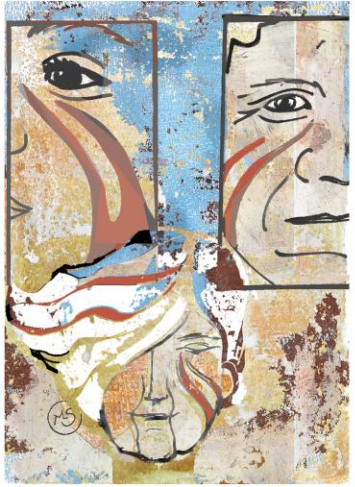


17·20 Dicembre 2025 Napoli

70° CONGRESSO NAZIONALE SIGG

LIBERI E LONGEVI

Università degli Studi di Napoli Federico II
Polo Didattico di **SCAMPIA**

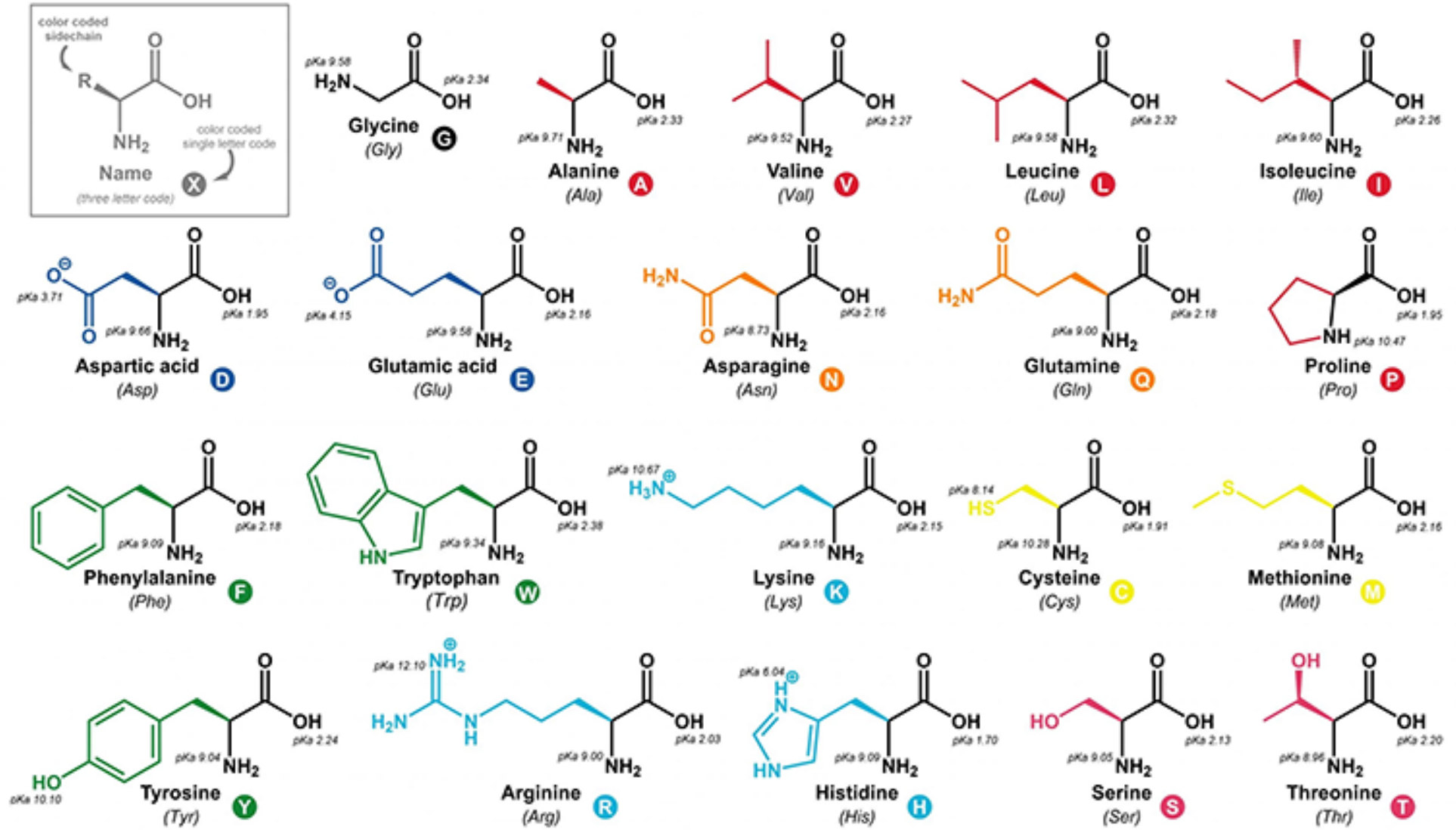
SOCIETÀ ITALIANA DI GERONTOLOGIA E GERIATRIA

SUPPLEMENTAZIONE AMINOACIDICA NELLA MODULAZIONE DELL'INFIAMMAZIONE CRONICA

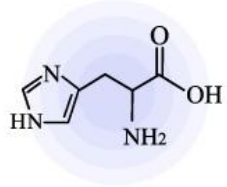
LAURA PETRAGLIA

Dipartimento di Scienze Mediche Traslazionali
Università degli Studi di Napoli «Federico II»

20 Amminoacidi fondamentali o proteinogenici

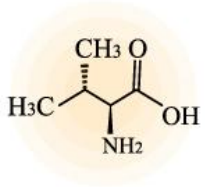


9 Essential Amino Acids



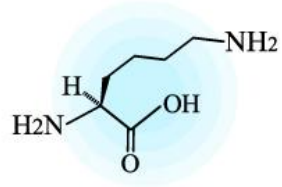
Histidine

The Silent Protector



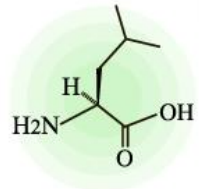
Isoleucine

Your Muscle Fuel



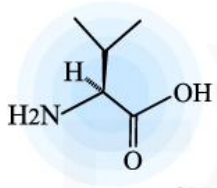
Lysine

The Builder



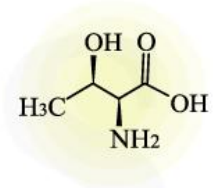
Leucine

The Growth Booster



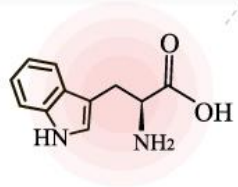
Valine

The Energy Catalyst



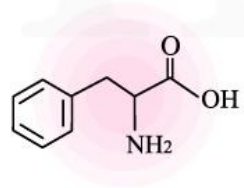
Threonine

The Repair Master



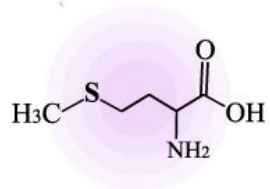
Tryptophan

The Sleep Savior



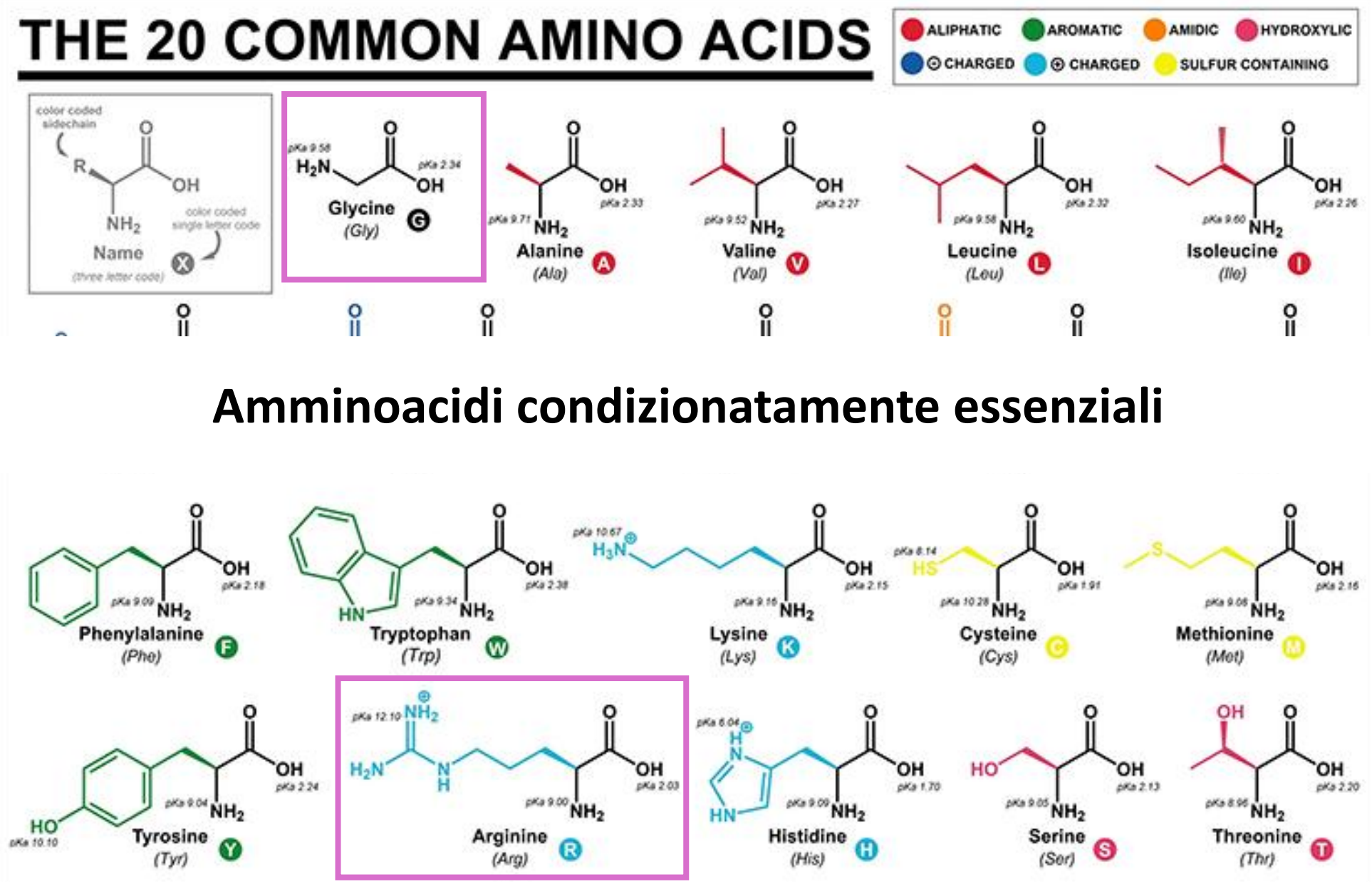
Phenylalanine

The Mood Balancer



Methionine

The Detox Expert



Amminoacidi condizionatamente essenziali

Principali funzioni biologiche degli amminoacidi

Tre livelli di funzione

Funzione strutturale (“mattoni”)

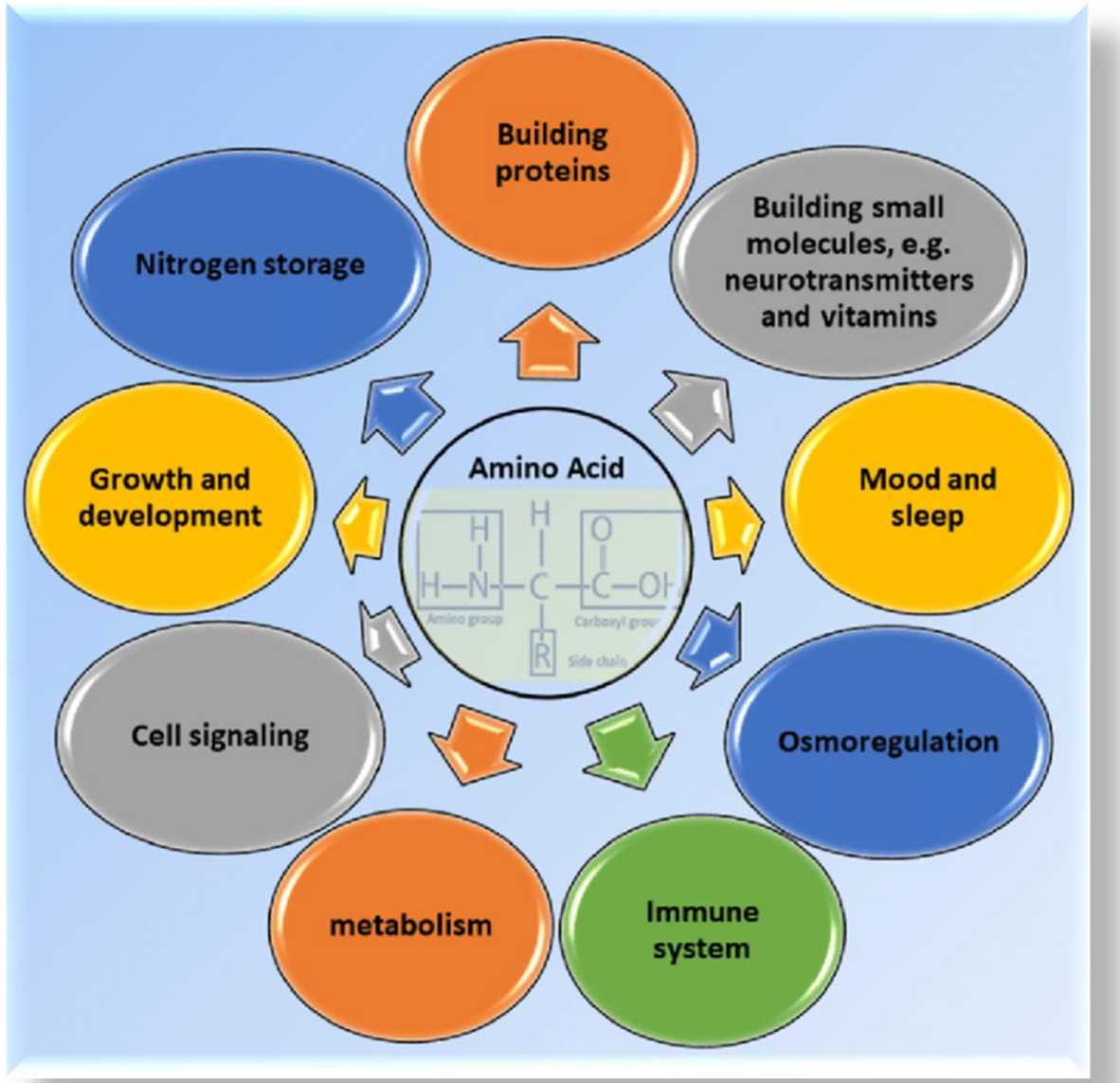
Gli aminoacidi sono i **costituenti fondamentali delle proteine**, quindi indispensabili per: sintesi proteica muscolare, enzimi, recettori, ormoni peptidici, immunoglobuline, proteine della matrice extracellulare.

Funzione metabolica / energetica

Molti aminoacidi sono **substrati energetici** (es. glutamina, glutammato), **intermedi metabolici** (gluconeogenesi), regolatori dell’equilibrio redox (precursori del glutatione), coinvolti nel metabolismo dell’azoto.

Funzione regolatoria / di segnale

Gli aminoacidi attivano o inibiscono vie di segnale (mTOR, AMPK, NF-κB), modulano trascrizione genica ed epigenetica, agiscono su recettori specifici (es. recettori della glicina), influenzano fenotipo immunitario.



Moulaee K et Neri G; Biosensors, 2021

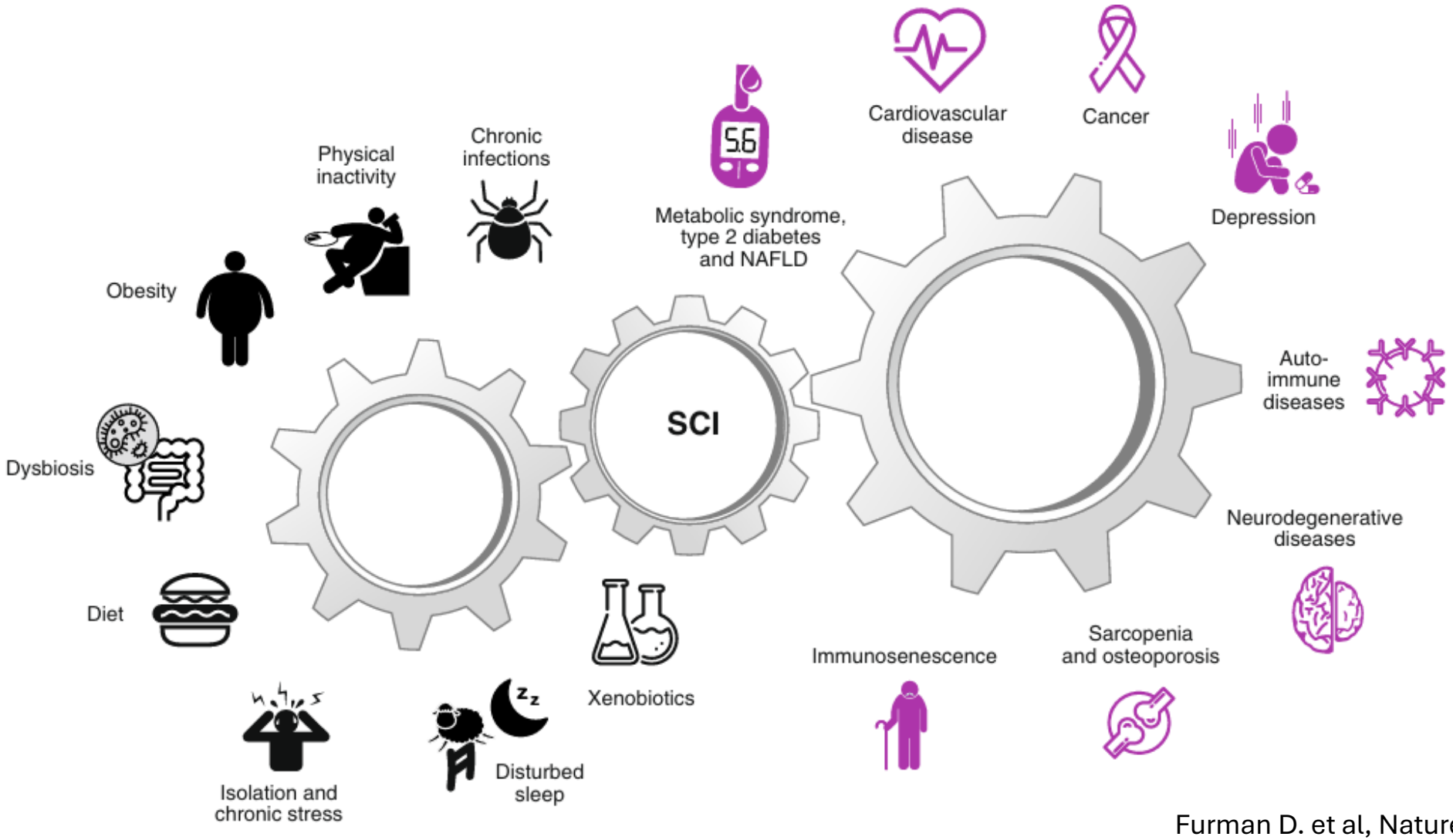
INFLAMMAGING

Infiammazione cronica, sistemica, di basso grado, asintomatica

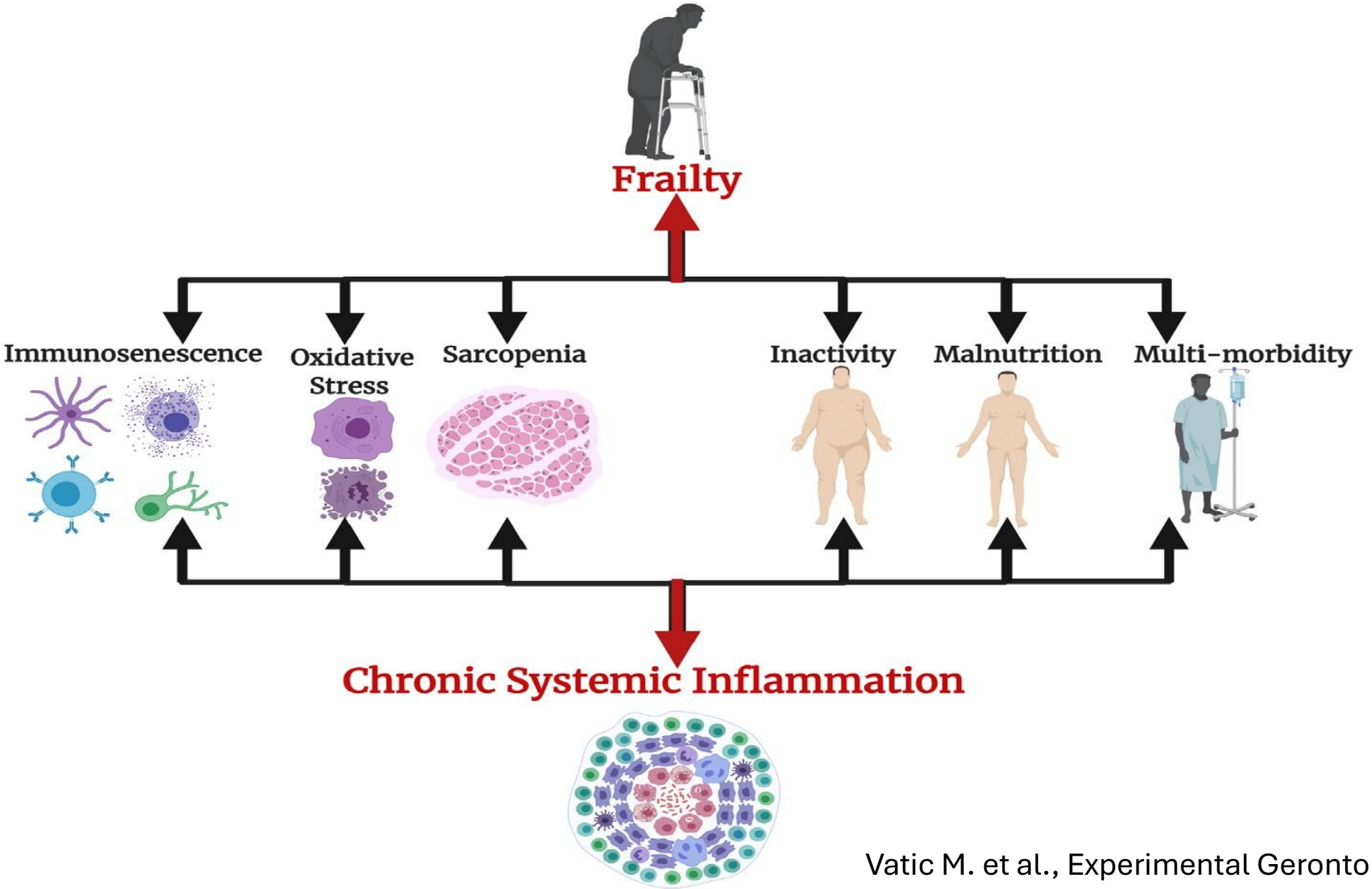
Franceschi C. 2020

SYSTEMIC CHRONIC INFLAMMATION

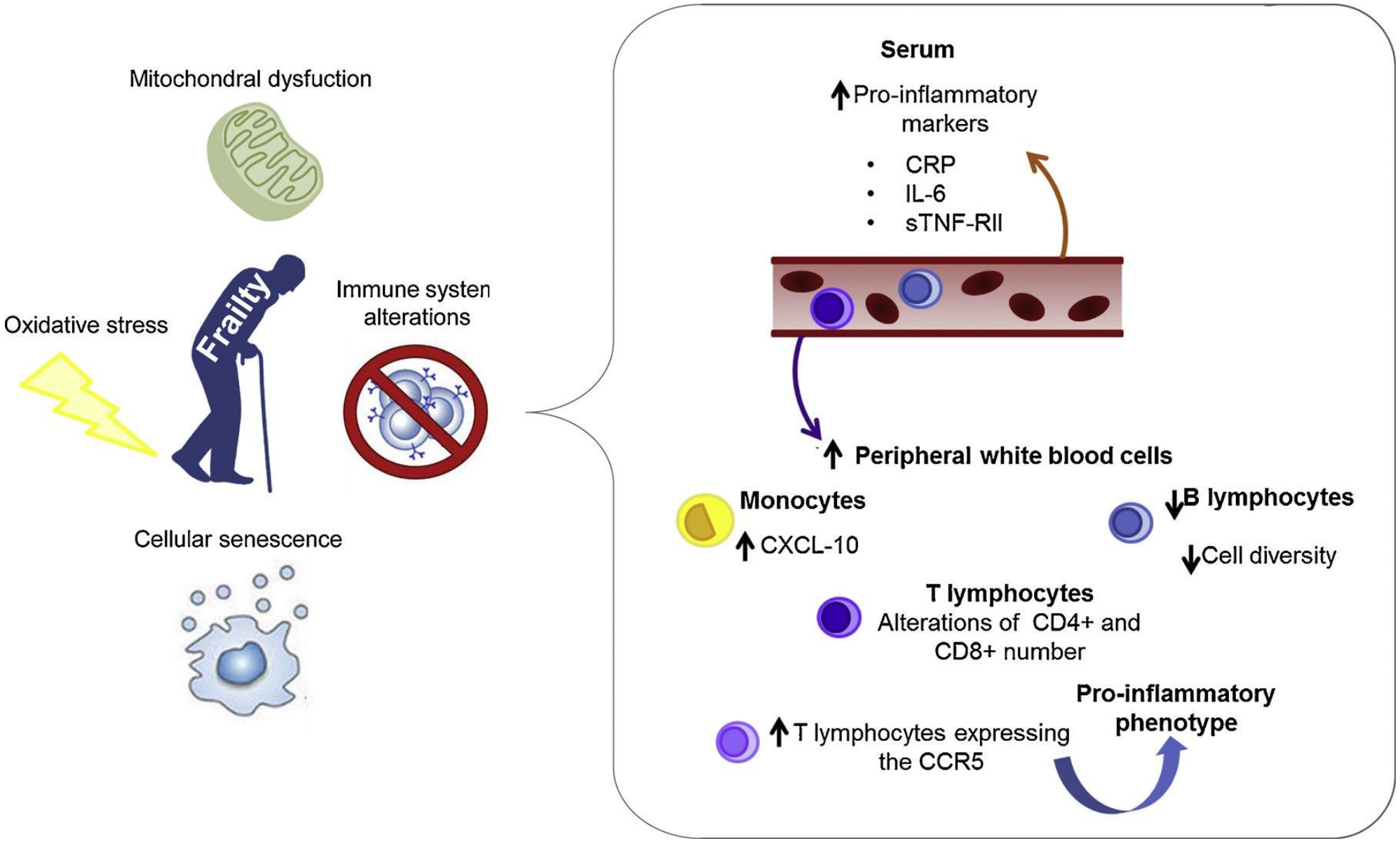
Causa e conseguenza di immunosenescenza e stress ossidativo



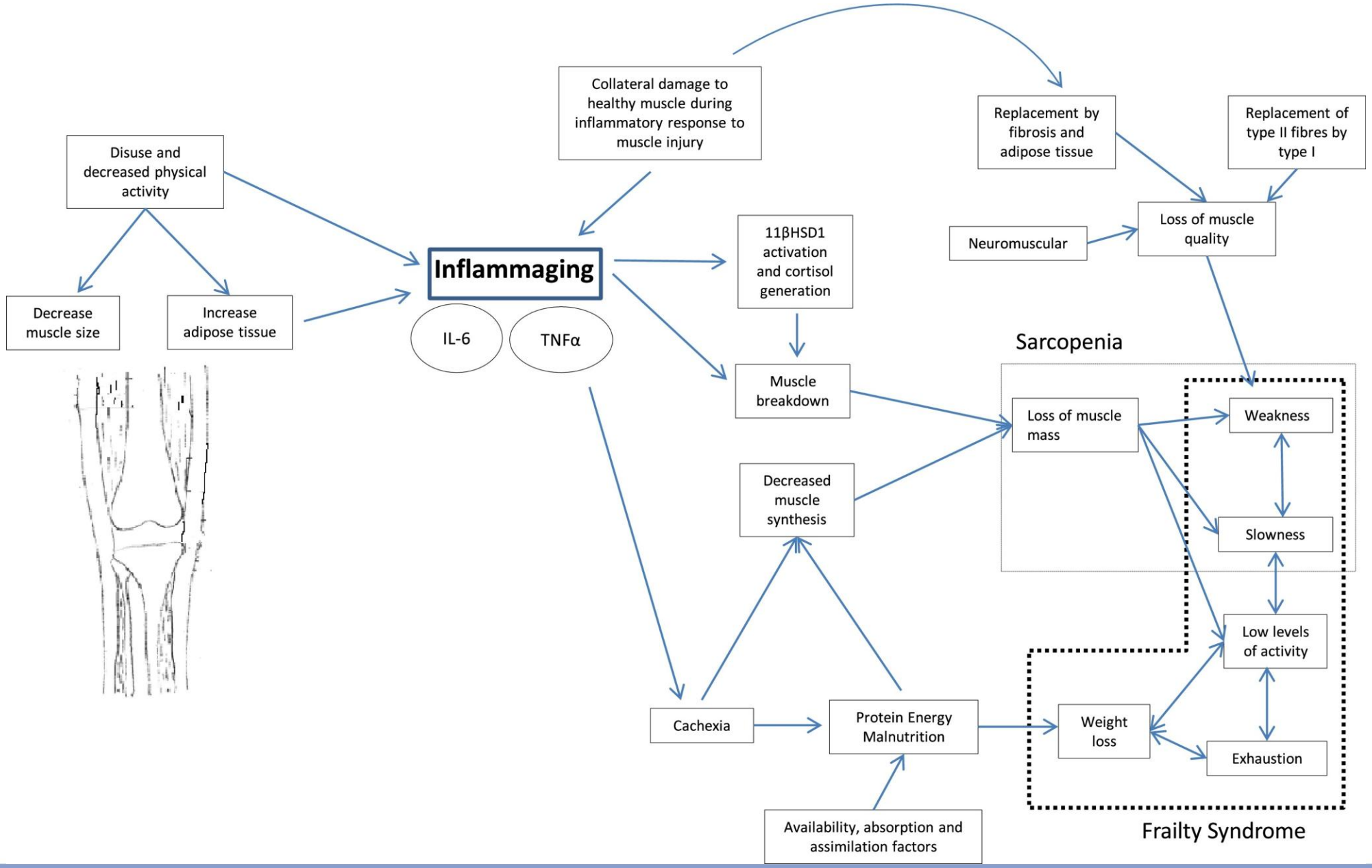
Furman D. et al, Nature Medicine, 2019



Vatic M. et al., Experimental Gerontology, 2020

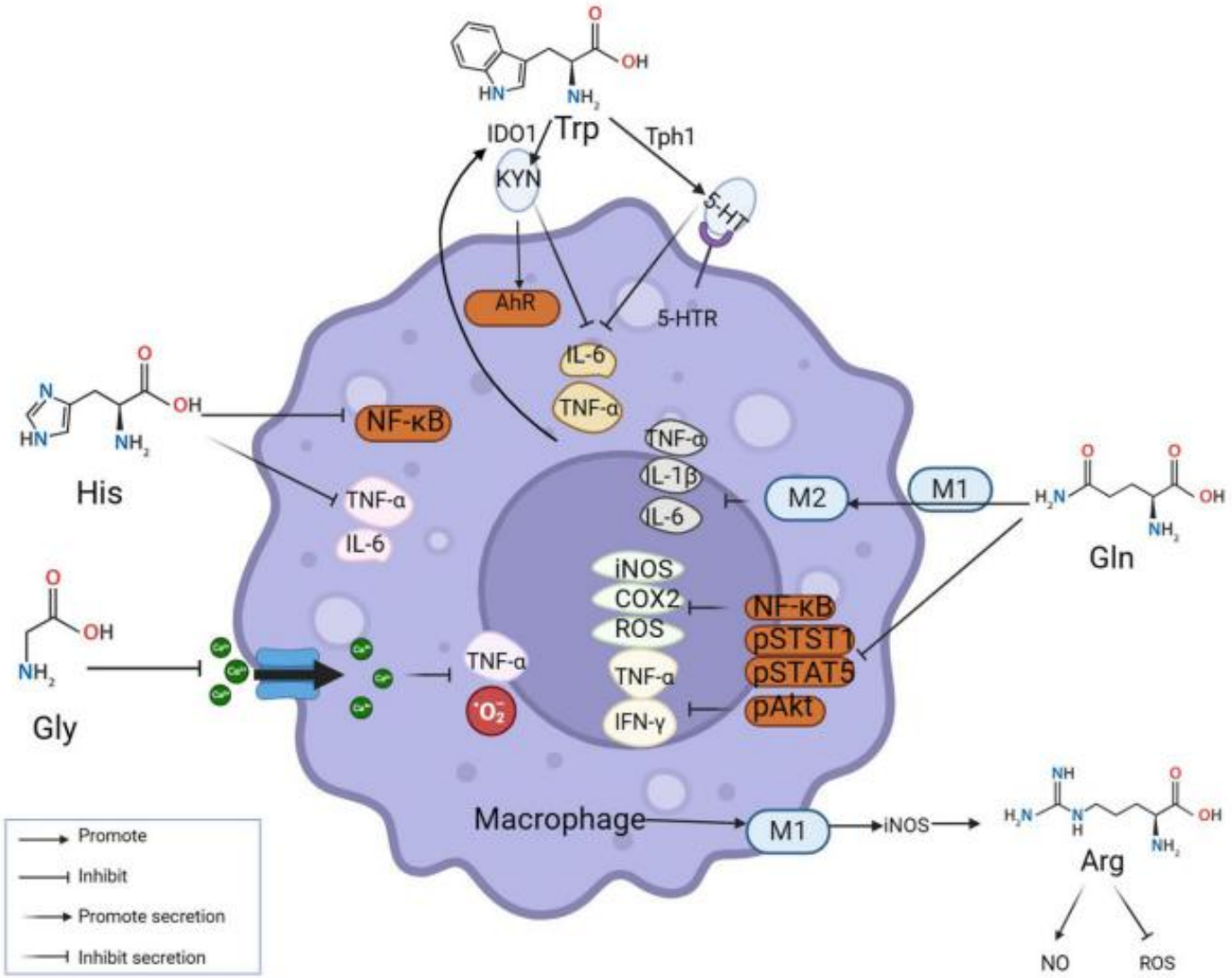


Pansarasa O. et al., Ageing Research Reviews, 2019



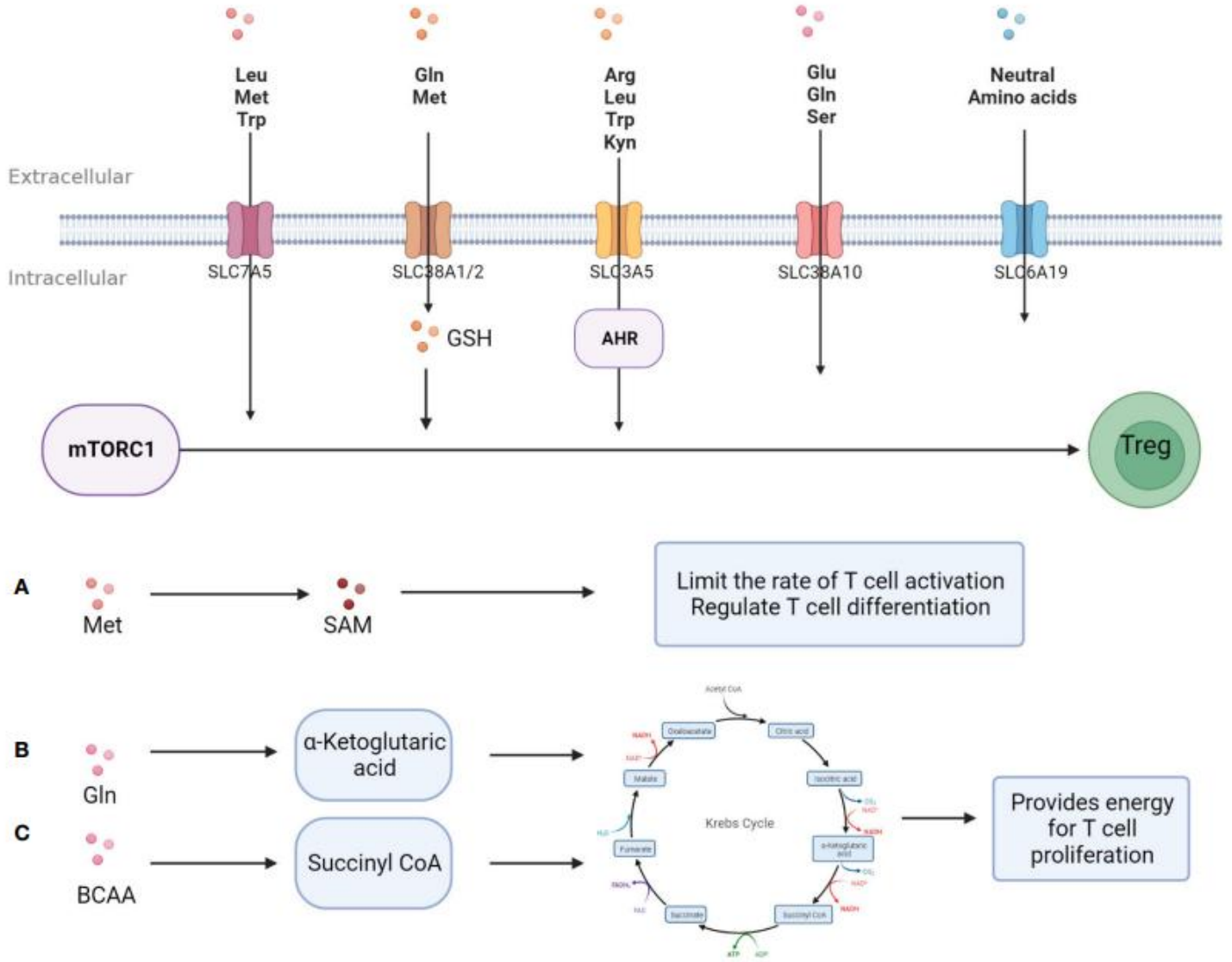
Wilson D. et al, Ageing Research Reviews, 2017

Gli amminoacidi regolano la polarizzazione dei macrofagi ed inibiscono le principali vie infiammatorie

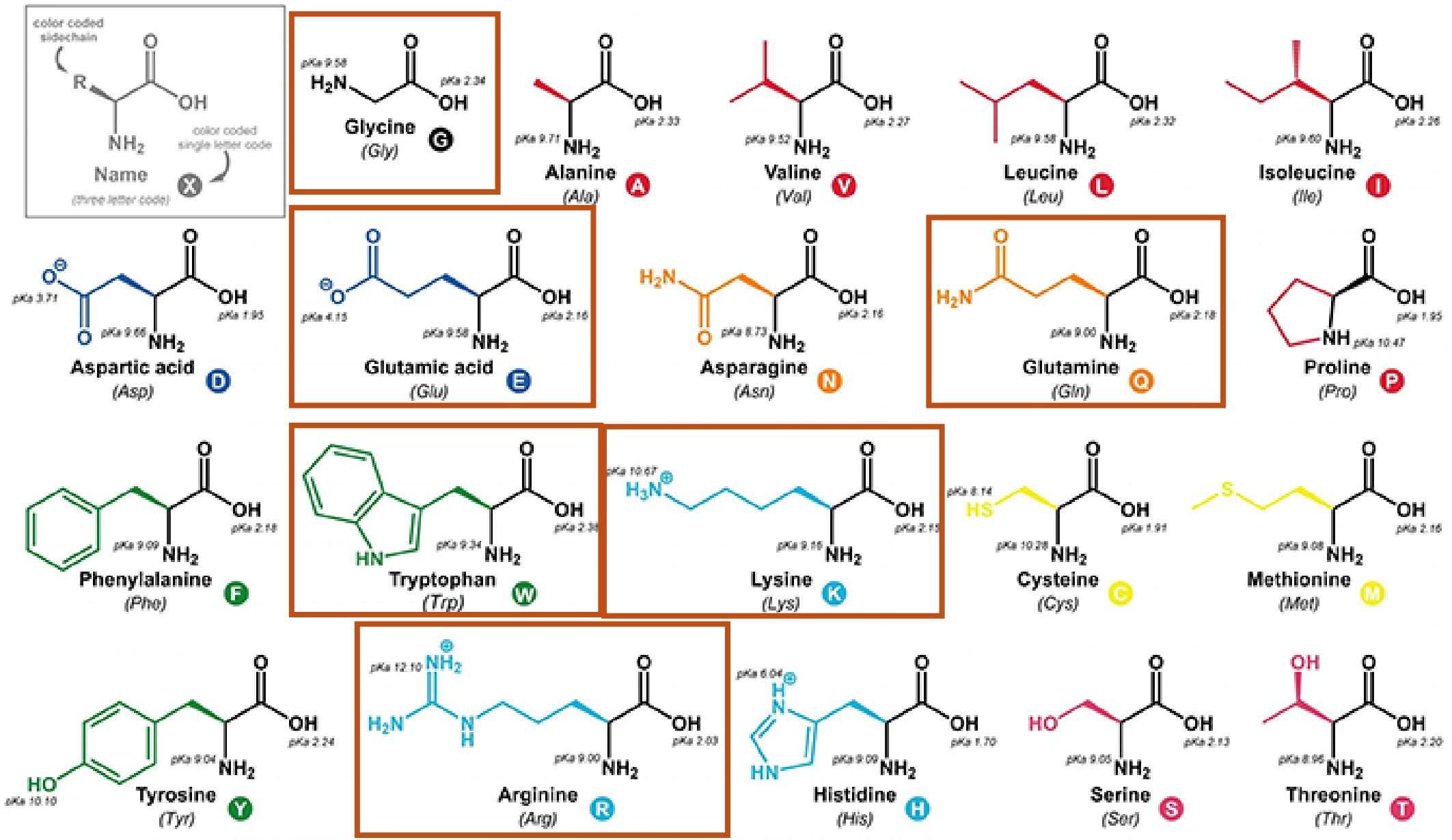


Zheng X. et al. Frontiers in Immunology 2023

Gli aminoacidi contribuiscono alla regolazione dell'immunità innata ed adattativa



Zheng X. et al. Frontiers in Immunology 2023


color coded sidechain
R
OH
NH2
color coded single letter code
Name
(three letter code)
X
Glycine (Gly) G
Alanine (Ala) A
Valine (Val) V
Leucine (Leu) L
Isoleucine (Ile) I
Aspartic acid (Asp) D
Glutamic acid (Glu) E
Asparagine (Asn) N
Glutamine (Gln) Q
Proline (Pro) P
Phenylalanine (Phe) F
Tryptophan (Trp) W
Lysine (Lys) K
Cysteine (Cys) C
Methionine (Met) M
Tyrosine (Tyr) Y
Arginine (Arg) R
Histidine (His) H
Serine (Ser) S
Threonine (Thr) T

Supplementazione amminoacidica: criticità nell'analisi della letteratura

Singoli amminoacidi

Combinazioni di singoli amminoacidi

Mix bilanciati di amminoacido essenziali

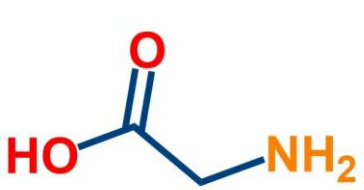
Grande eterogeneità di setting e disegni di studio

ATTENZIONE

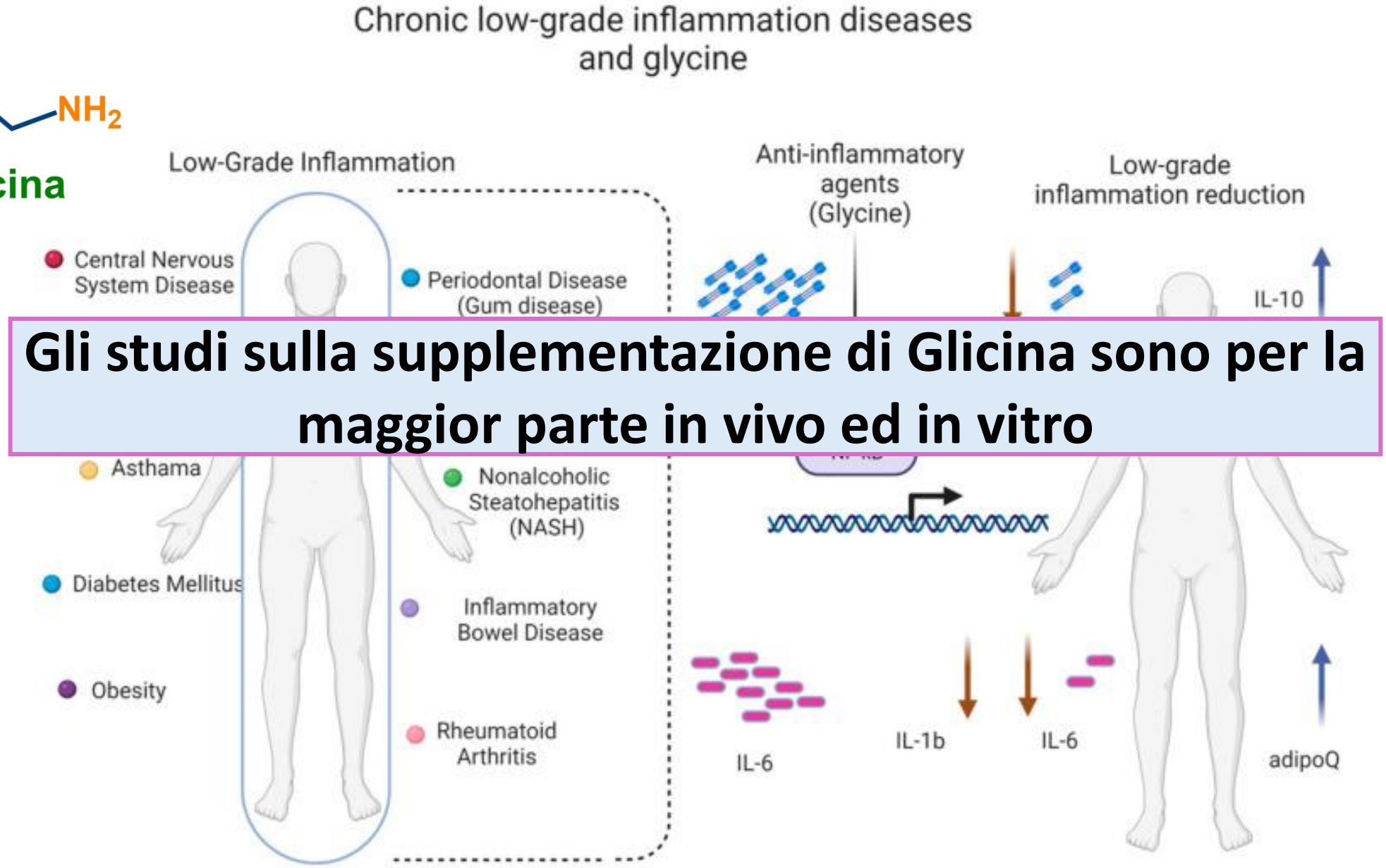
Molti studi su supplementi usano endpoint clinici e funzionali.

Criteri di solidità

- Trial randomizzati e controllati
- Rigore metodologico
- Uniformità dell'approccio metodologico
- Riproducibilità e dimensione campionaria



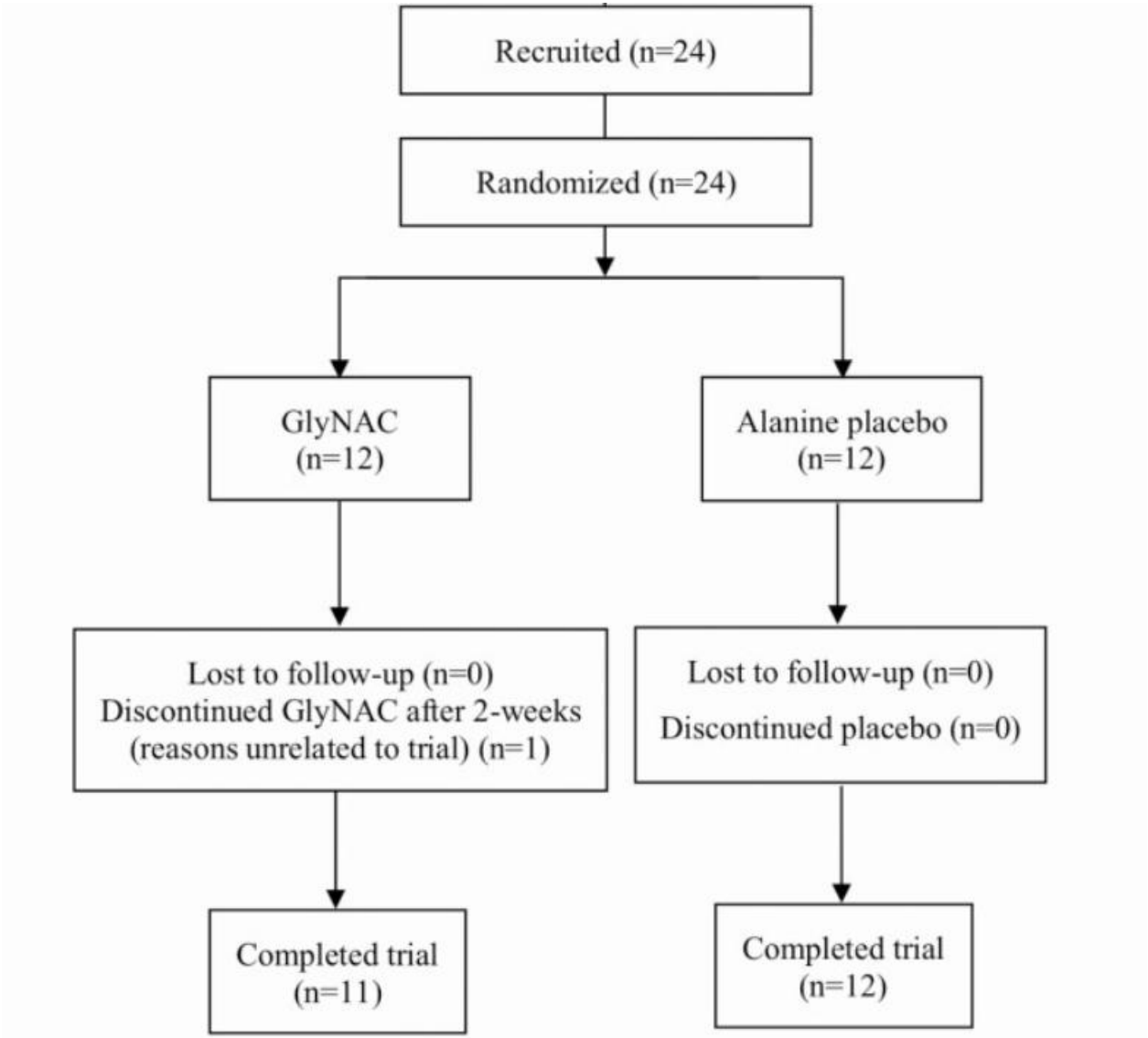
Glicina



Gli studi sulla supplementazione di Glicina sono per la maggior parte in vivo ed in vitro

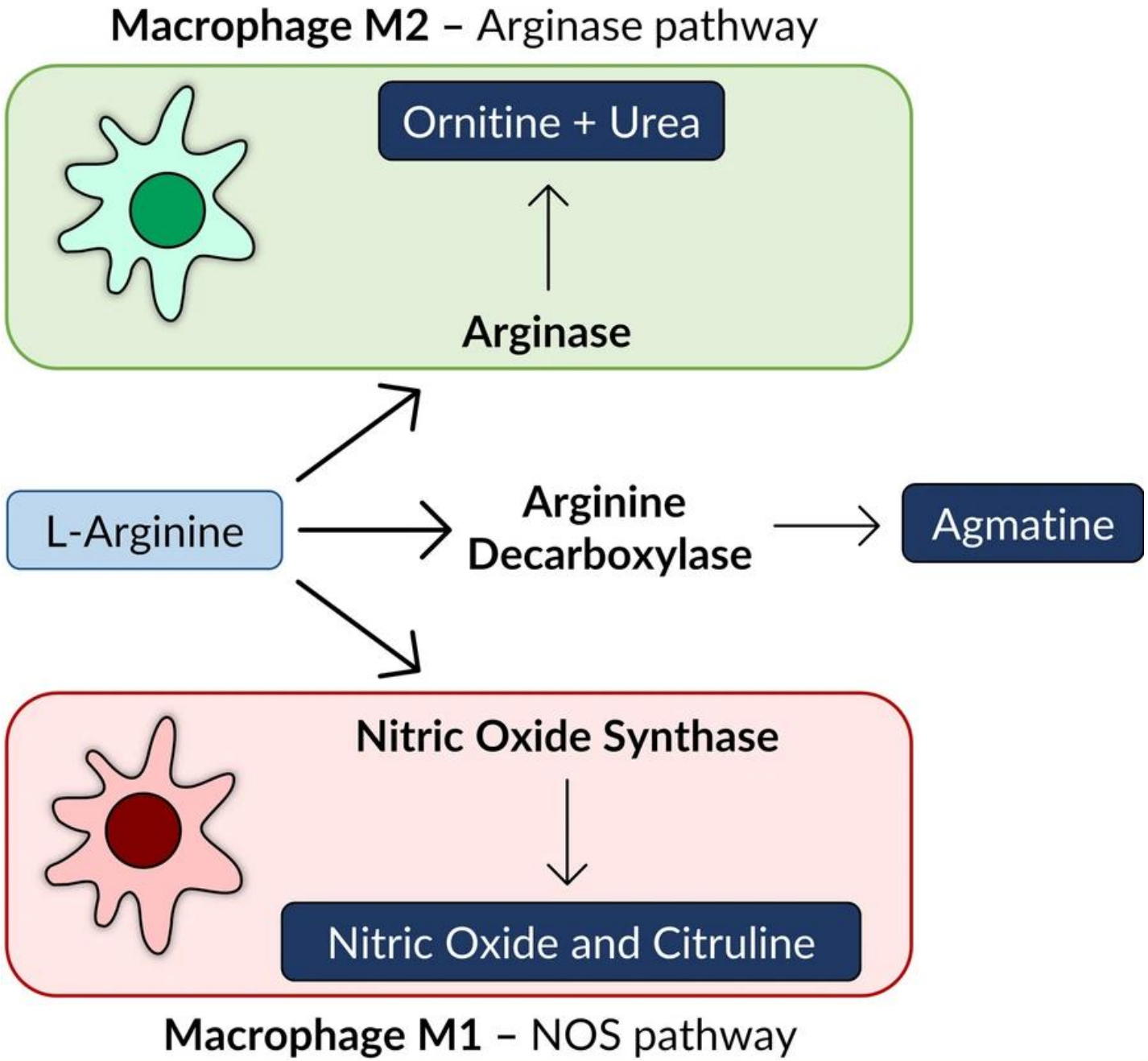
Aguayo-Cerón K. A. et al, Int J Mol Sci, 2023

Supplementazione di Glicina e N-Acetilcisteina

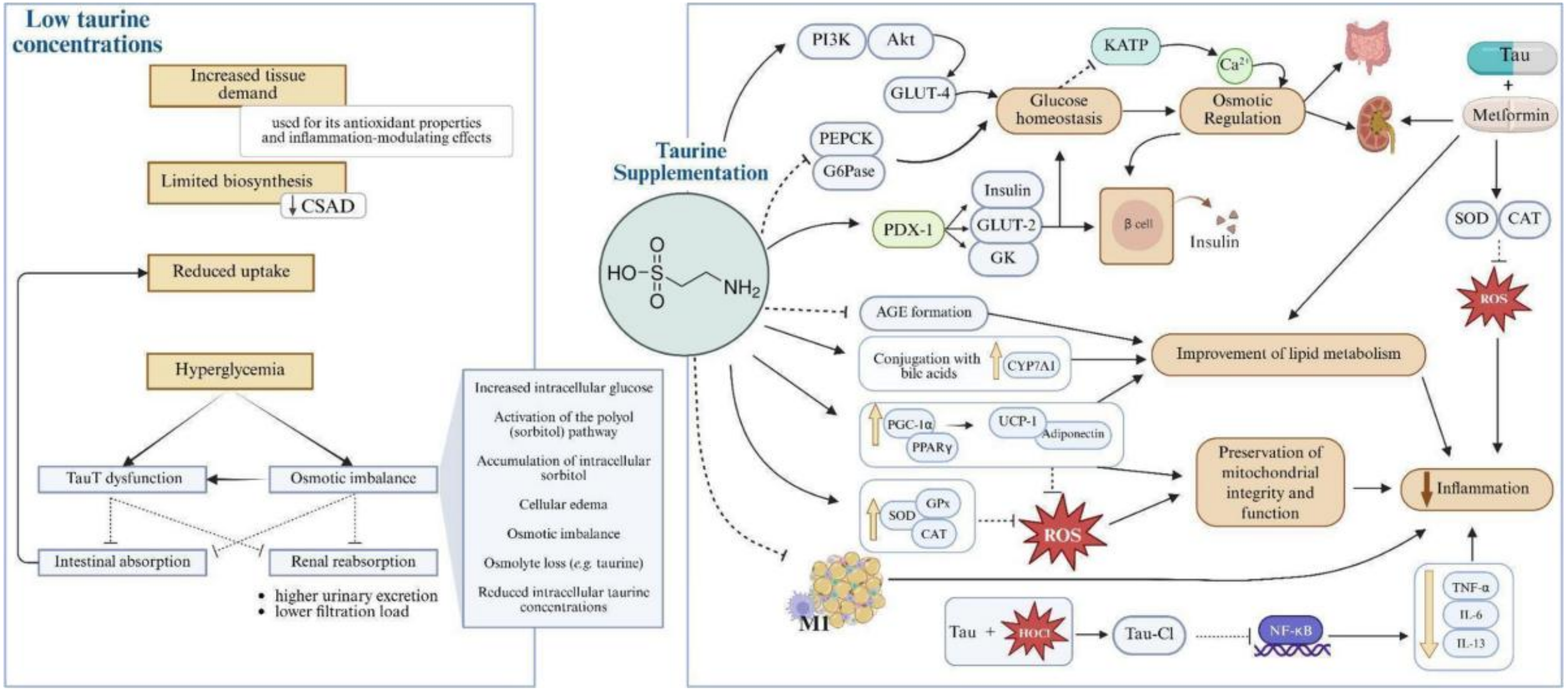


Kumar P. et al, J Gerontol A Biol Sci Med Sci, 2022

Kumar P. et al, Clinical and Translational Medicine, 2021

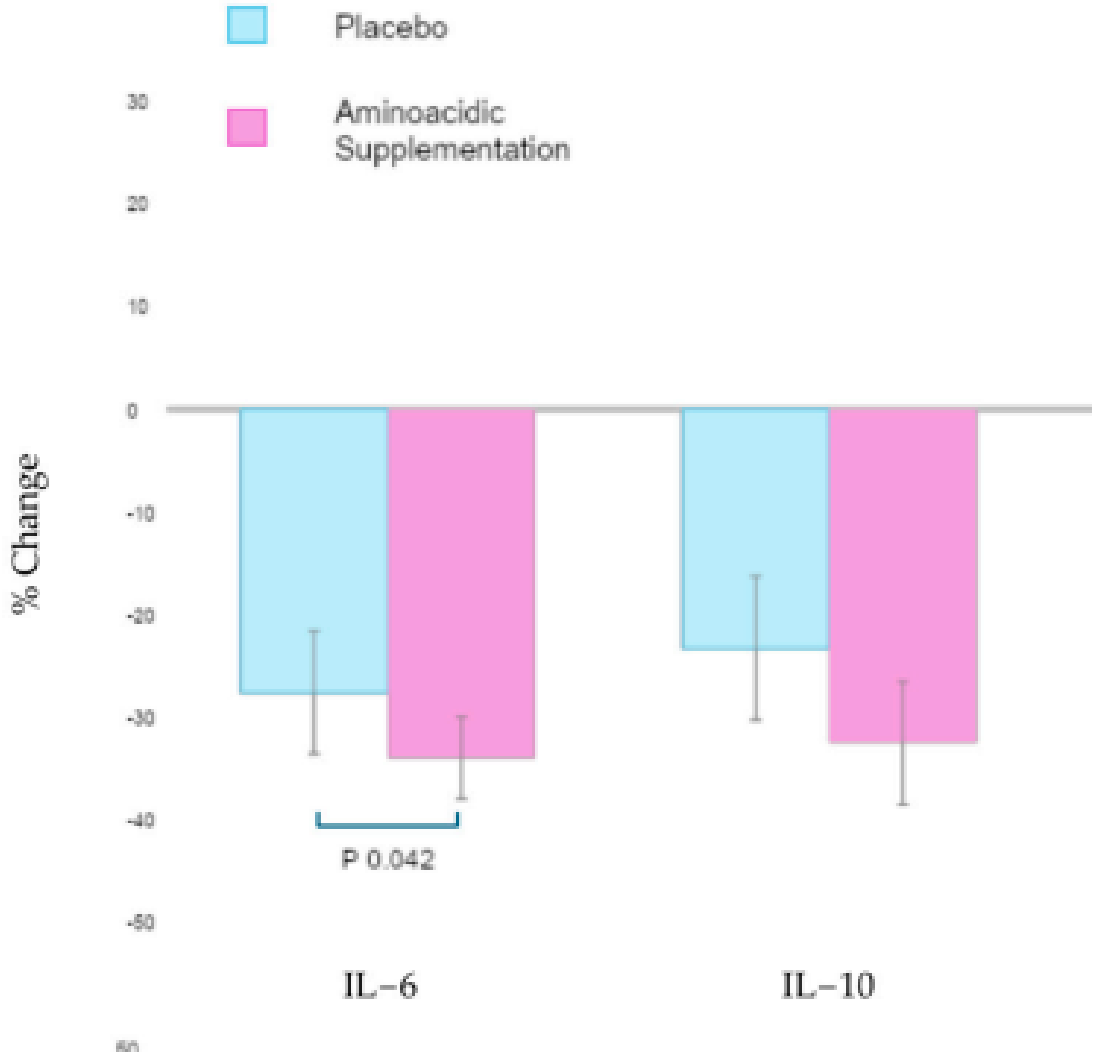


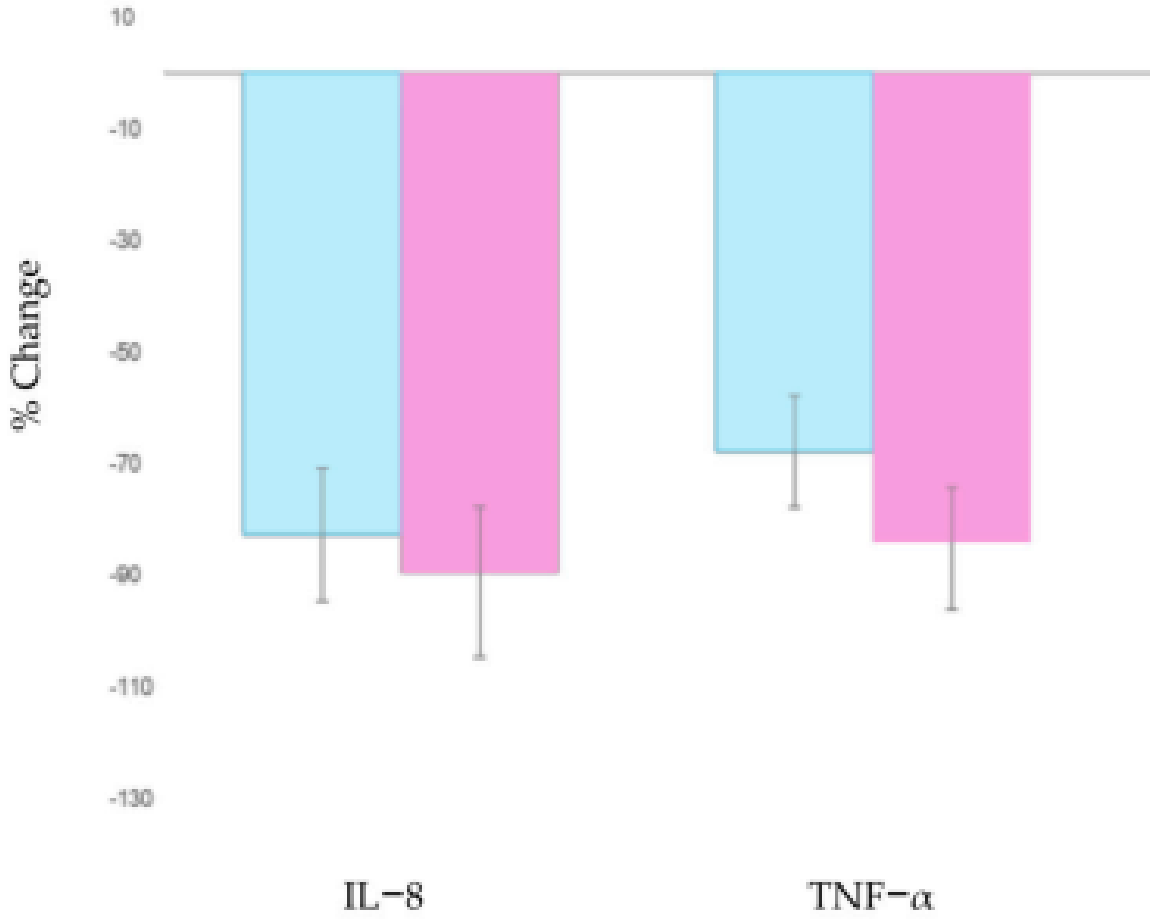
Pedrazini et al. Future Journal of Pharmaceutical Sciences, 2024.



Fogagnolo C, et al. Curr Nutr Rep. 2025

Effects of oral amino acid supplementation on physical activity, systemic inflammation and quality of life in adult patients with Cystic Fibrosis: a single center randomized, double-blind, placebo-controlled pilot study





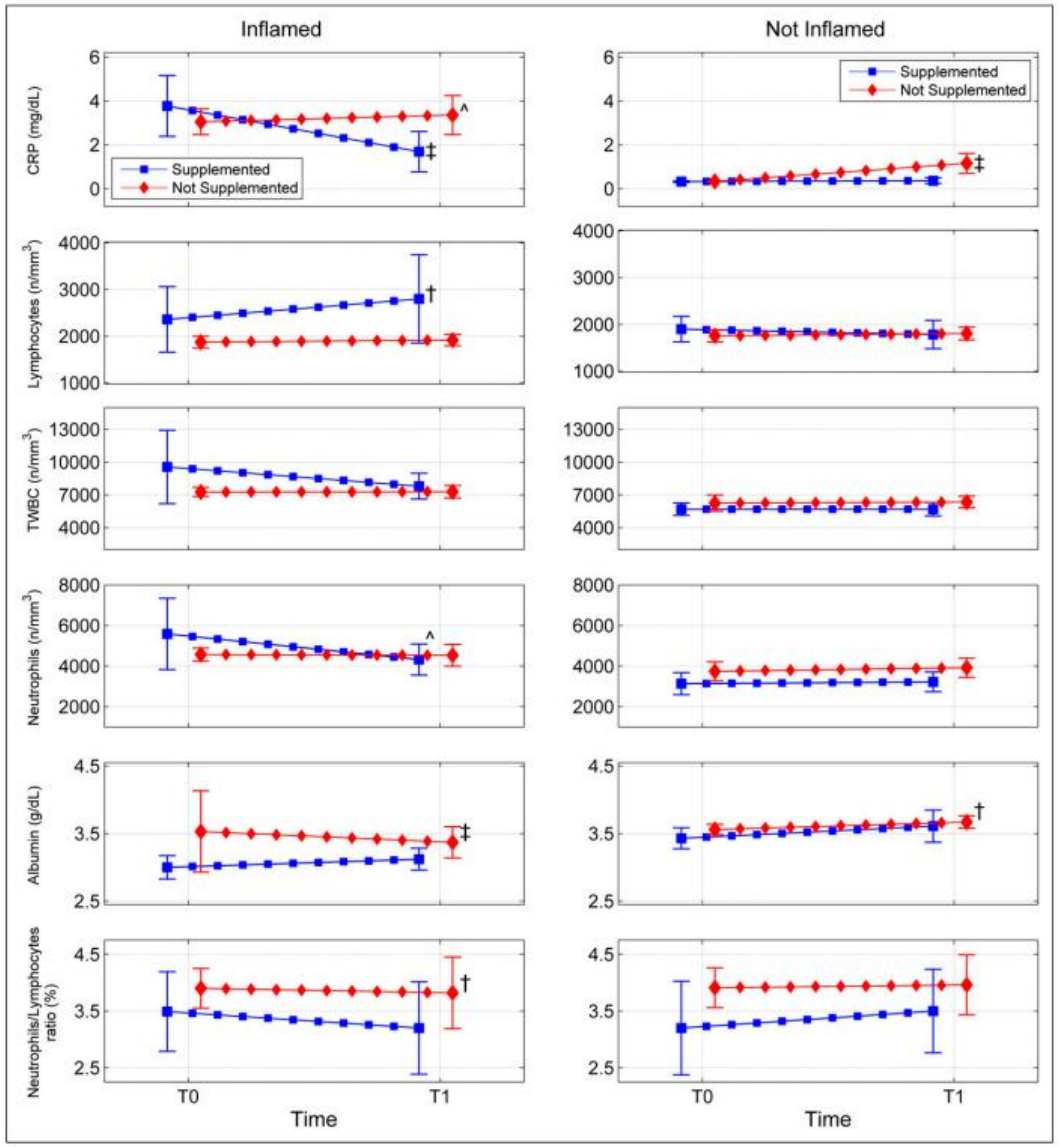
Petraglia L. et al. Nutrients 2025

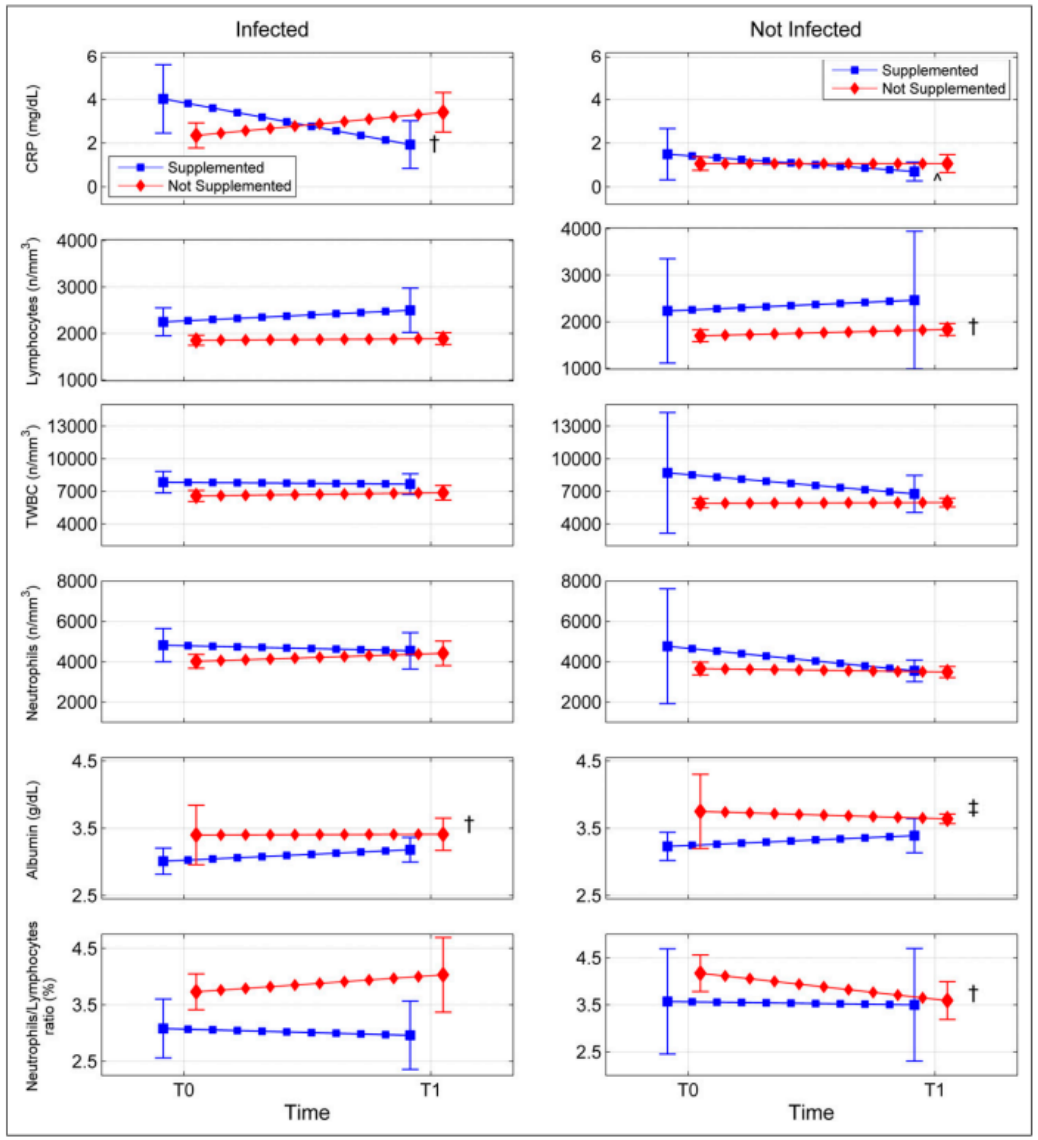
Effects of oral amino acid supplementation on physical activity, systemic inflammation and quality of life in adult patients with Cystic Fibrosis: a single center randomized, double-blind, placebo-controlled pilot study

- La terapia con supplemetazione aminoacidica consisteva in **2 bustine/die** contenenti 20.6 kcal e **4 g di aminoacidi** (inclusi gli aminoacidi essenziali) **per 4 settimane**
- Popolazione **non anziana**
- La numerosità campionaria era esigua: **solo 60 pazienti**

Valore energetico	20.6 Kcal
Grassi	0.15 g
Carboidrati	0.25
Proteine	0
L-Leucina	1250 mg
L-Lisina	650 mg
L-Isoleucina	625 mg
L-Valina	625 mg
L-Treonina	350 mg
L-Cistina	150 mg
L-Istidina	150 mg
L-Fenilalanina	100 mg
L-Metionina	50 mg
L-Tirosina	30 mg
L-Triptofano	20 mg
Vitamina B6	0.15 mg
Vitamina B1	0.15 mg

282 elderly patients admitted to the rehabilitation institute after acute events





Aquilani R. et al International Journal of Immunopathology and Pharmacology , 2021

metabolites

MDPI

Article

Essential Amino Acid Supplementation May Attenuate Systemic Inflammation and Improve Hypoalbuminemia in Subacute Hemiplegic Stroke Patients

Mirella Boselli [1,†], Roberto Aquilani [2,†], Roberto Maestri [3], Paolo Iadarola [2], Alessandro Magistroni [1], Chiara Ferretti [1], Antonia Pierobon [4], Matteo Cotta Ramusino [5], Alfredo Costa [6,7], Daniela Buonocore [2], Marco Peviani [2], Federica Boschi [8] and Manuela Verri [2,*]

Conclusions: This study demonstrates the feasibility of improving post-stroke inflammation and hypoalbuminemia through supplementation with a physiological dose of EAAs. However, the findings also highlight the limitations of the current EAA formulation, which proved insufficient to fully resolve systemic inflammation and correct hypoalbuminemia.

nutrients

MDPI

Review

Dietary Protein and Amino Acid Supplementation in Inflammatory Bowel Disease Course: What Impact on the Colonic Mucosa?

Sandra Vidal-Lletjós [1], Martin Beaumont [1], Daniel Tomé [1], Robert Benamouzig [1,2], François Blachier [1,*] and Annaïg Lan [1,*]

nutrients

MDPI

Review

Duality of Branched-Chain Amino Acids in Chronic Cardiovascular Disease: Potential Biomarkers versus Active Pathophysiological Promoters

Daniela Maria Tanase [1,2,†], Emilia Valasciuc [1,2,*], Claudia Florida Costea [3,4,†], Dragos Viorel Scripcariu [5,6], Anca Ouatu [1,2], Loredana Liliana Hurjui [7,8], Claudia Cristina Tarniceriu [9,10], Diana Elena Floria [1,11], Manuela Ciocoiu [12], Livia Genoveva Baroi [13,14] and Mariana Floria [1,2]

Gli amminoacidi sono modulatori biologici

Il loro effetto può dipendere da:

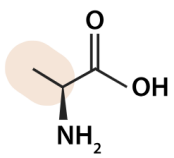
- **Stato Infiammatorio**
- **Comorbidità**
- **Equilibrio nutrizionale complessivo**
- **Tipologia, dosaggio e durata dell'assunzione**

Take Home Message

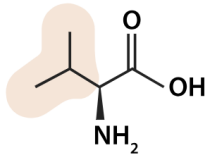
SUPPLEMENTAZIONE AMINOACIDICA NELLA MODULAZIONE DELL'INFIAMMAZIONE CRONICA

- La maggior parte delle evidenze scientifiche sulla supplementazione dei singoli amminoacidi deriva da studi in vivo e in vitro
- Gli studi clinici sono esigui, condotti con metodologie eterogenee e in setting molto diversi
- I risultati a volte non sono univoci
- Ulteriori studi sono indispensabili per esplorare il vero potenziale clinico della supplementazione amminoacidica

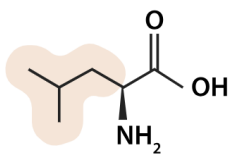
Non-polar side chains, uncharged, hydrophobic



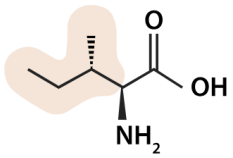
Alanine (Ala, A)
MW: 89,09
pI: 6,01
C3H7N1O2



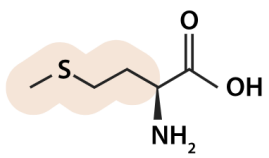
Valine (Val, V)
MW: 117,15
pI: 6,00
C5H11N1O2



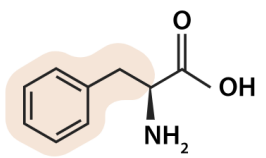
Leucin (Leu, L)
MW: 131,17
pI: 6,01
C6H13N1O2



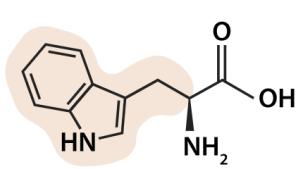
Isoleucine (Ile, I)
MW: 131,17
pI: 6,05
C6H13N1O2



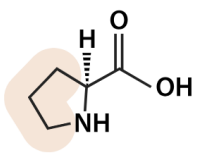
Methionine (Met, M)
MW: 149,21
pI: 5,74
C5H11N1O2S1



Phenylalanine (Phe, F)
MW: 165,19
pI: 5,49
C9H11N1O2



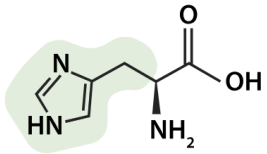
Tryptophan (Trp, W)
MW: 204,23
pI: 5,89
C11H12N2O2



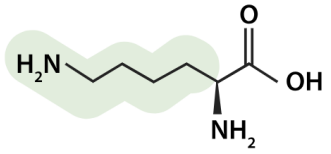
Proline (Pro, P)
MW: 115,13
pI: 6,30
C5H9N1O2

Electrically charged side chains

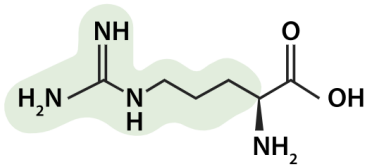
Basic



Histidine (His, H)
MW: 155,16
pI: 7,60
C6H9N3O2

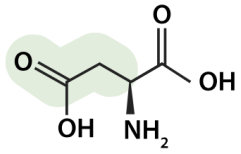


Lysine (Lys, K)
MW: 146,19
pI: 9,60
C6H14N2O2

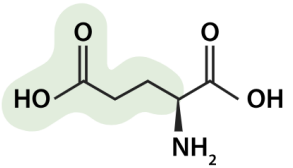


Arginine (Arg, R)
MW: 174,20
pI: 10,76
C6H14N4O2

Acidic

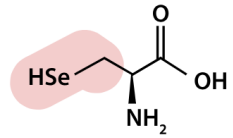


Aspartaic Acid (Asp, D)
MW: 133,1
pI: 2,85
C4H7N1O4



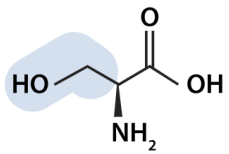
Glutamic Acid (Glu, E)
MW: 147,13
pI: 3,15
C5H9N1O4

Special amino acids

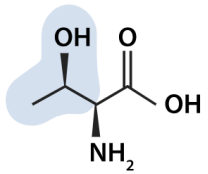


Selenocysteine (Sec, U)
MW: 168,07
pI: 3,9
C3H7N1O2Se

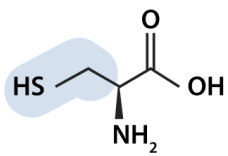
Polar side chains, uncharged



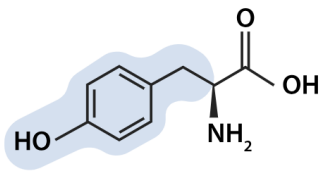
Serine (Ser, S)
MW: 105,09
pI: 5,68
C3H7N1O3



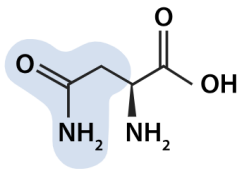
Threonine (Thr, T)
MW: 119,12
pI: 5,60
C4H9N1O3



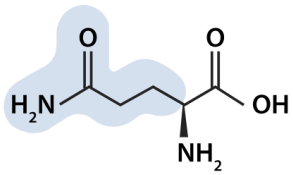
Cysteine (Cys, C)
MW: 121,16
pI: 5,05
C3H7N1O2S1



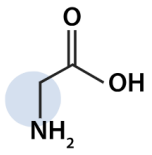
Tyrosine (Tyr, Y)
MW: 181,19
pI: 5,64
C9H11N1O3



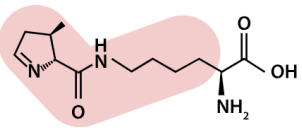
Asparagine (Asn, N)
MW: 132,12
pI: 5,41
C4H8N2O3



Glutamine (Gln, Q)
MW: 146,15
pI: 5,65
C5H10N2O3

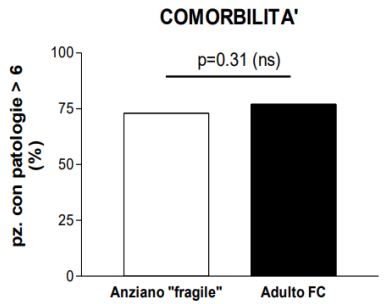


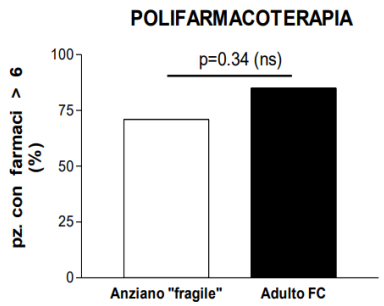
Glycine (Gly, G)
MW: 75,07
pI: 6,06
C2H5N1O2



Pyrrolysine (Pyl, O)
MW: 255,31
pI:
C12H21N3O3

Prevalenza di comorbilità e polifarmacoterapia

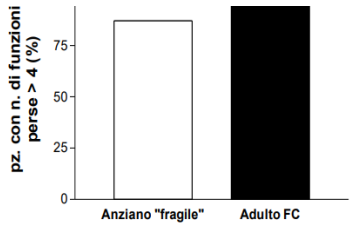


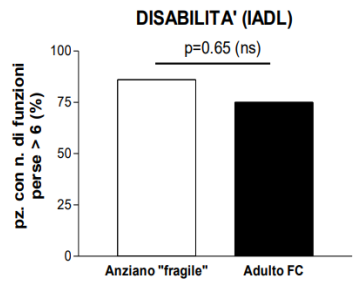


Carnovale et al Orizzonti FC 2003

La fibrosi cistica dell'adulto è un paradigma di fragilità

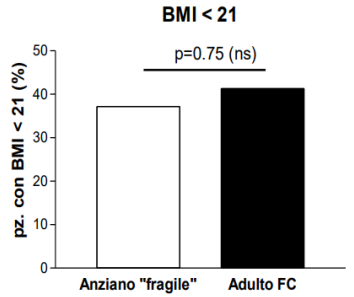
Prevalenza di disabilità nelle attività di base (BADL) e strumentali (IADL) della vita quotidiana

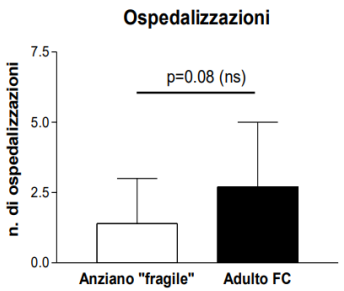




Carnovale et al Orizzonti FC 2003

Prevalenza di ridotto indice di massa corporea (BMI <21) ed ospedalizzazioni





Carnovale et al Orizzonti FC 2003