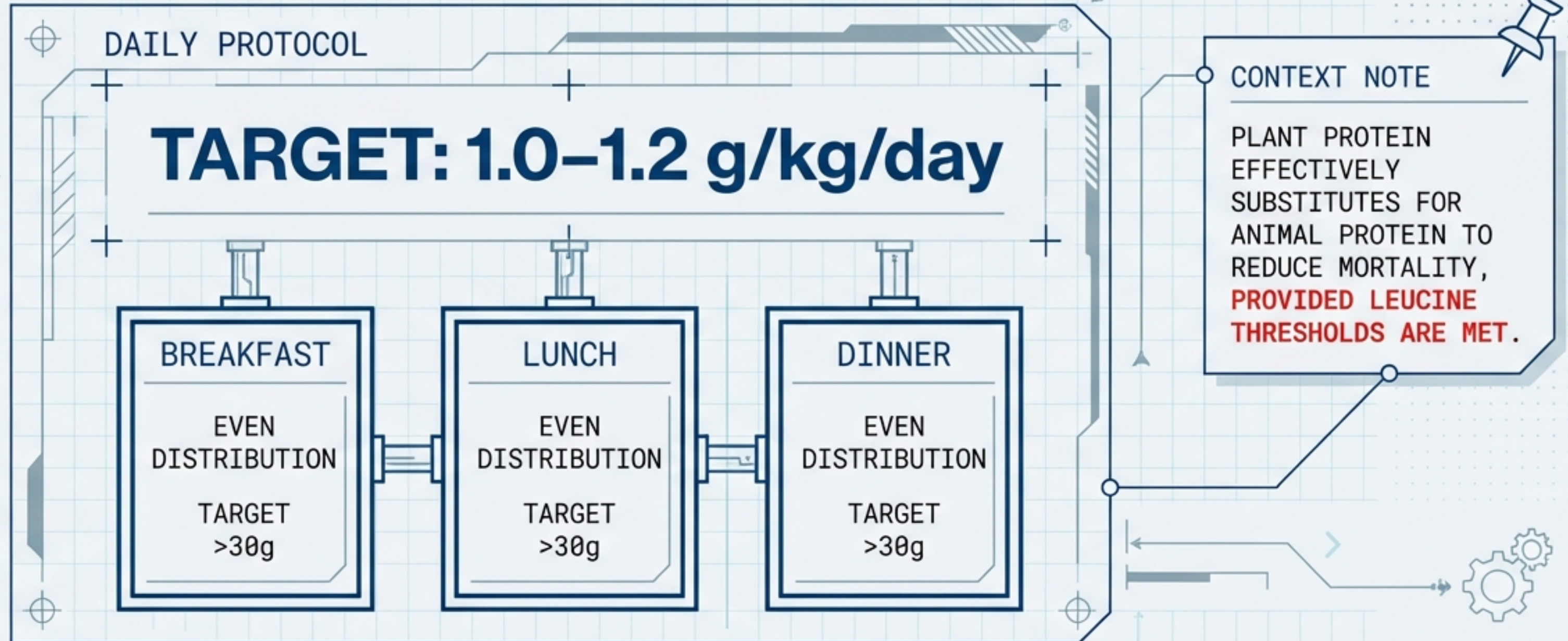


Founders Grotesk Mono

“The risk profile flips. What is protective in midlife becomes hazardous in late life.”

# PRECISION GERONUTRITION: THE PROTEIN PROTOCOL

Swiss International Medical



# THE PHARMACOLOGIC TOOLKIT: EMERGING INTERVENTIONS

## RAPAMYCIN

### mTOR Inhibitor

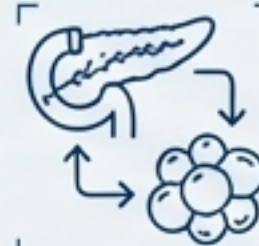
Founders Grotesk Mono  
Mimics caloric restriction.  
**Status:** Investigational for immunity.



## GLP-1 AGONISTS

### Metabolic Regulator

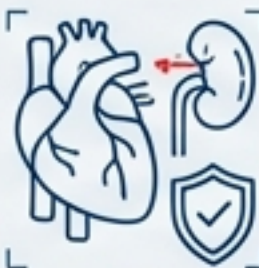
Founders Grotesk Mono  
Reduces inflammation & adiposity.  
**Status:** Robust cardiometabolic benefits.



## SGLT2 INHIBITORS

**Hemodynamic Modulator.**  
Prevents heart failure.

**Status:** Preserves cardiovascular resilience.



## UROLITHIN A

**Mitophagy Activator.**  
Induces mitochondrial cleanup.

**Status:**  
Gut-derived postbiotic.



# COGNITIVE RESILIENCE AND THE ANTIOXIDANT PARADOX

## EFFICIENCY

Founders Grotesk Mono



**The Paradox:**  
Resilient agers often have LOWER antioxidant levels because they produce LESS oxidative stress.

## WARFARE

Founders Grotesk Mono



### CONTEXT NOTE

Caloric moderation preserves myelin integrity and reduces neuro-inflammation.

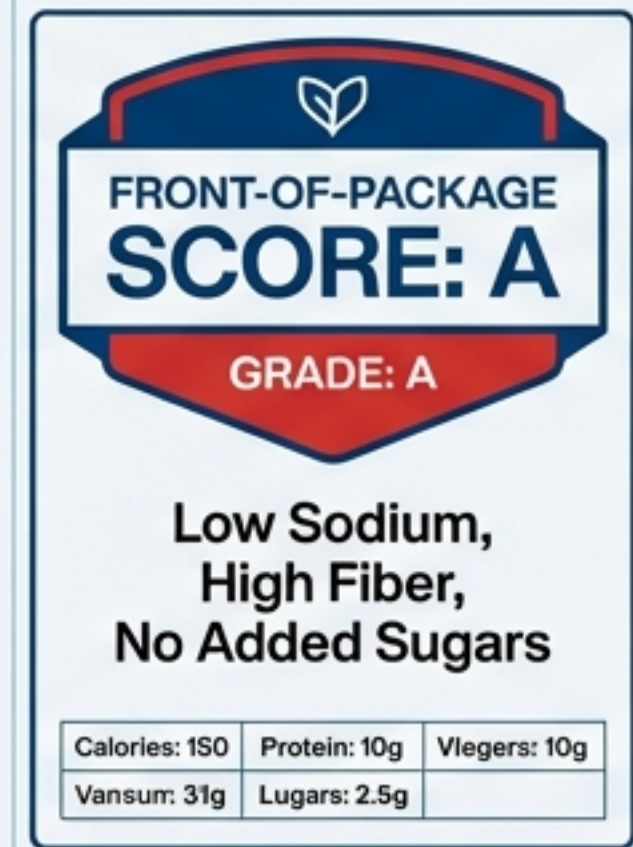
Redox homeostasis is achieved through reduced production of damage, not maximal antioxidant deployment.

# THE ENVIRONMENTAL ARCHITECTURE: REDUCING DECISION FRICTION

Standard Label  
Dense text, hard to read

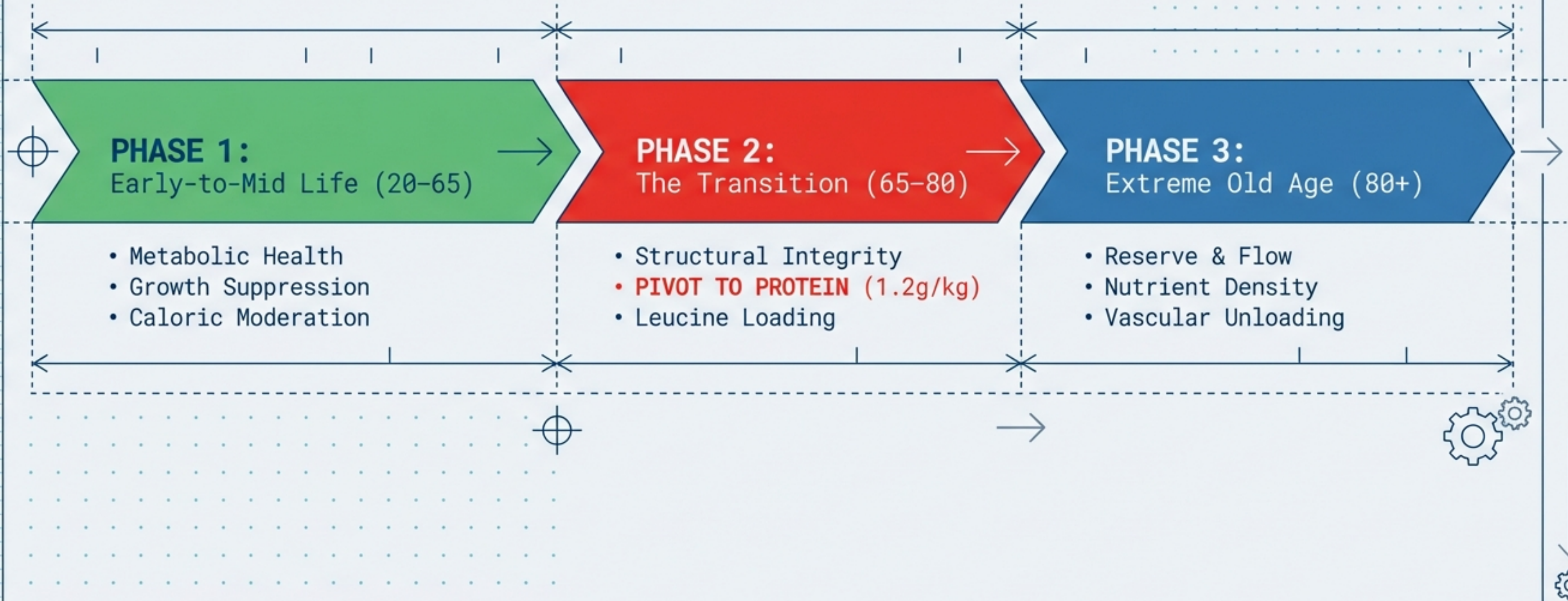


Longevity-Focused Label



Longevity is an environmental outcome. Front-of-package labeling improves consumer understanding and reduces cardiometabolic aging risk at the population level.

# THE LIFETIME ROADMAP



# CONCLUSION: THE CALCULATED PIVOT

THE TRANSITION TO LONGEVITY IS NOT DOING “MORE” OF THE SAME. IT IS A CALCULATED PIVOT FROM **GROWTH SUPPRESSION** IN MIDLIFE TO **STRUCTURAL PRESERVATION** IN LATE LIFE.

SUCCESS LIES IN NAVIGATING THE BIOLOGICAL HURDLES BETWEEN STANDARD GERIATRIC AGING AND THE RESILIENT CENTENARIAN TRAJECTORY.