

7º MBNE

MEETING BRASILEIRO DE
NUTRIÇÃO ESTÉTICA

Realização





DRA. ROBERTA CARBONARI

Nutricionista | SÃO PAULO

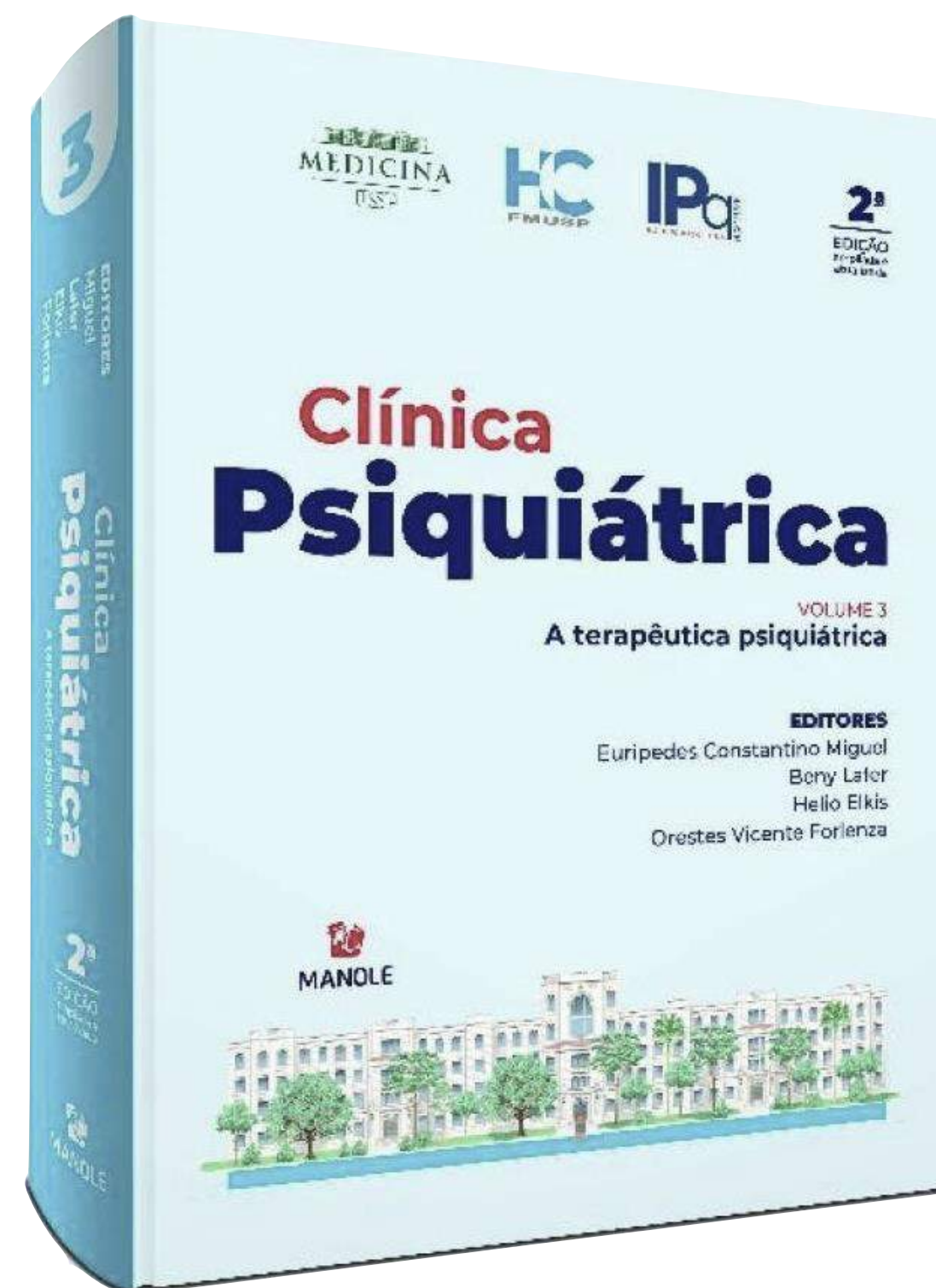
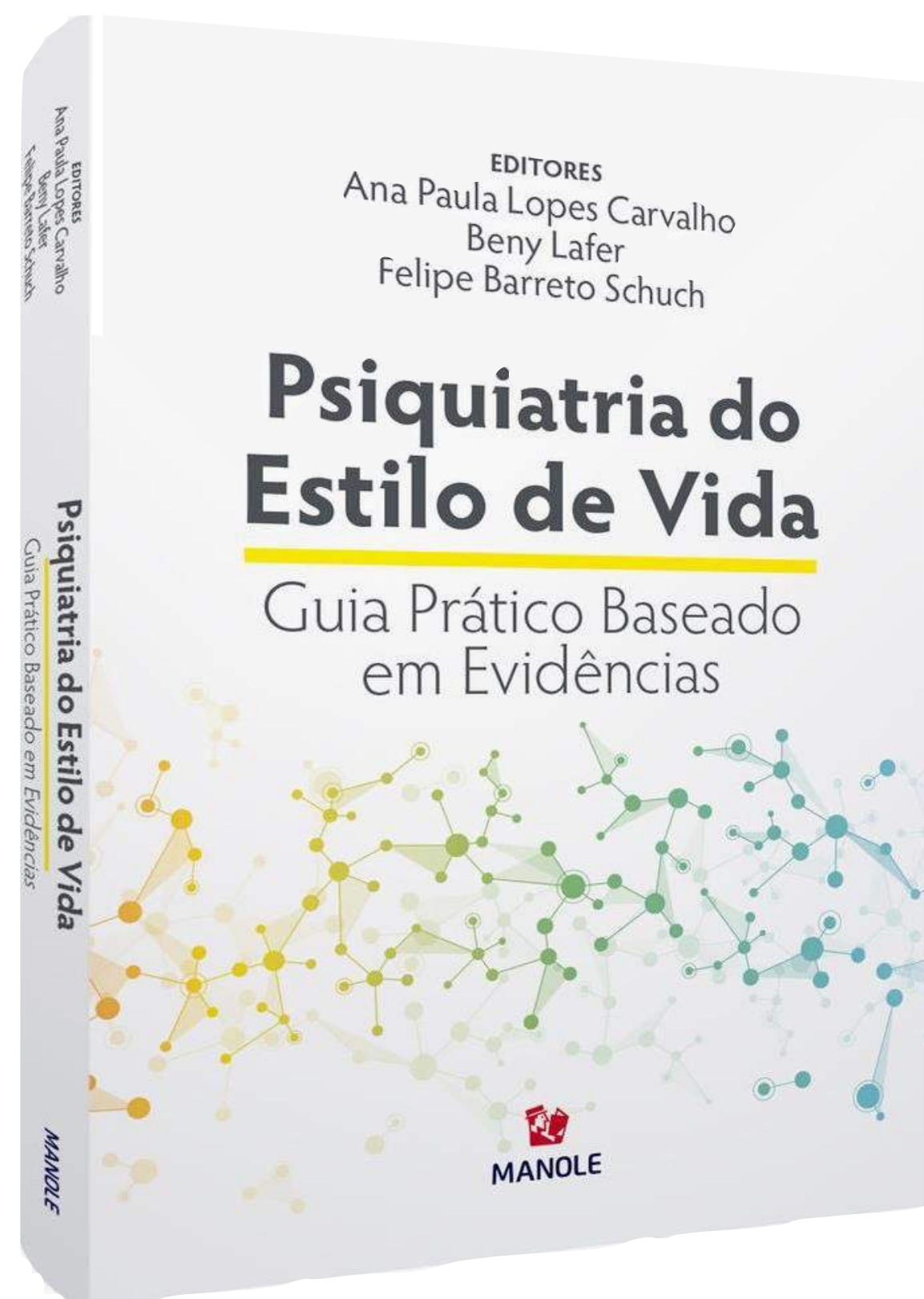


TEMA

**PSIQUIATRIA NUTRICIONAL
E DEPRESSÃO**

Módulo 2
SAÚDE DA
MULHER

PSIQUIATRIA NUTRICIONAL



Busca por emagrecimento é maior que pela felicidade no Google

Pesquisa constatou que, em média, 112 mil delas eram sobre emagrecimento, enquanto as buscas relacionadas à felicidade tiveram cerca de 23 mil procuras

112 MIL QUEREM
EMAGRECER

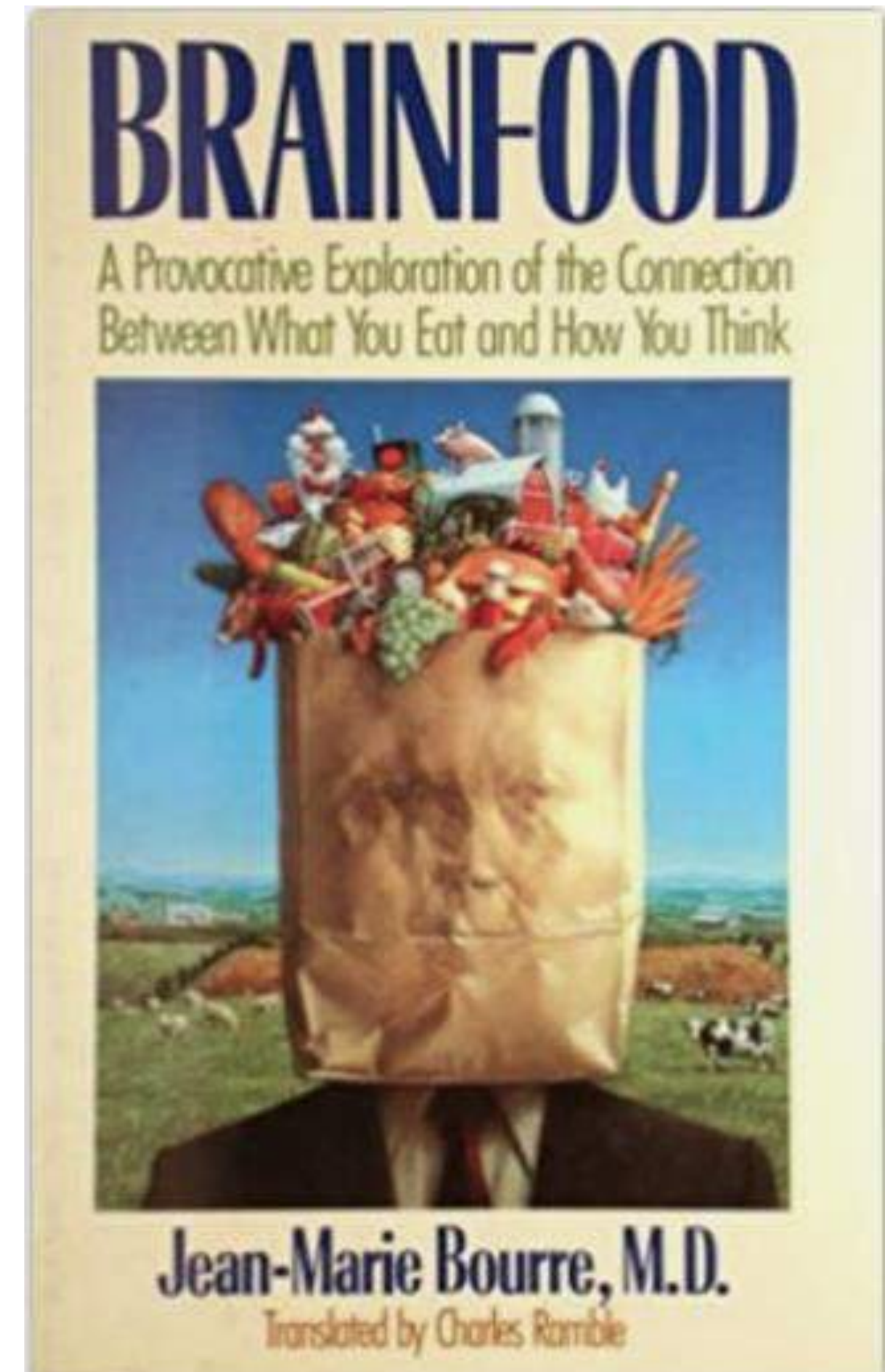
23 MIL QUEREM
FELICIDADE

Pesquisa feita pela plataforma de consultoria digital SEMRush 2019.

A publicação de seu primeiro livro...

"A dietética do cérebro: Inteligência e prazer" deu origem a controvérsias, às vezes violentas, principalmente por parte de psiquiatras e neurologistas.

Eles refutavam a teoria do Dr. Bourre de que os nutrientes influenciam a inteligência.



THE LANCET

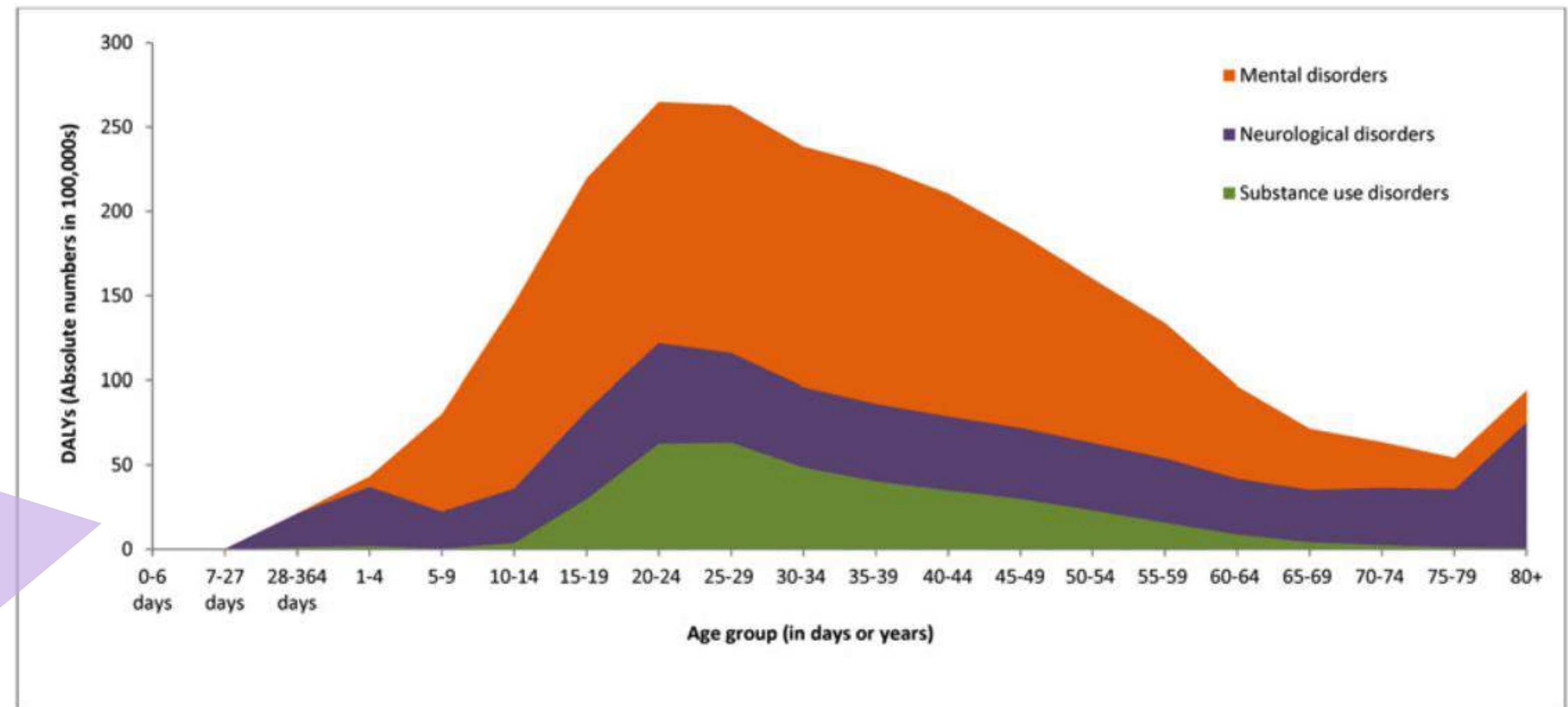
Global Burden of Disease

2017 | 2016 | 2015 | 2013 | 2010

O estudo Global Burden of Disease (GBD), publicado no The Lancet, envolveu mais de 1800 pesquisadores em mais de 180 países e reuniu sistematicamente evidências sobre a prevalência de doenças, suas causas e consequências.

ALIMENTAÇÃO COMO 2a. MAIOR CAUSA DE MORTE NO MUNDO.

DOENÇAS COMO ALZHEIMER E DEMÊNCIAS AUMENTARAM EM 40%.



Note: DALYs = disability-adjusted life years.

Fig 1. Absolute DALYs Attributable to Mental, Neurological, and Substance Use Disorders, by Age, 2010.

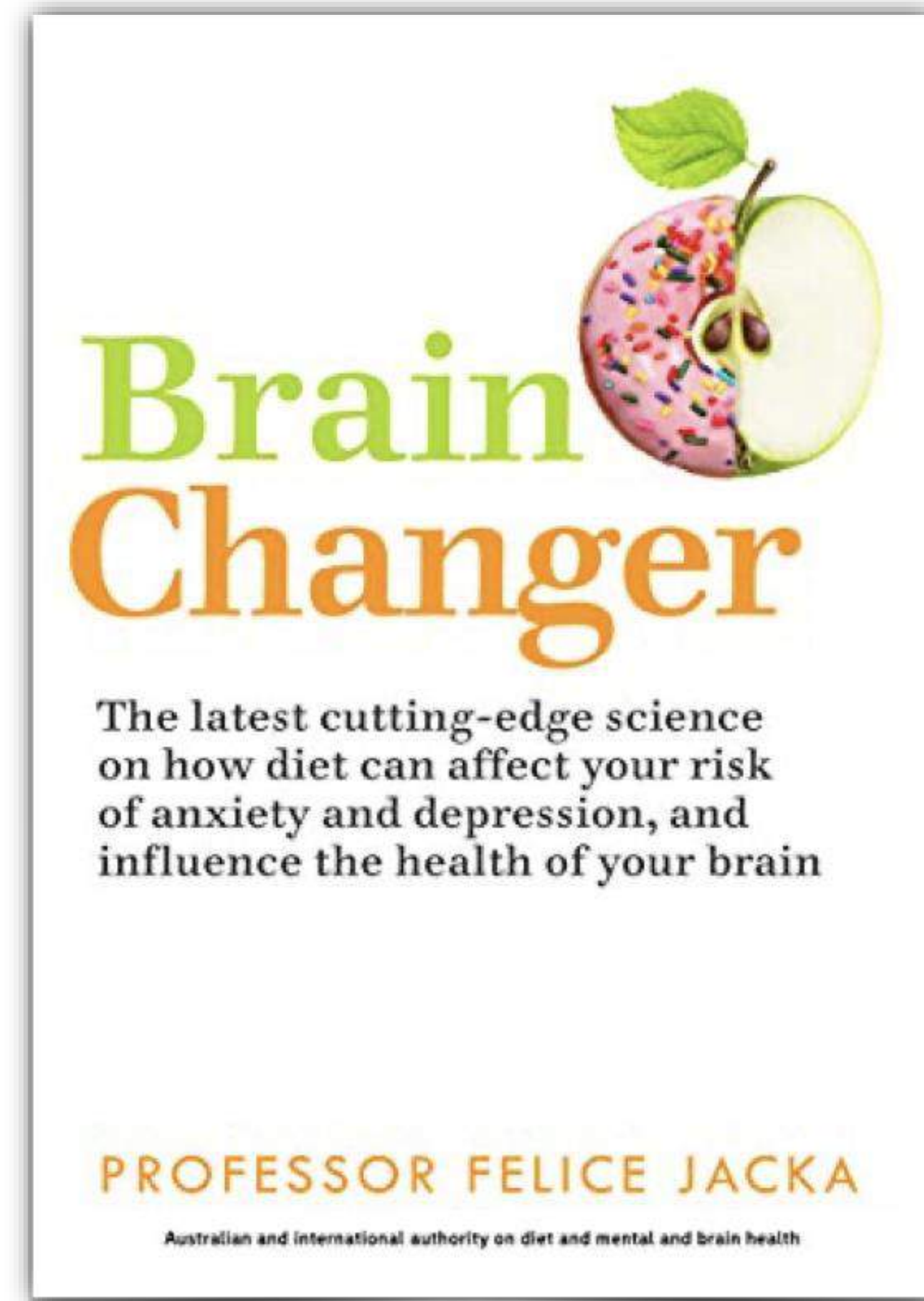


Felice Jacka

International Society for Nutritional Psychiatry Research Fundadora-Presidente).

Food and Mood Centre (Diretora).

Conduziu e publicou os primeiros estudos sobre o papel da dieta na depressão do adolescente, o primeiro estudo a identificar a nutrição materna como importante preditor da saúde mental das crianças e o **primeiro estudo clínico que mostrou que a dieta pode auxiliar a tratar a depressão.**



Conference on 'Diet, nutrition and mental health and wellbeing'

Plenary Lecture: Mental health as an emerging public health problem

Marx, Moseley, Jacka; 2017

Mental illness, including depression, anxiety and bipolar disorder, accounts for a significant proportion of global disability and poses a substantial social, economic and health burden. Treatment is presently dominated by pharmacotherapy, such as antidepressants, and psychotherapy, such as cognitive behavioural therapy; however, such treatments avert less than half of the disease burden, suggesting that additional strategies are needed to prevent and treat mental disorders. There are now consistent mechanistic, observational and interventional data to suggest diet quality may be a modifiable risk factor for mental illness. This review provides an overview of the nutritional psychiatry field. It includes a discussion of the neurobiological mechanisms likely modulated by diet, the use of dietary and nutraceutical interventions in mental disorders, and recommendations for further research. Potential biological pathways related to mental disorders include inflammation, oxidative stress, the gut microbiome, epigenetic modifications and neuroplasticity. Consistent epidemiological evidence, particularly for depression, suggests an association between measures of diet quality and mental health, across multiple populations and age groups; these do not appear to be explained by other demographic, lifestyle factors or reverse causality. One recently published intervention trial provides preliminary clinical evidence that dietary interventions in clinically diagnosed populations are feasible and can provide significant clinical benefit. Furthermore, nutraceuticals including *n*-3 fatty acids, folate, *S*-adenosylmethionine, *N*-acetyl cysteine and probiotics, among others, are promising avenues for future research. Continued research is now required to investigate the efficacy of intervention studies in large cohorts and within clinically relevant populations, particularly in patients with schizophrenia, bipolar and anxiety disorders.

Evidências consistentes sugerem **associação entre qualidade da dieta e saúde mental**, independente de região demográfica e estilo de vida.

MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

EPIGENÉTICA

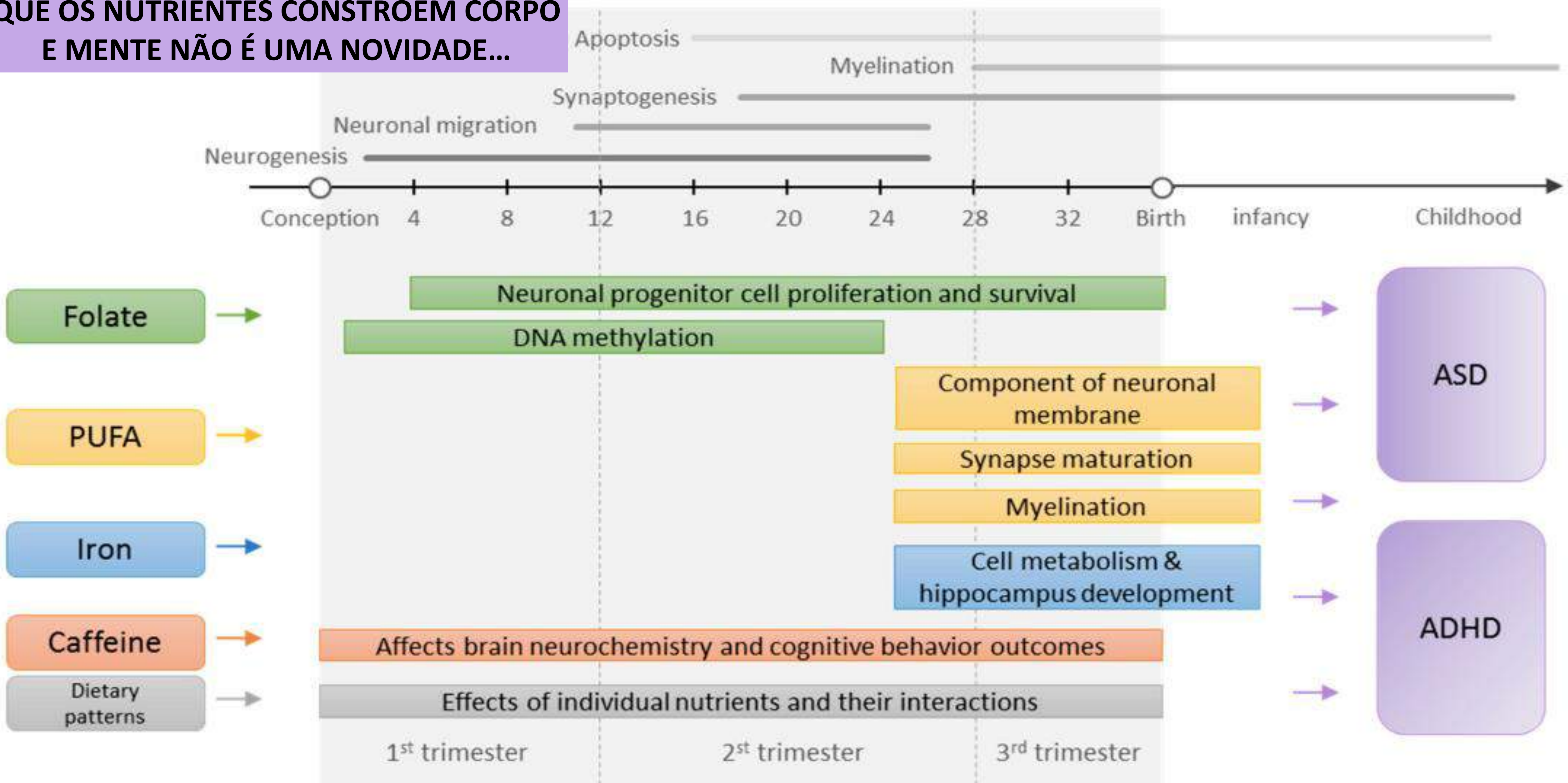
INFLAMAÇÃO

ESTRESSE OXIDATIVO

MICROBIOTA INTESTINAL

NEUROPLASTICIDADE

QUE OS NUTRIENTES CONSTROEM CORPO E MENTE NÃO É UMA NOVIDADE...



MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

INFLAMAÇÃO
ESTRESSE OXIDATIVO
MICROBIOTA INTESTINAL
NEUROPLASTICIDADE
EPIGENÉTICA



A Review of the Impact of Maternal Obesity on the Cognitive Function and Mental Health of the Offspring

[Laura Contu](#) and [Cheryl A. Hawkes](#)*

Marica Bakovic, Academic Editor

IMC GESTACIONAL ASSOCIADO A REBAIXAMENTO COGNITIVO, DEPRESSÃO E ANSIEDADE DO BEBÊ.

3. Human Studies

Go to:

The impact of maternal obesity on cognitive function and the development of psychiatric disorders in human offspring has recently been reviewed [[57](#),[58](#),[59](#)]. In general, analyses of longitudinal, prospective, and observational studies support an association between maternal BMI and poorer cognitive performance, as well as increased risk of developing depression and anxiety. The relationship between maternal obesity and offspring risk of developing attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorder is currently less clear.

TDAH E TEA COM EVIDÊNCIAS MENOS ROBUSTAS.

Globally, more than 20% of women of reproductive age are currently estimated to be obese. Children born to obese mothers are at higher risk of developing obesity, coronary heart disease, diabetes, stroke, and asthma in adulthood. Increasing clinical and experimental evidence suggests that maternal obesity also affects the health and function of the offspring brain across the lifespan. This review summarizes the current findings from human and animal studies that detail the impact of maternal obesity on aspects of learning, memory, motivation, affective disorders, attention-deficit hyperactivity disorder, autism spectrum disorders, and neurodegeneration in the offspring. Epigenetic mechanisms that may contribute to this mother-child interaction are also discussed.

20% of women of reproductive age are currently estimated to be obese.



International Journal of
Molecular Sciences



[Int J Mol Sci.](#) 2017 May; 18(5): 1093.

Published online 2017 May 19. doi: [10.3390/ijms18051093](https://doi.org/10.3390/ijms18051093)

PMCID: PMC5455002

PMID: [28534818](https://pubmed.ncbi.nlm.nih.gov/28534818/)

A Review of the Impact of Maternal Obesity on the Cognitive Function and Mental Health of the Offspring

[Laura Contu](#) and [Cheryl A. Hawkes](#)*

Marica Bakovic, Academic Editor

ALIMENTAÇÃO MATERNA E INFANTIL AFETA COMPORTAMENTO

Maternal and Early Postnatal Nutrition and Mental Health of Offspring by Age 5 Years: A Prospective Cohort Study

Felice N. Jacko, Ph.D., Eivind Ystrom, Ph.D., Anne Lise Brantsaeter, Ph.D., Evalill Karevold, Ph.D., Christine Roth, M.Sc., Margaretha Haugen, Ph.D., Helle Margrete Meltzer, Ph.D., Synnve Schjølberg, M.A., Michael Berk, Ph.D.

Maior ingestão de alimentos não saudáveis durante a **gravidez** aumentou problemas de **externalização** (idade = 5anos) independentemente de outros fatores de confusão.

Crianças com padrões elevados de dieta não saudável e baixo nível de dieta saudável (**1,5-3 anos**) apresentaram níveis mais altos de **problemas psicológicos internalizantes e externalizantes** aos 5 anos.

Internalizantes: sintomas de ansiedade e depressão

Externalizantes: sintomas de transtorno desafiador de oposição, de conduta e TDAH.

Padrão saudável: vegetais, frutas e cereais ricos em fibras.

Padrão “não saudável”: carnes processadas, cereais refinados, bebidas doces e salgadinhos.



MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

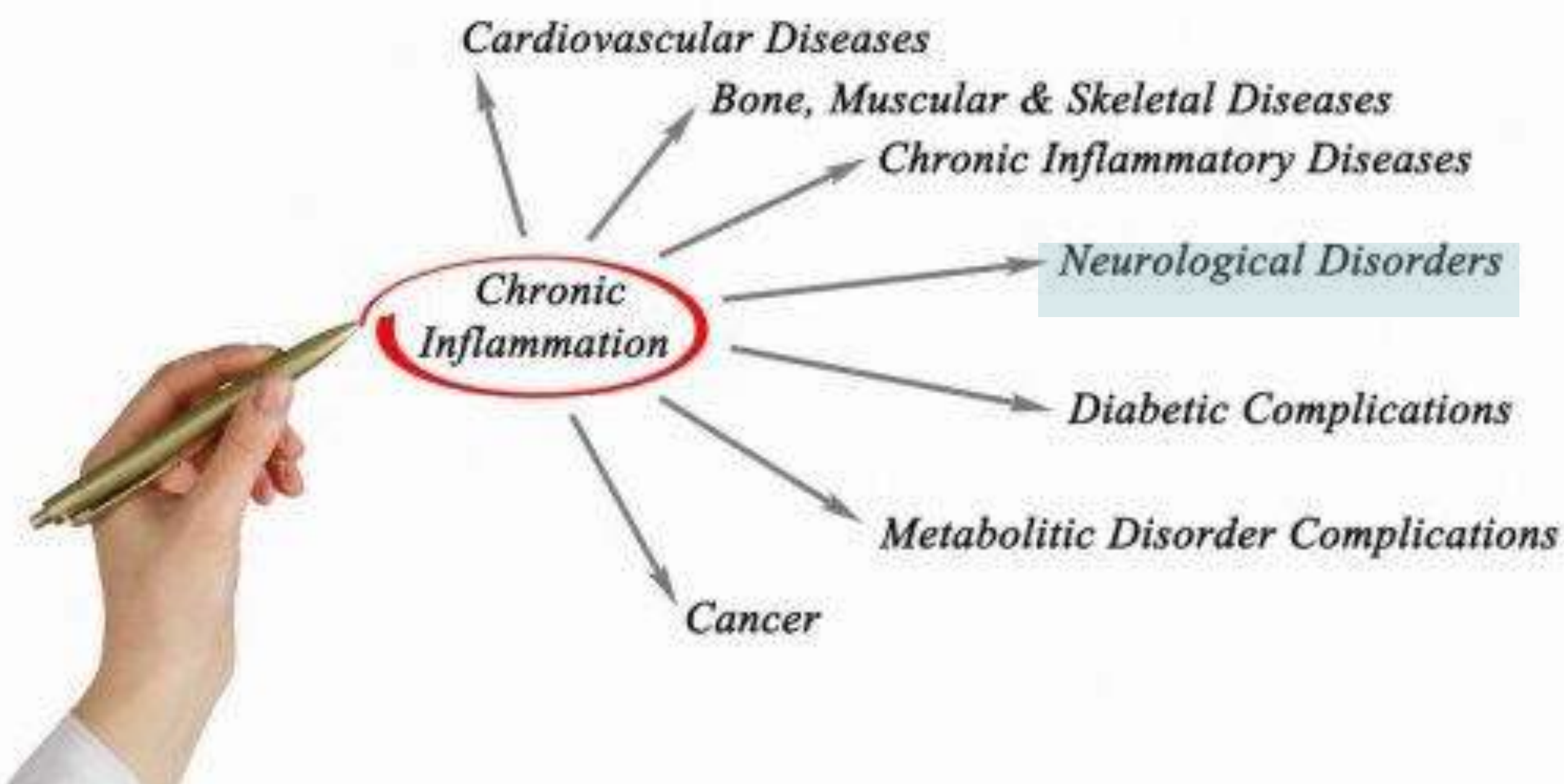
INFLAMAÇÃO

**ESTRESSE OXIDATIVO
MICROBIOTA INTESTINAL
NEUROPLASTICIDADE
EPIGENÉTICA**

INFLAMAÇÃO MEDIADA POR ADIPOSIDADE

Inflammation

Chronic low-grade inflammation, characterised by an elevation in pro-inflammatory cytokines and acute phase proteins, is implicated in the development of *de novo* depression, schizophrenia and bipolar disorder^(13,22,23).



Inflammation in depression: is adiposity a cause?

Richard C. Shelton, MD; Andrew H. Miller, MD

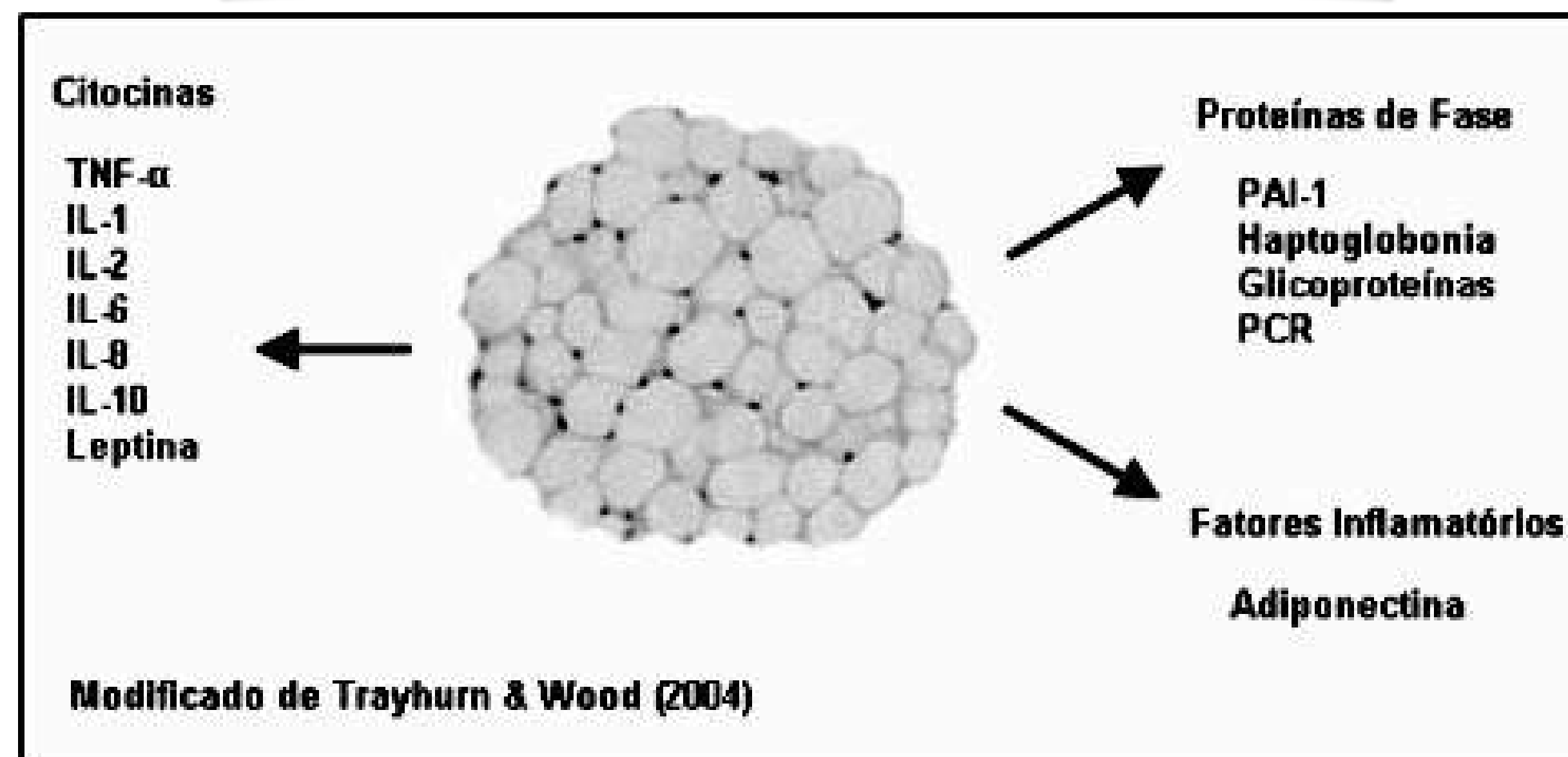
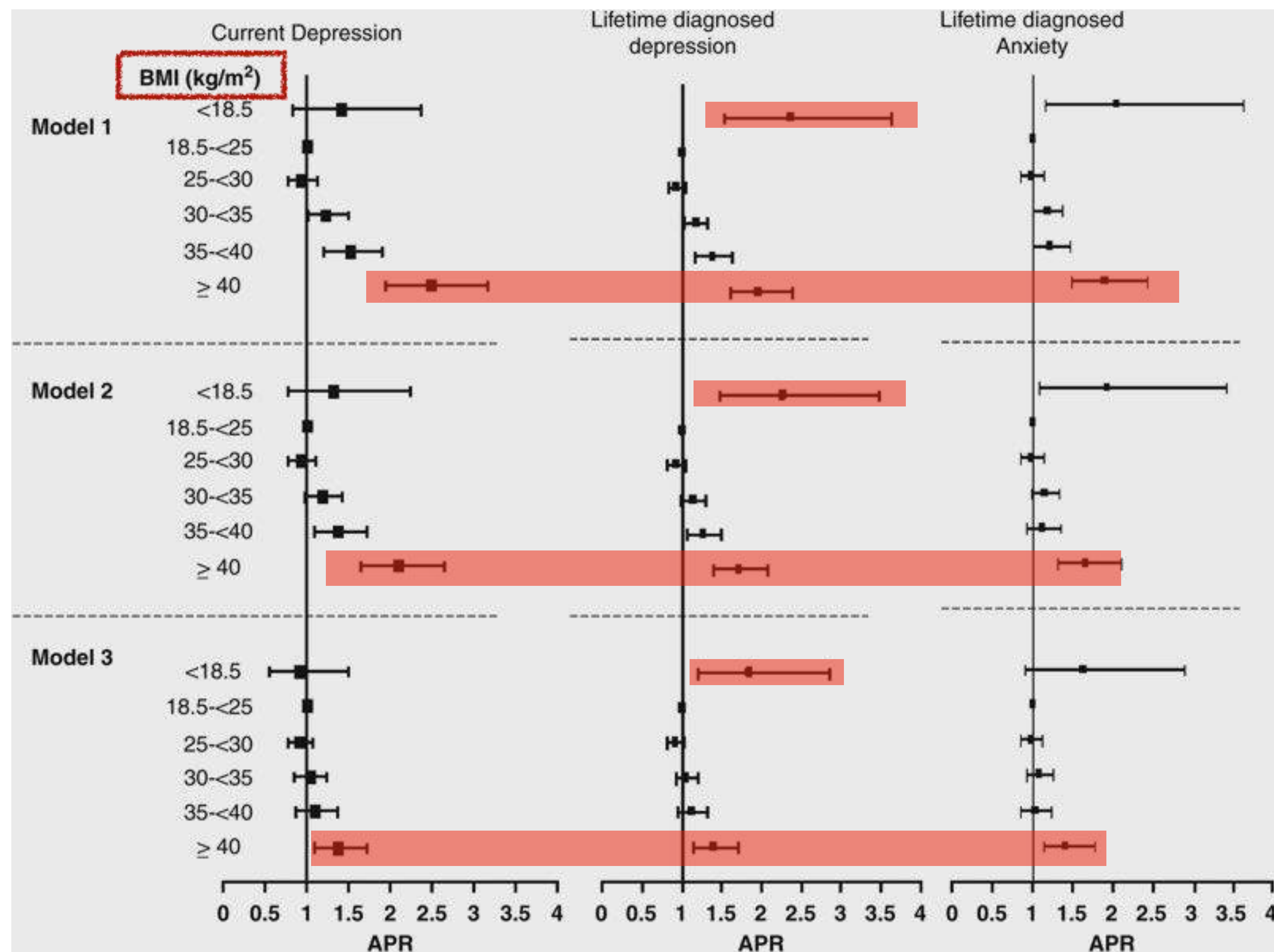


Figura 1. Marcadores inflamatórios e proteínas de fase aguda secretadas pelo tecido adiposo

TNF- α – fator de necrose tumoral- α ; IL – interleucina; PAI-1 – fator de inibição do plasminogênio; PCR – proteína C reativa

Depression and anxiety among US adults: associations with body mass index

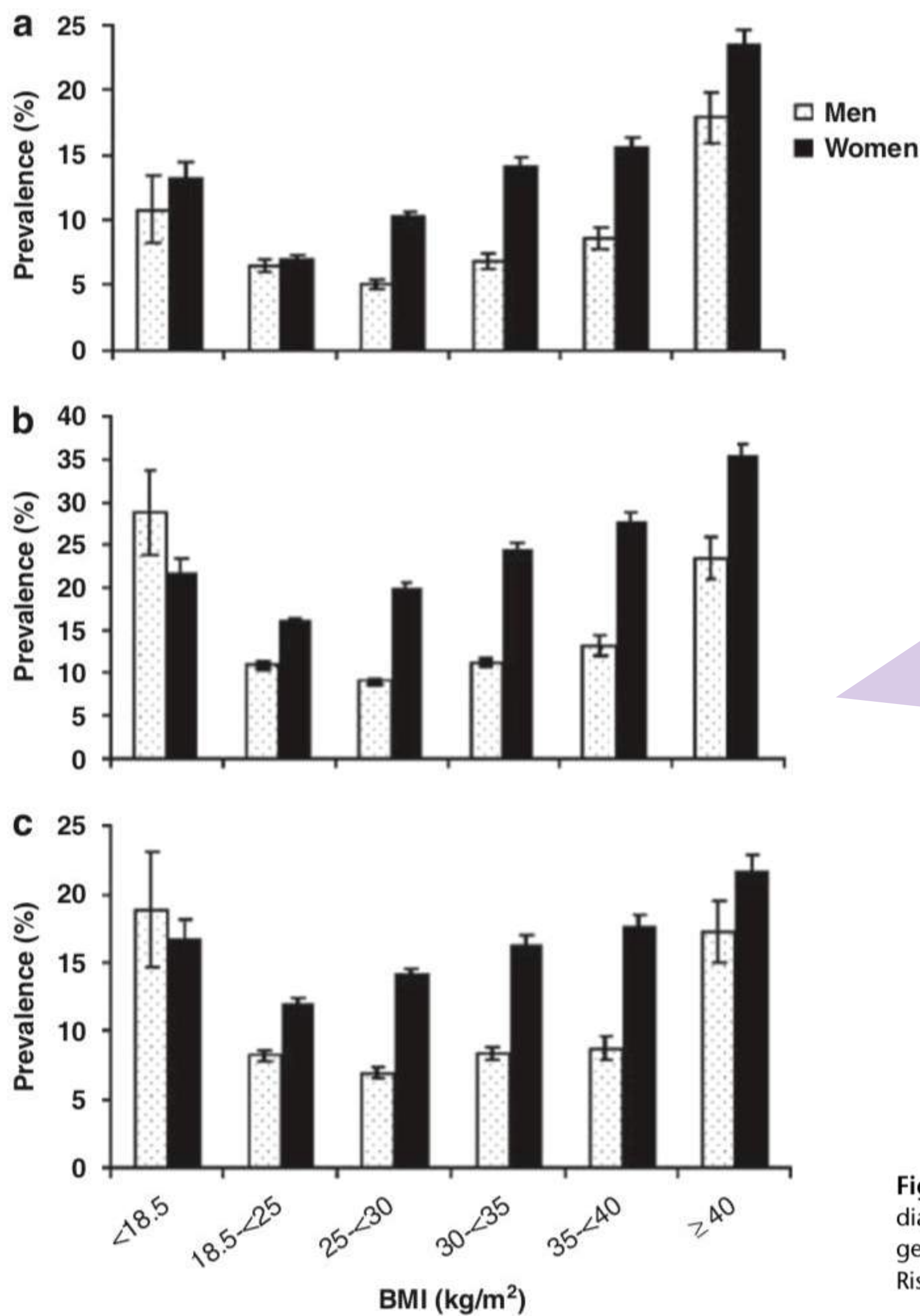
G Zhao , E S Ford, S Dhingra, C Li, T W Strine & A H Mokdad



- Model 1: adjusted for age, race/ethnicity, education, employment and marital status.
- Model 2: adjusted as in Model 1 plus obesity-related comorbidities: diabetes, myocardial infarction, angina pectoris, stroke and asthma.
- Model 3: same set as Model 2 plus current smoking, heavy alcohol drinking, leisure-time exercise, emotional support, life satisfaction and general health status.

Obesidade (IMC ≥ 40) e baixo (IMC ≤ 18,5) peso foram associados ao maior risco de depressão e ansiedade diagnosticadas

Our findings add to the growing evidence that BMI is an independent predictor of mental disorders. Importantly, the



IMC é um preditor independente para distúrbios de ordem mental.



IMC > 25kg/m²
17-31% de risco aumentado diagnóstico de depressão
17-53% risco diagnóstico prévio de depressão

IMC < 18,5kg/m²
risco aumentado em 85% para depressão ao longo da vida.

IMC > 40kg/m²
risco aumentado em 38% de diagnóstico de depressão e 40% risco de diagnóstico prévio

Figure 1 Age-standardized prevalence of current depression (a), lifetime diagnosed depression (b) and anxiety (c) among US adults aged ≥18 years by gender and BMI levels, BRFSS, 2006. BMI, body mass index; BRFSS, Behavioral Risk Factor Surveillance System.

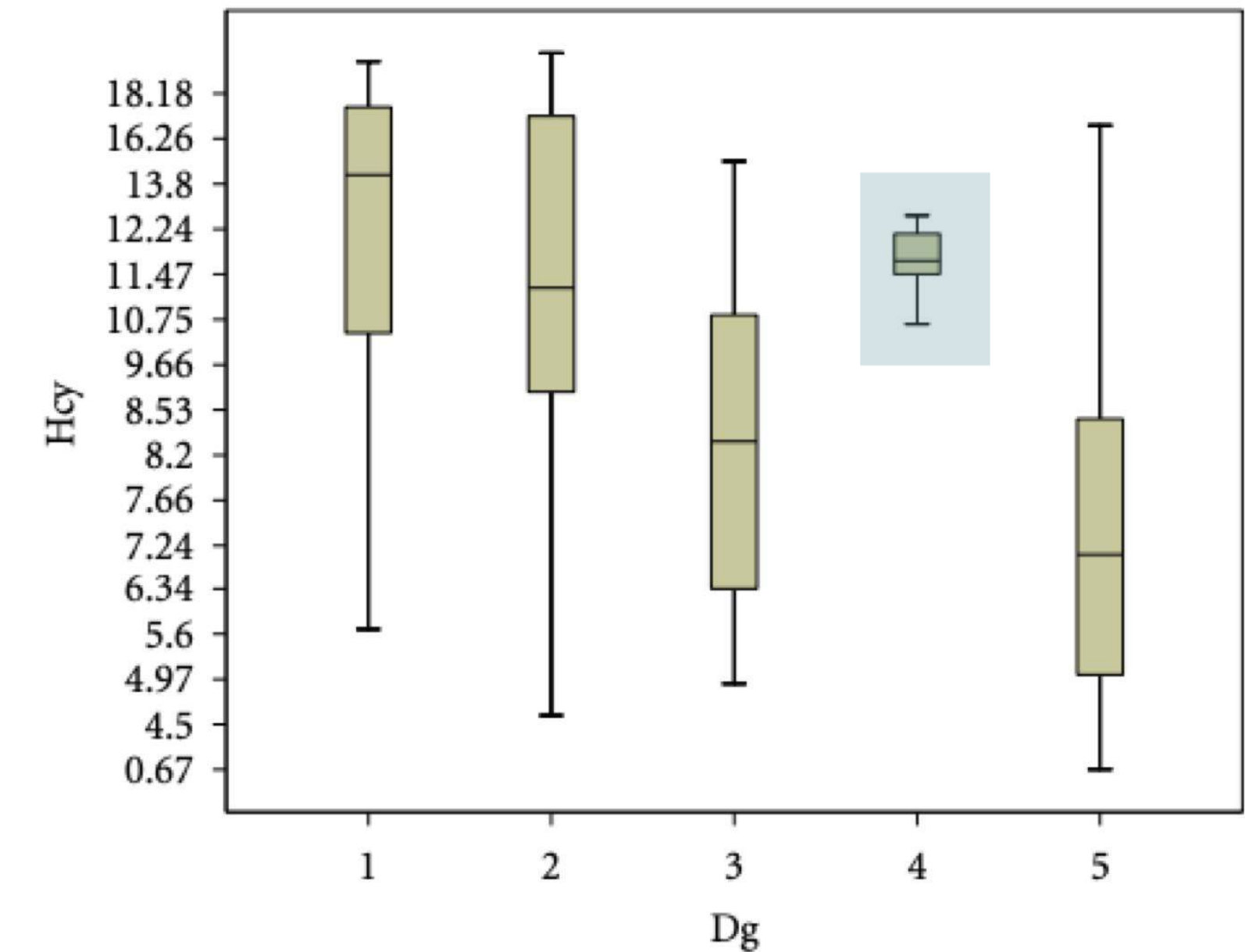
MARCADORES DA INFLAMAÇÃO

Elevated Serum Levels of Homocysteine as an Early Prognostic Factor of Psychiatric Disorders in Children and Adolescents

TABLE 3: Correlation (r) of Hcy concentration between control group and psychiatric disorder groups.

Diagnosis	Control group	
	Pearson's correlation	t test
Schizophrenia spectrum disorders	-.46	<0.01
Paranoid schizophrenia, continuous	-.58	<0.01
Paranoid schizophrenia, episodic with residual symptoms	-.56	<0.01
Simple schizophrenia	-.19	<0.01
Patients with mood disorders	-.45	<0.01

The t -test is used to evaluate the differences in means between two groups. Pearson correlation coefficient r , also called linear or product-moment correlation, is used to determine the extent to which values of two variables are “proportional” to each other.



Codes of diagnosis (Dg):

- 1- paranoid schizophrenia, continuous
- 2- paranoid schizophrenia, episodic with residual symptoms
- 3- simple schizophrenia
- 4- depressive episode, recurrent depressive disorder
- 5- control group (healthy)

FIGURE 1: The mean level of Hcy ($\mu\text{mol/L}$) in patients with affective disorders and schizophrenia spectrum disorders.



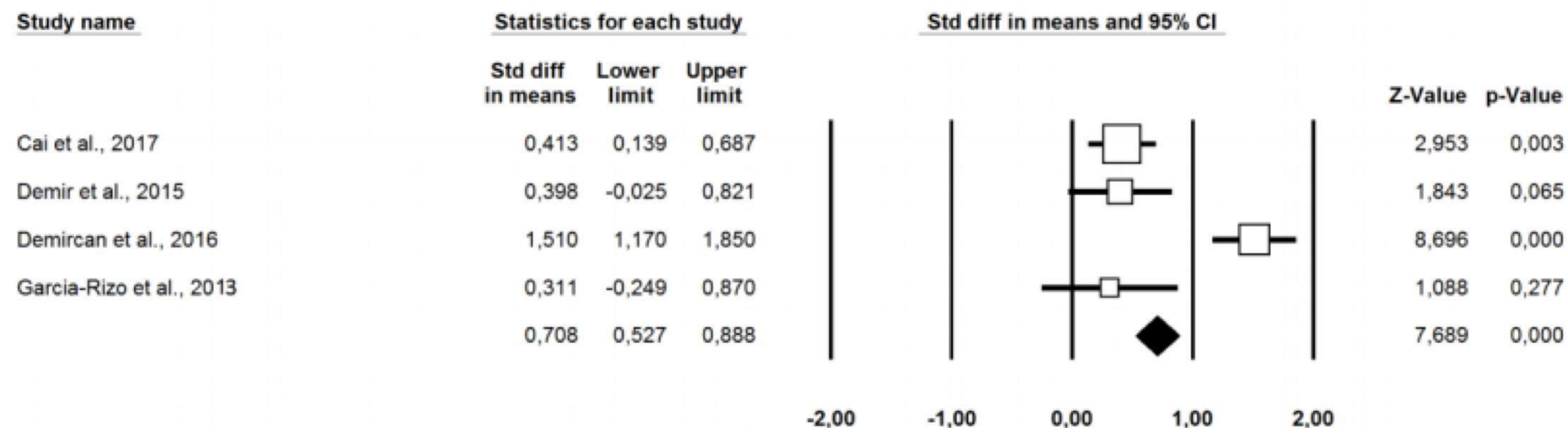
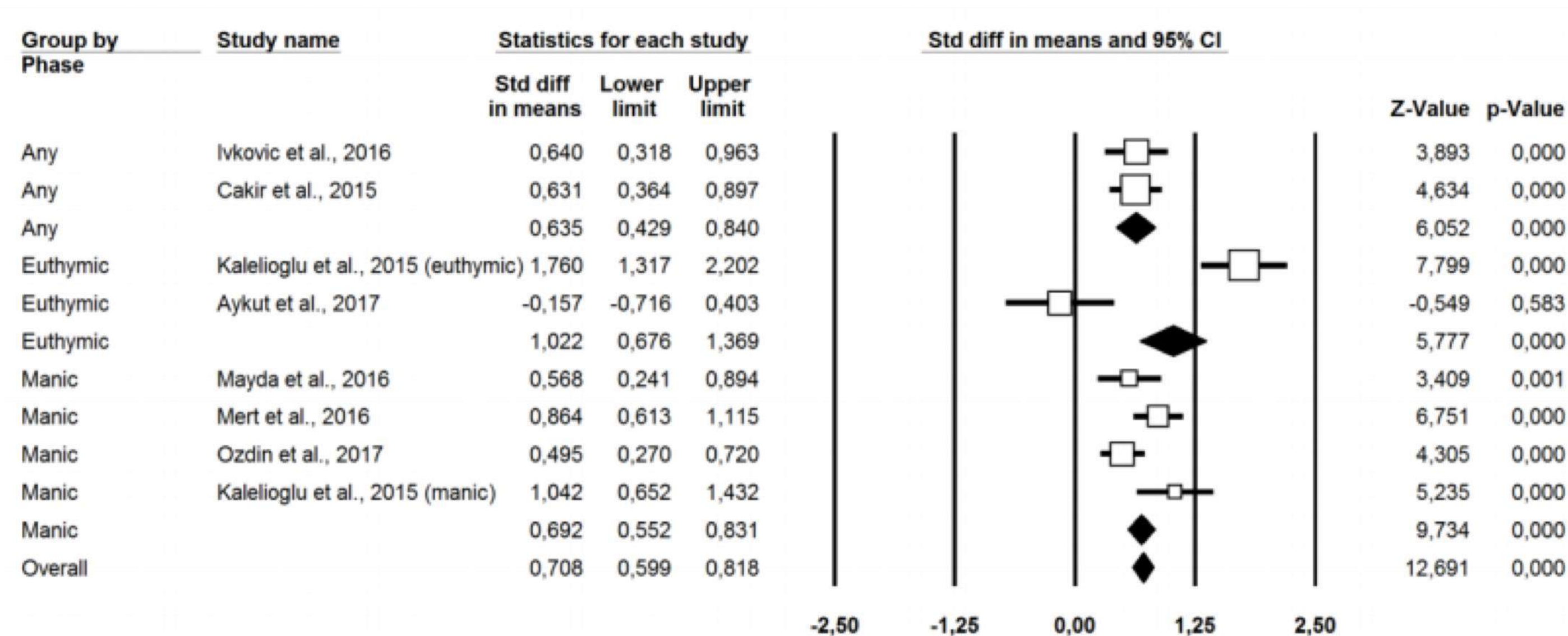
Neutrophil/lymphocyte ratio and platelet/lymphocyte ratio in mood disorders: A meta-analysis

NEUTROFILO/LINFÓCITO



MARCADORES DA
INFLAMAÇÃO

Differences in NLR between subjects with bipolar disorder and healthy controls



MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

INFLAMAÇÃO
ESTRESSE OXIDATIVO
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NEUROPLASTICIDADE
EPIGENÉTICA

BDNF - PLASTICIDADE CEREBRAL

● Mice ● Rats ● Humans

Diminuem a formação de BDNF

Aumentam a formação de BDNF

AGING

○ ● ●

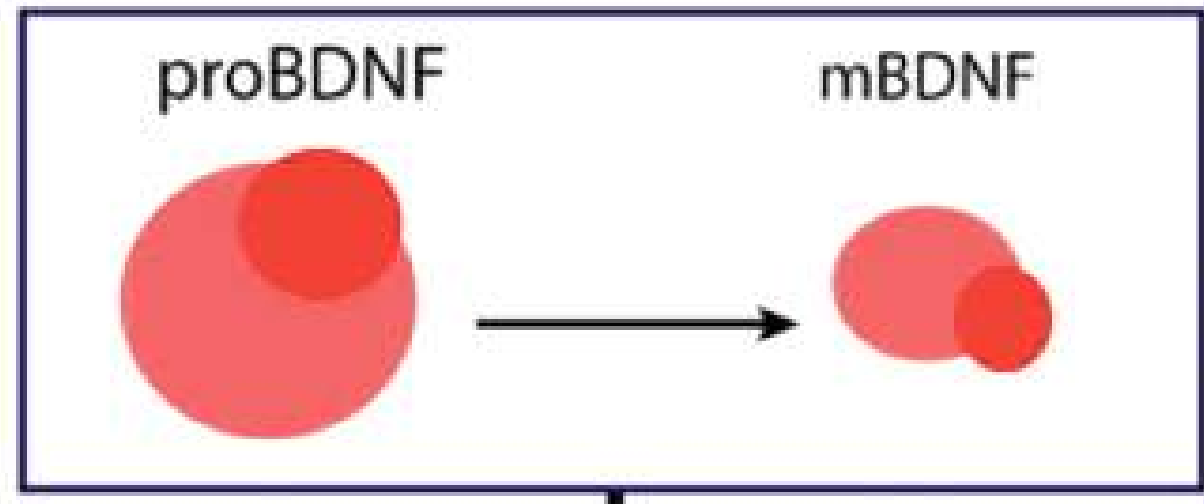
ALZHEIMER'S DISEASE

● ● ●

CHRONIC STRESS

● ● ●

Polymorphisms
Alternative splicing
Alternative polyA signals
Alternative AUG codons



LTD
Apoptosis
Spine Pruning

LTP
Cell survival
Spine complexity

EXERCISE

● ● ●

ENRICHED ENVIRONMENT

● ● ○

ANTIDEPRESSANTS

● ● ●

Memory Performance

O fator neurotrófico derivado do cérebro (BDNF) regula a sobrevivência e o crescimento dos neurônios, diferenciação celular, formação de sinapses, eficiência e a plasticidade sináptica, influenciando memória e funções cognitivas.

Brain-Derived Neurotrophic Factor: A Key Molecule for Memory in the Healthy and the Pathological Brain

frontiers in Cellular Neuroscience

published: 07 August 2019
doi: 10.3389/fncel.2019.00363

SISTEMA ANTIOXIDANTE

Chronic Obstructive Pulmonary Diseases:
Journal of the COPD Foundation



Review

The Beneficial Effects of Antioxidants in Health and Diseases

Sabina Janciauskiene, PharmD, PhD¹

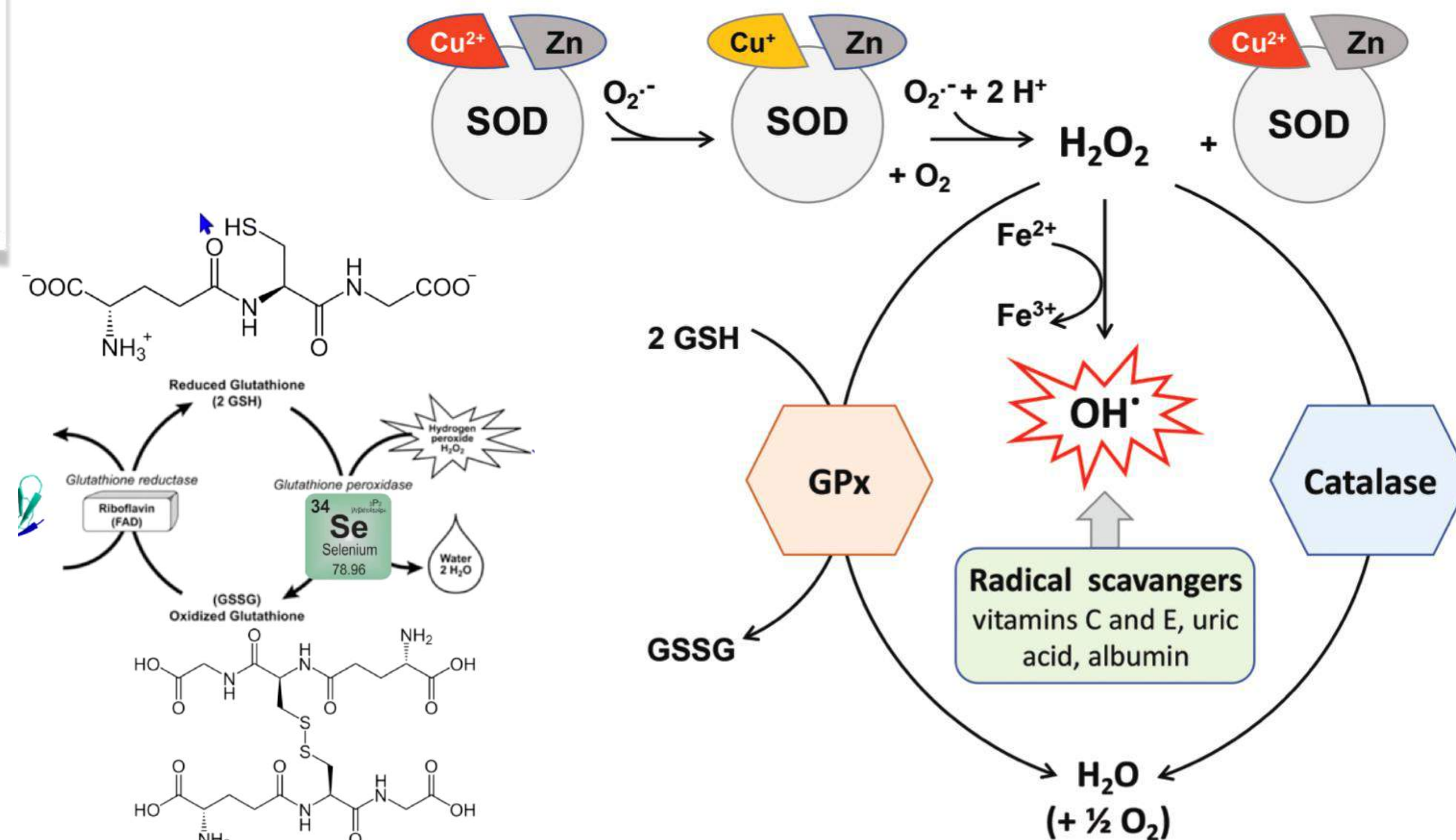
Enzimas Superóxido Dismutase (SOD)

Glutathiona redutase e Peroxidase

Catalases

....dependente de selênio, B2 e cisteína, cobre, zinco, manganês

Figure 2. Defense Mechanisms Against Free Radicals



MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

INFLAMAÇÃO
ESTRESSE OXIDATIVO
MICROBIOTA INTESTINAL
NEUROPLASTICIDADE
EPIGENÉTICA

EIXO MICROBIOTA- INTESTINO-CÉREBRO

Nervo vago

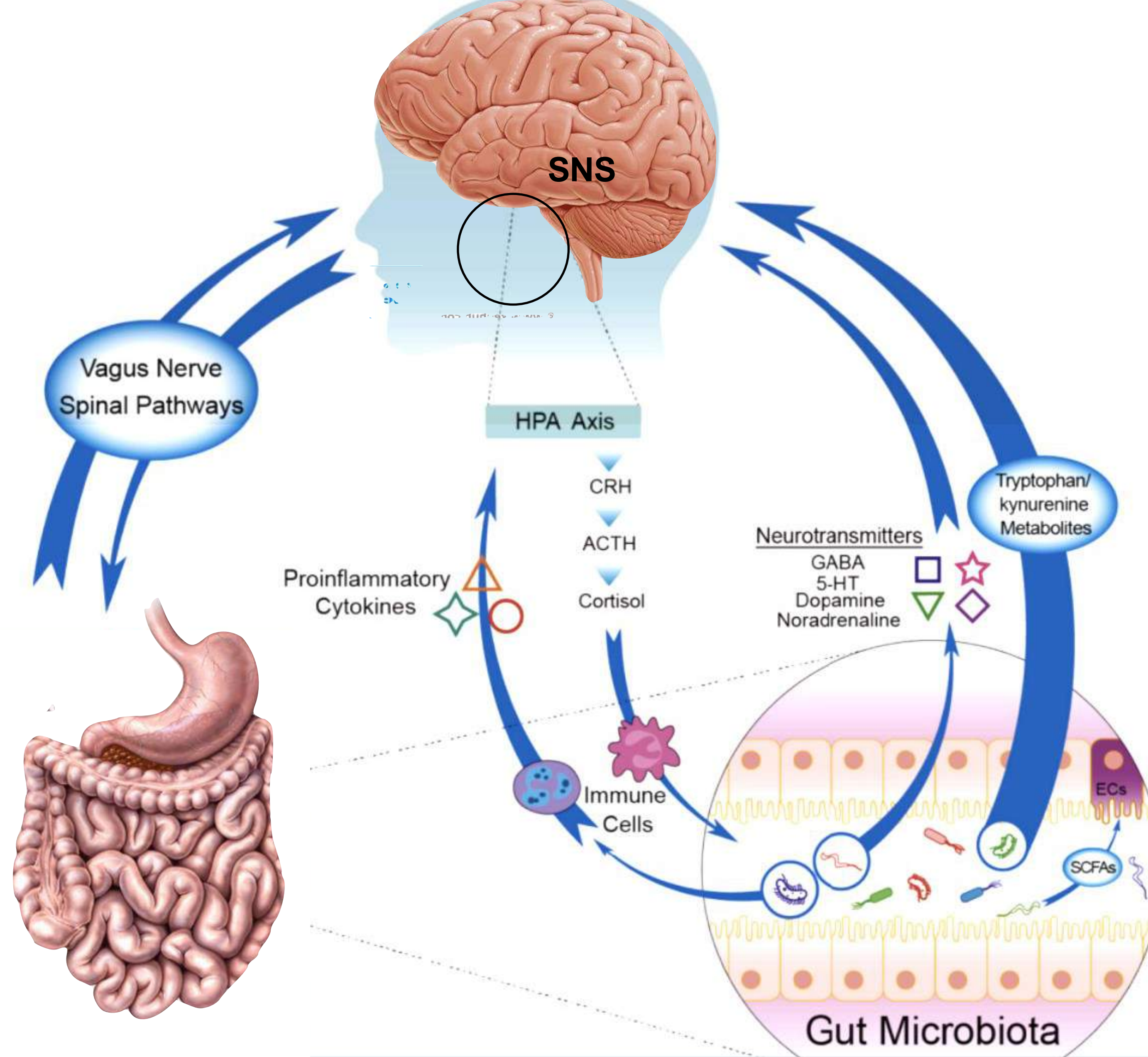
Citocinas inflamatórias

Eixo HPA (cortisol)

Neurotransmissores

Metabólitos

M. Naveed, et al. - 2021



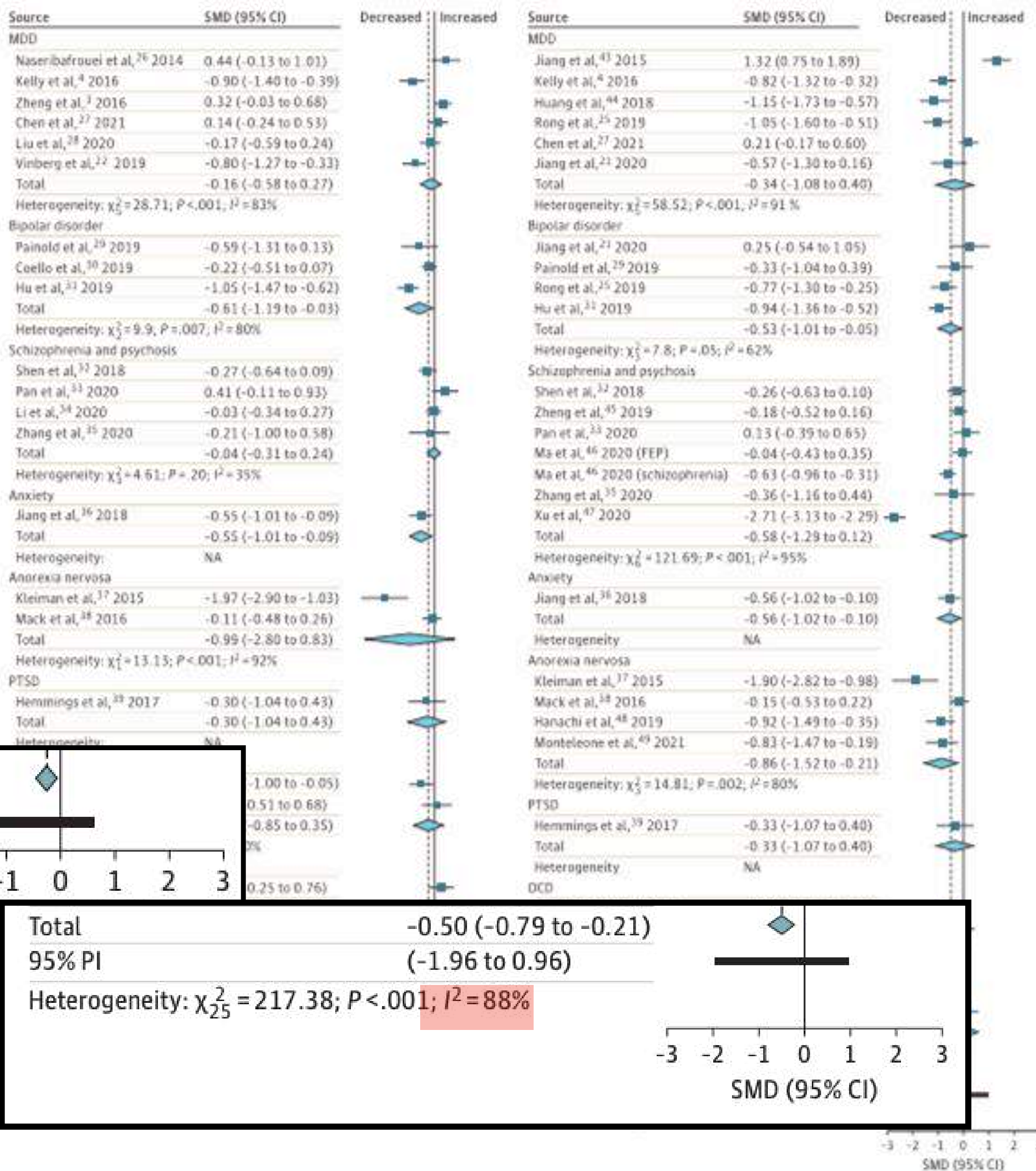
MICROBIOTA E DESORDENS PSIQUIATRICAS

Perturbations in Gut Microbiota Composition in Psychiatric Disorders A Review and Meta-analysis

Viktoriya L. Nikolova, MRes¹; Megan R. B. Hall, BSc²; Lindsay J. Hall, PhD^{3,4,5}; et al

JAMA Psychiatry. 2021;78(12):1343-1354.

Indivíduos com desordens psiquiátricas possuem microbiota menos diversa, comparado ao controle (avaliado por dois métodos distintos).

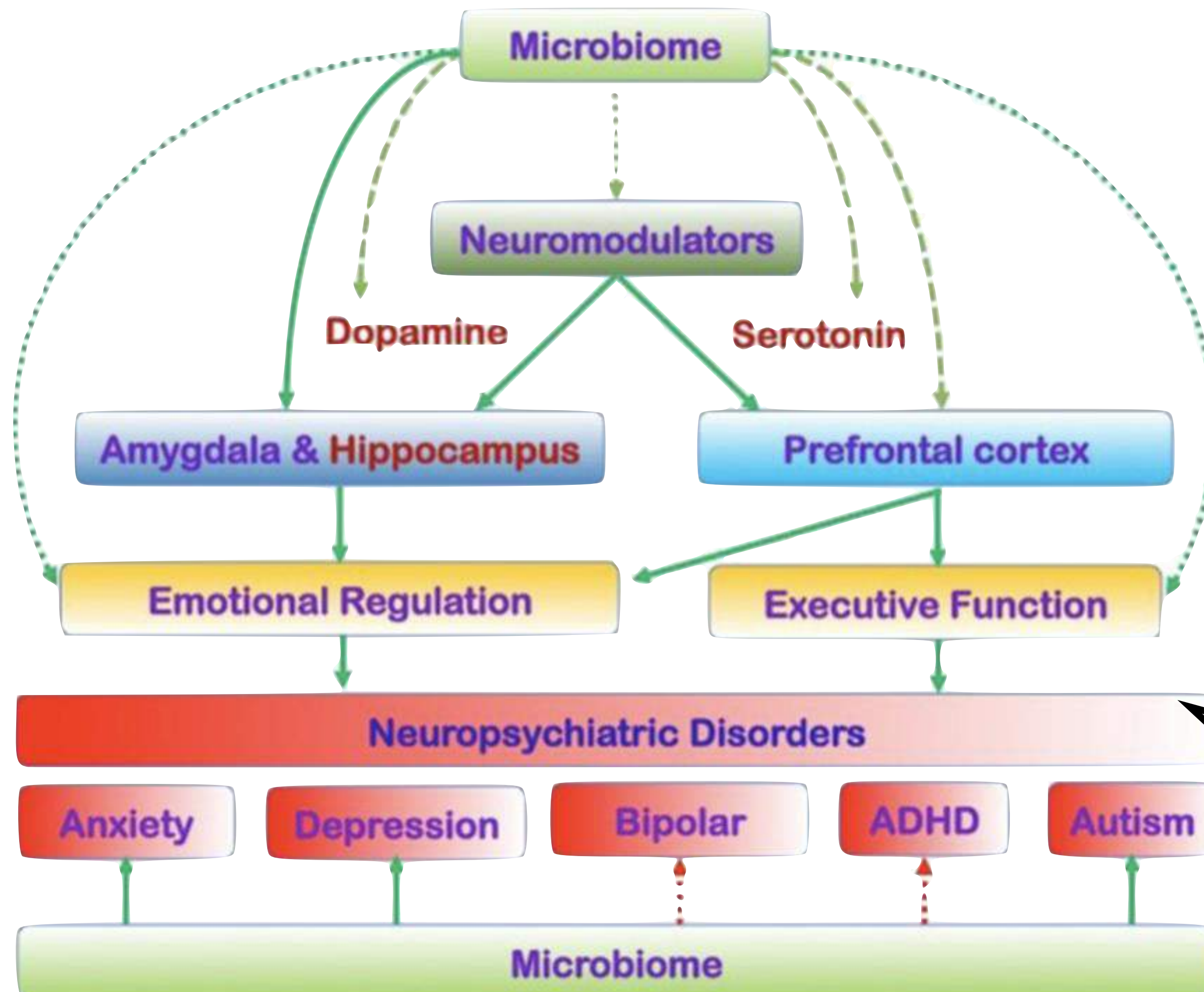


Total	-0.26 (-0.47 to -0.06)
95% PI	(-1.12 to 0.59)
Heterogeneity: $\chi^2_{19} = 74.75$; $P < .001$; $I^2 = 75\%$	

Total	-0.50 (-0.79 to -0.21)
95% PI	(-1.96 to 0.96)
Heterogeneity: $\chi^2_{25} = 217.38$; $P < .001$; $I^2 = 88\%$	

Alta heterogeneidade, interpretar com cautela

From gut dysbiosis to altered brain function and mental illness: mechanisms and pathways

GB Rogers¹, DJ Keating², RL Young³, M-L Wong⁴, J Licinio⁴ and S Wesselingh¹

“Embora uma associação entre enteropatia e certas condições psiquiátricas seja reconhecida há muito tempo, agora ENTENDE-SE que os microrganismos intestinais representam mediadores diretos da psicopatologia.

MICROBIOTA INTESTINAL E DIETA OCIDENTAL

Clinically, differences in patterns of faecal microbiota, reflecting decreased gut microbiota richness and diversity, have been reported in depressed patients compared with healthy controls⁽⁴⁵⁾. Transplantation of microbes from depressed patients into rodents results in depression-related behaviours^(45,46) and altering gut microbiota through probiotic supplementation or food products influences depression-related behaviour in animals⁽⁴⁷⁾.

frontiers in
MICROBIOLOGY

OPINION ARTICLE
published: 12 January 2015
doi: 10.3389/fmicb.2014.00764

Aging and the human gut microbiota—from correlation to causality

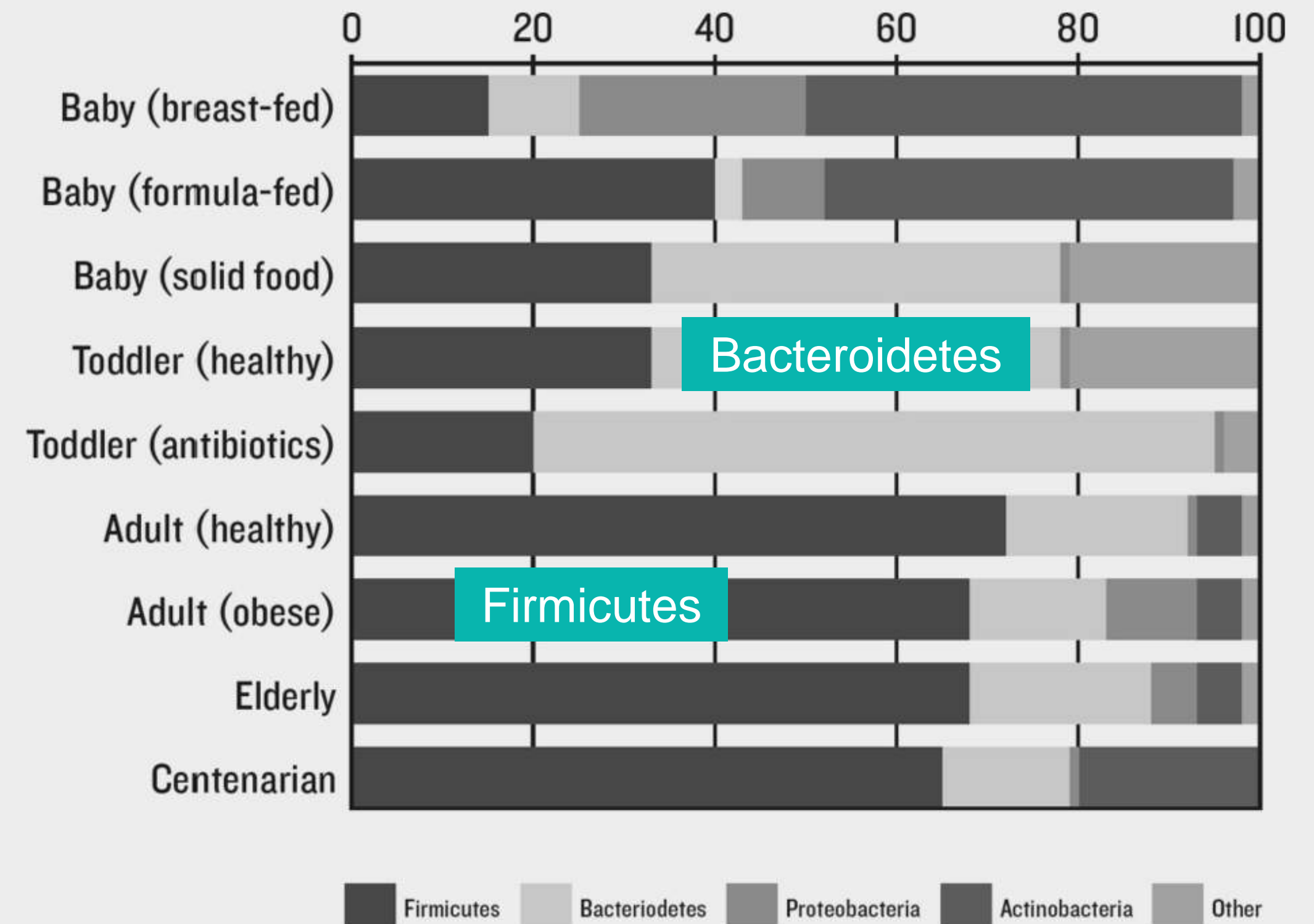
Sitaraman Saraswati¹ and Ramakrishnan Sitaraman^{2*}

¹ Department of Biochemistry, Dayananda Sagar College of Arts, Science, and Commerce, Bangalore, India

² Department of Biotechnology, TERI University, New Delhi, India

*Correspondence: minraj@gmail.com

O envelhecimento parece ter um efeito semelhante à dieta ocidental, aumentando a proporção de Firmicutes no intestino.

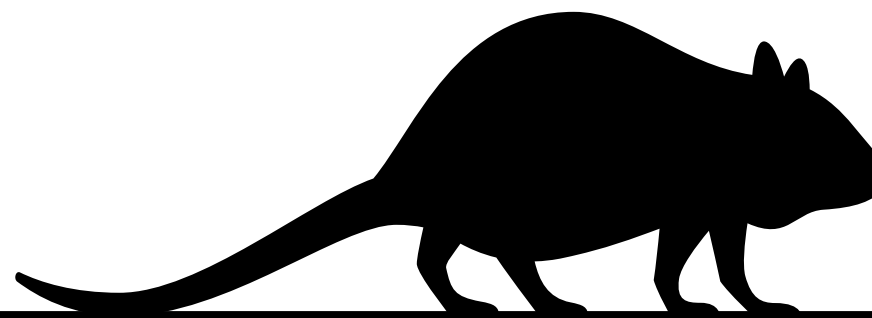
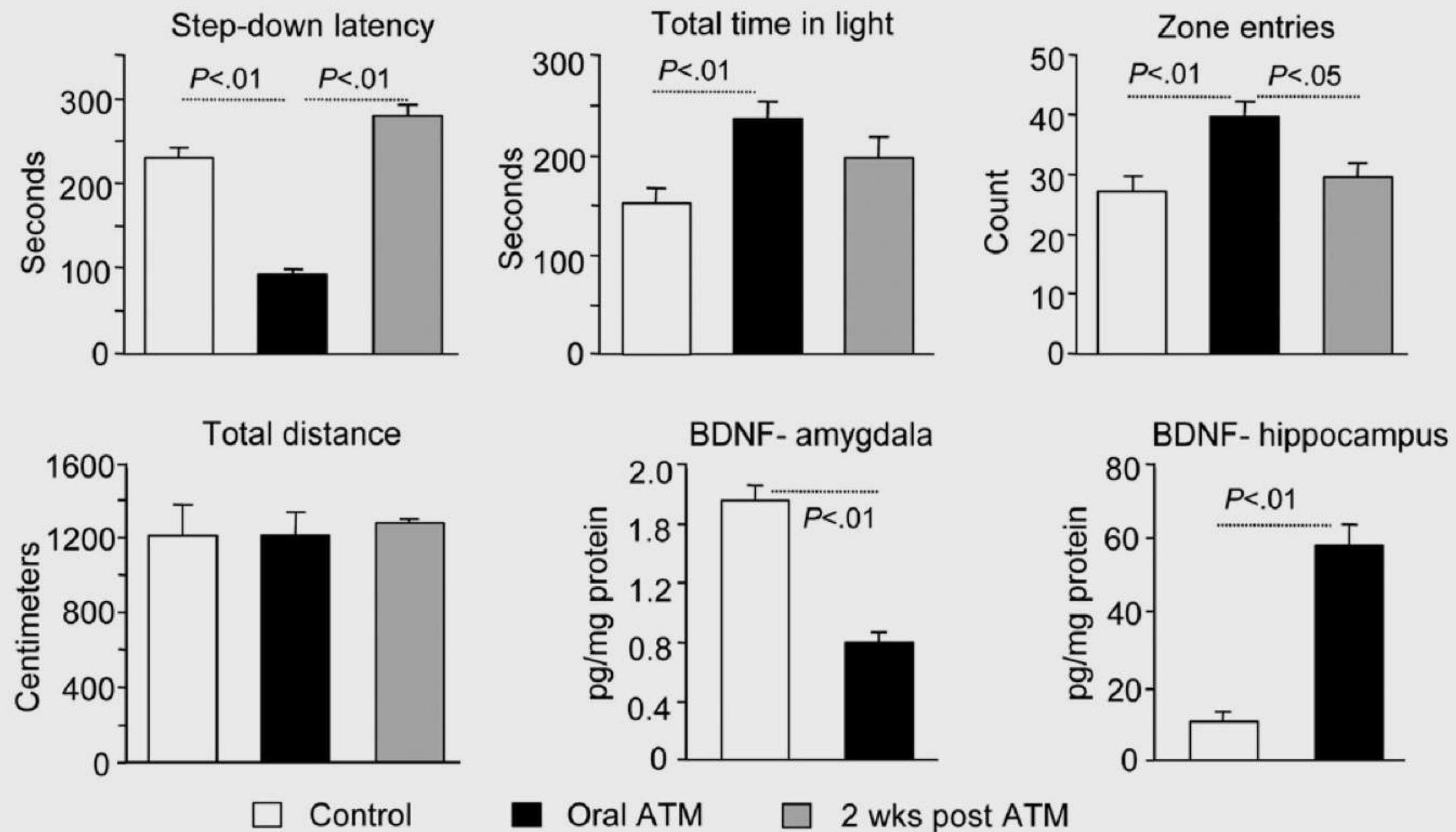


As you age or get sick, the proportional bacterial content of your microbiota changes, as the charts above convey.

MICROBIOTA INTESTINAL E BDNF

602 BERCIK ET AL

GASTROENTEROLOGY Vol. 141, No. 2



A alteração da microbiota modificou o comportamento e níveis de BDNF

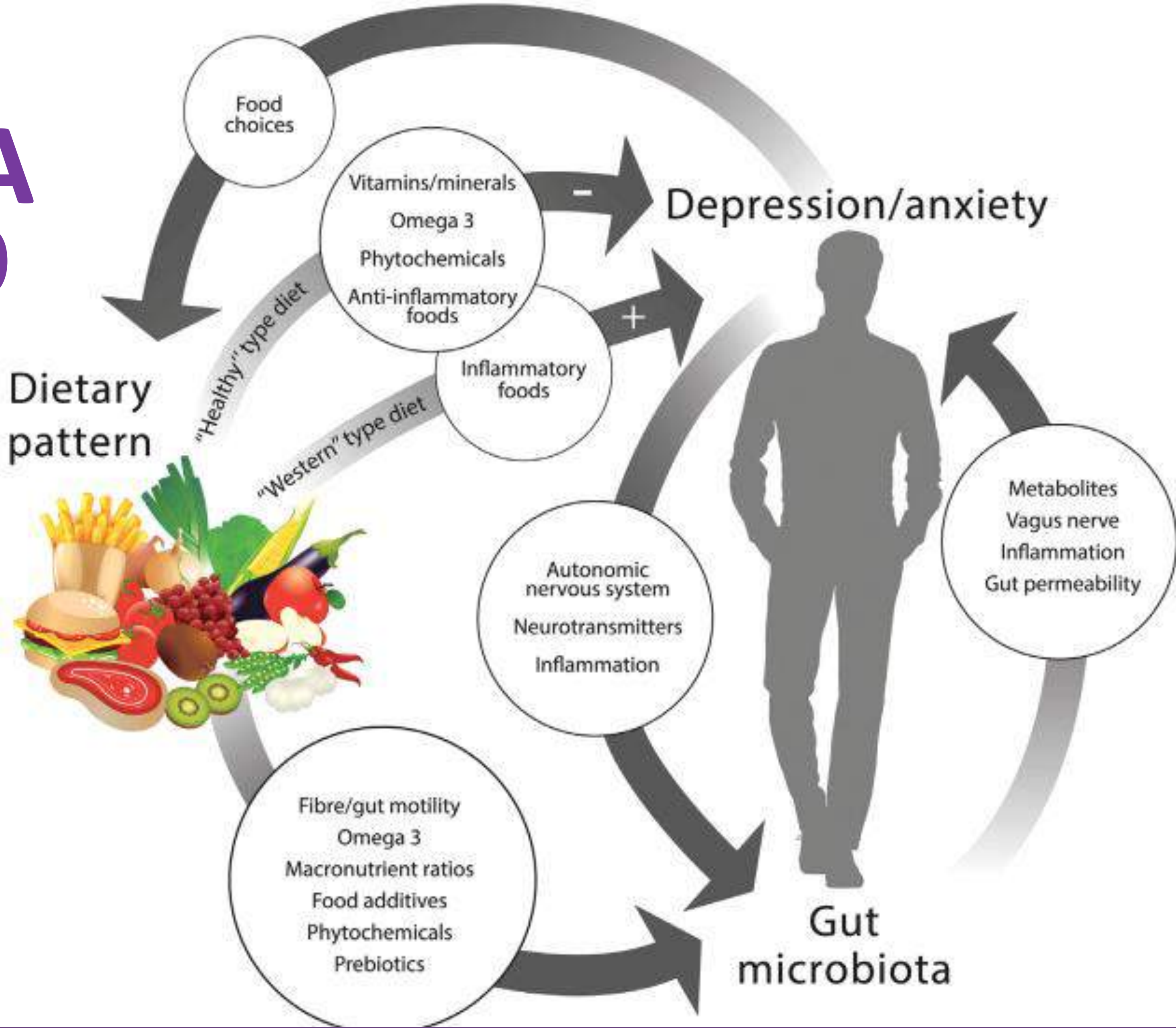
Figure 2. Oral ATM treatment alters mouse behavior promoting exploration. Results of step-down and light/dark preference tests in orally ATM-treated mice ($n = 39$), mice 2 weeks after ATM treatment ($n = 19$), and control mice ($n = 47$). BDNF protein levels measured by ELISA in the hippocampus and amygdala of control ($n = 17$) and ATM-treated ($n = 20$) mice.

ATM: Antimicrobial Treatment

doi: 10.1053/j.gastro.2011.04.052.

The gastrointestinal microbiota has been implicated in several neurobiological pathways related to mental illness, including the modulation of BDNF⁽³⁹⁾, serotonin neurotransmission⁽⁴⁰⁾, immune function⁽⁴¹⁾ and the hypothalamic-pituitary-adrenal axis-mediated stress response^(39,42).

COMO A DIETA INFLUENCIA O EIXO

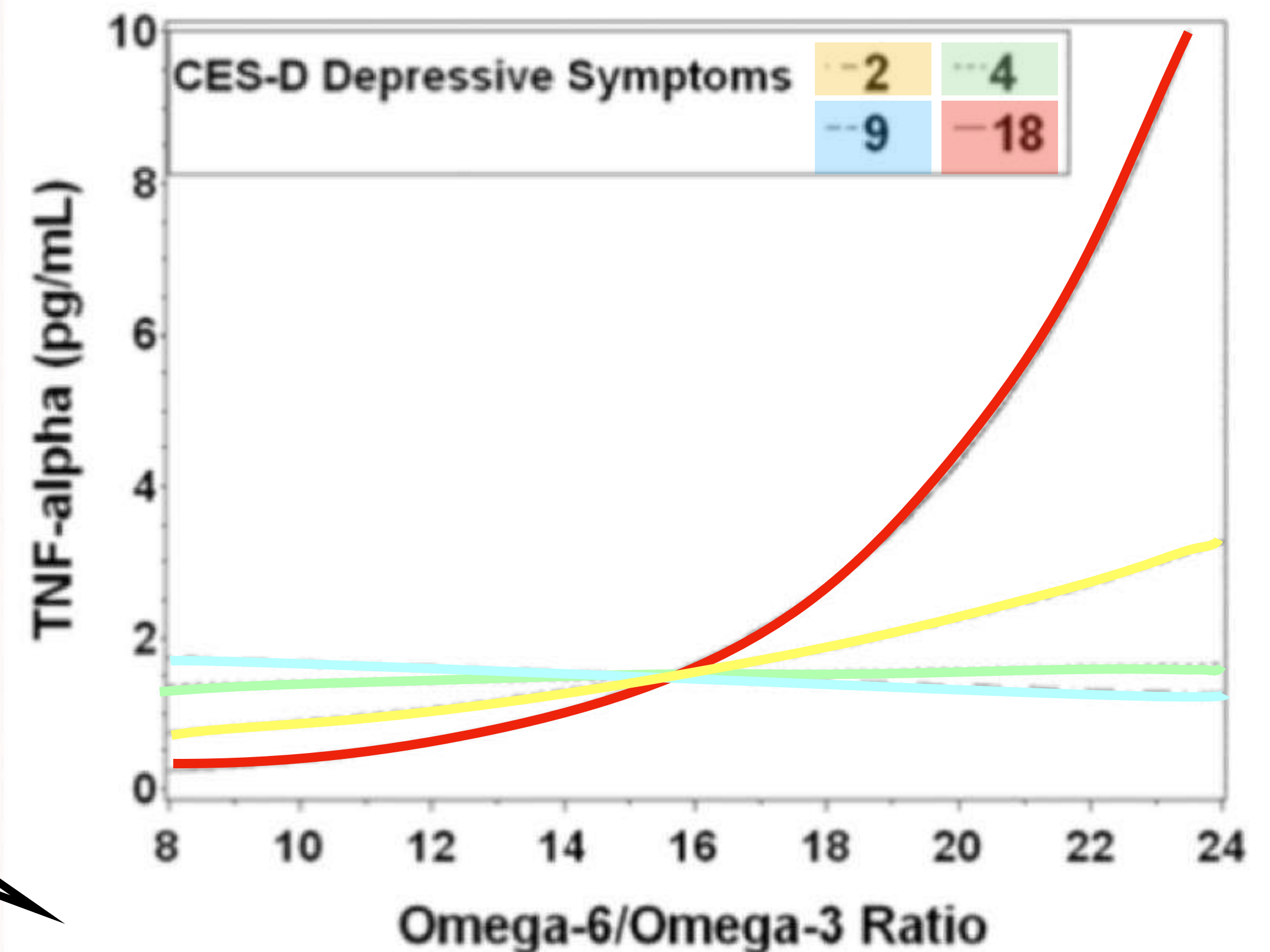


Depressive Symptoms, *n*-6:*n*-3 Fatty Acids, and Inflammation in Older Adults

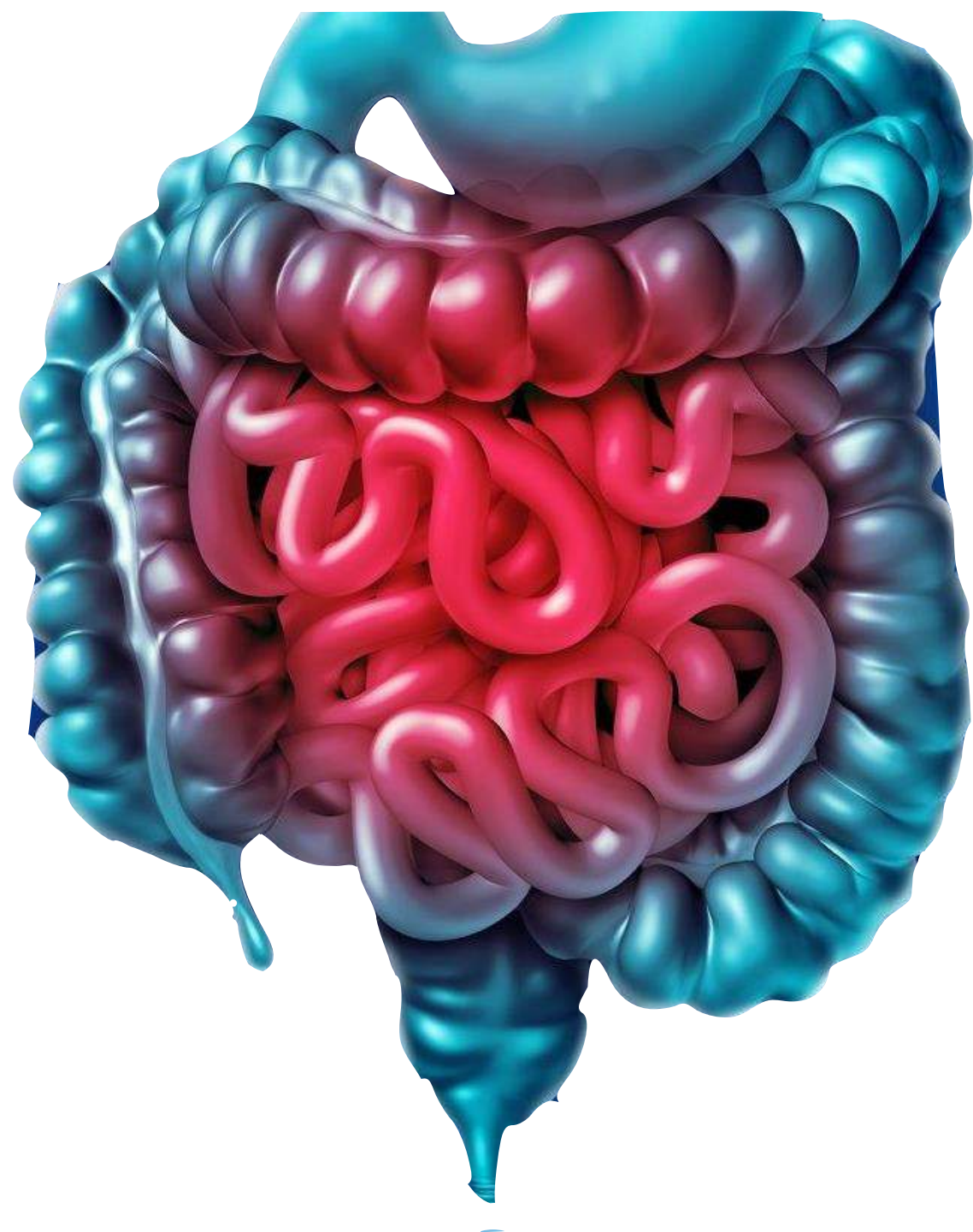
RAZÃO N-6:N-3

Indivíduos com depressão maior apresentaram razões *n*-6:*n*-3 mais altas e níveis mais altos de TNF- α e IL-6.

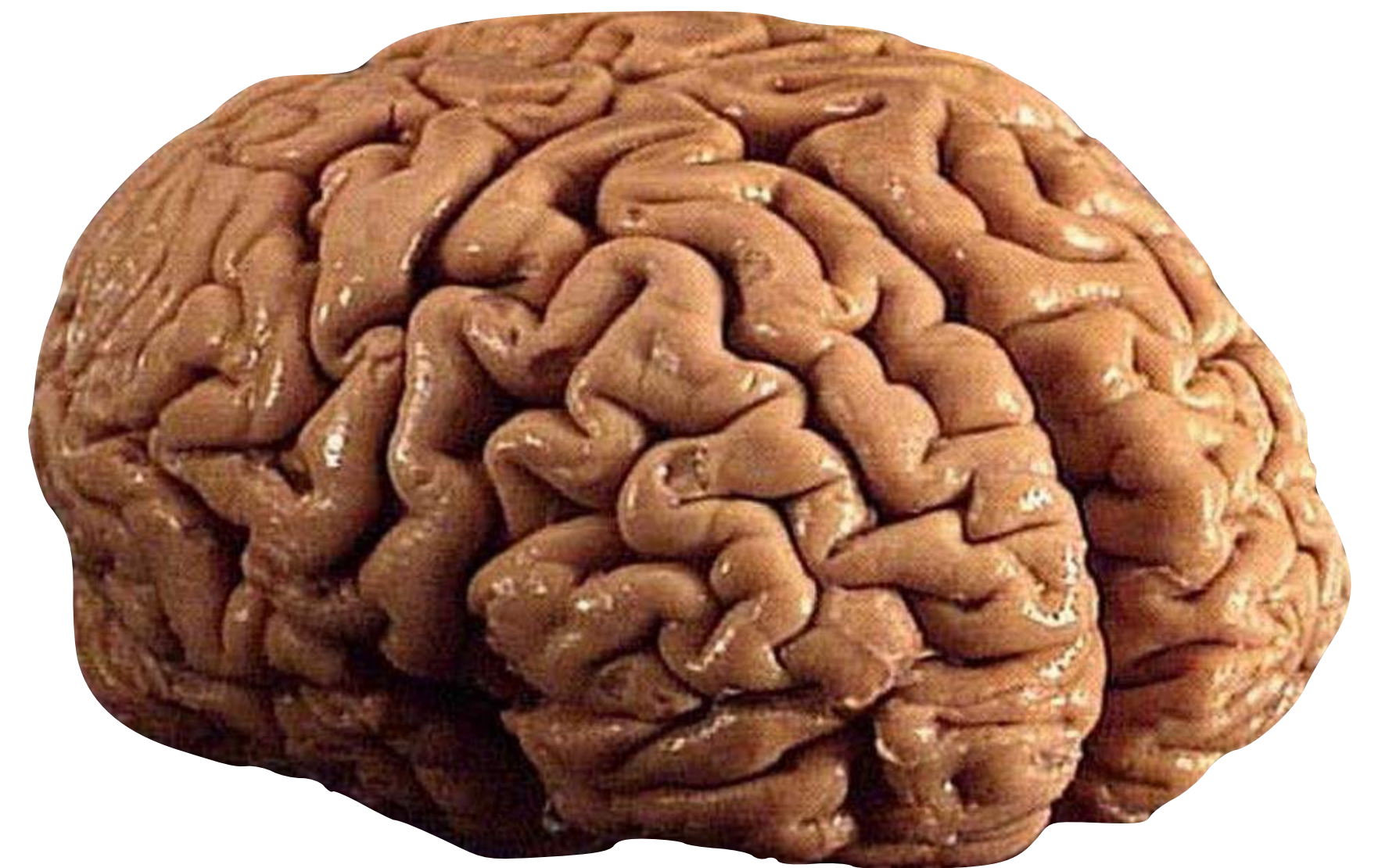
A associação entre maior razão *n*-6:*n*-3 e maiores níveis de TNF- α era maior nos indivíduos com maior escore de depressão.



MICROBIOTA SAÚDE MENTAL E ÔMEGA 3



ÔMEGA 3



AUMENTO DE FOSFATASE ALCALINA INTESTINAL REDUÇÃO DE TNF-alfa
REDUÇÃO DE E.coli

Efficacy of omega-3 PUFAs in depression: A meta-analysis

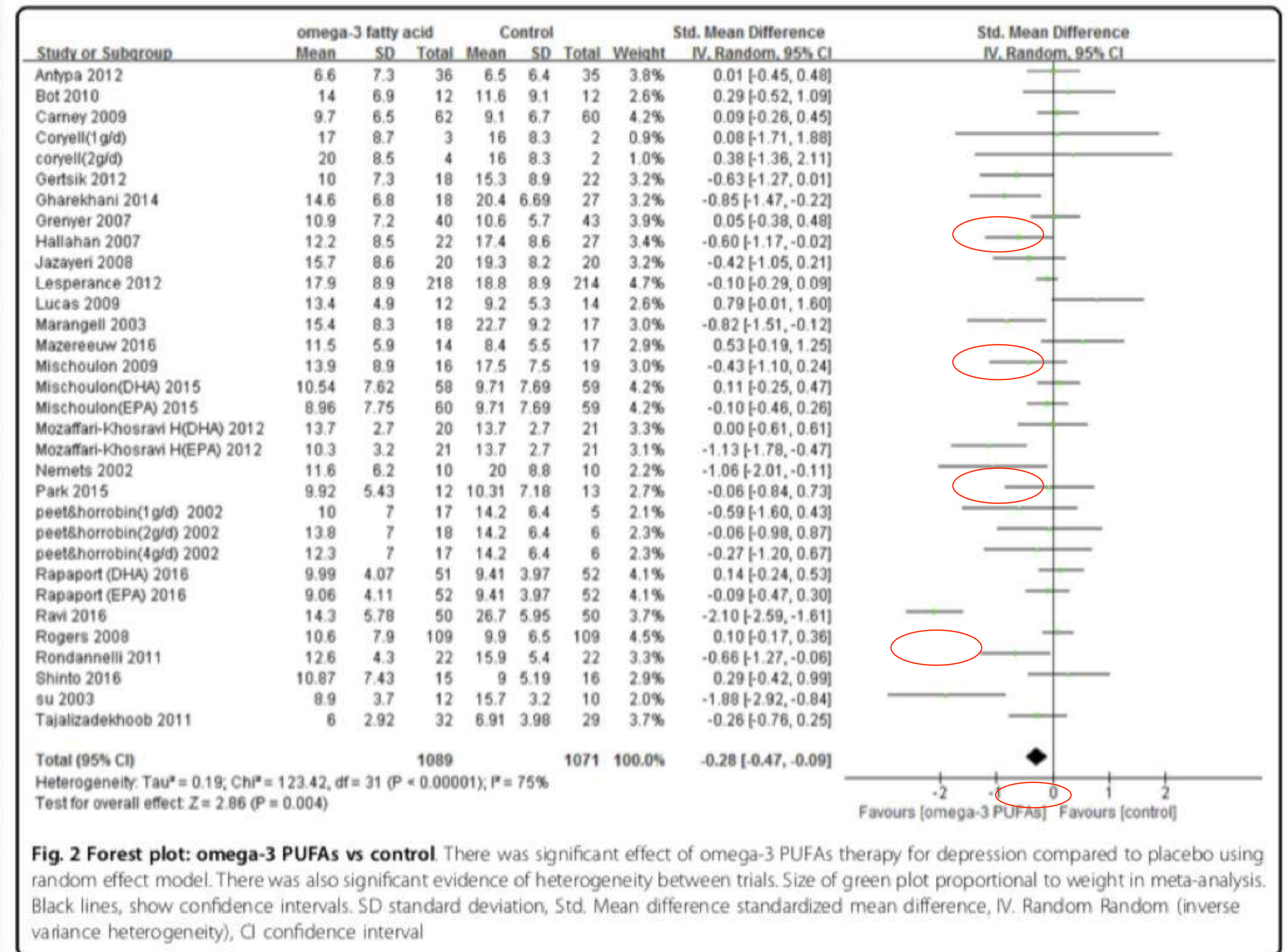
Yuhua Liao¹, Bo Xie¹, Huimin Zhang¹, Qian He¹, Lan Guo², M. Subramaniapillai³, Beifang Fan¹, Ciyong Lu² and R. S. Mdntyer³

Efeito benéfico ômega-3 nos sintomas de depressão (P = 0,004).

Comparadas ao placebo, as formulações EPA-puro (100% EPA) e EPA-principal (≥60% EPA): benefícios clínicos com uma dose de EPA ≤1 g/d

(SMD = -0,50, P = 0,003 e SMD = - 1,03, P = 0,03, respectivamente).

Formulações DHA-pura e DHA-principal não tiveram tais benefícios.



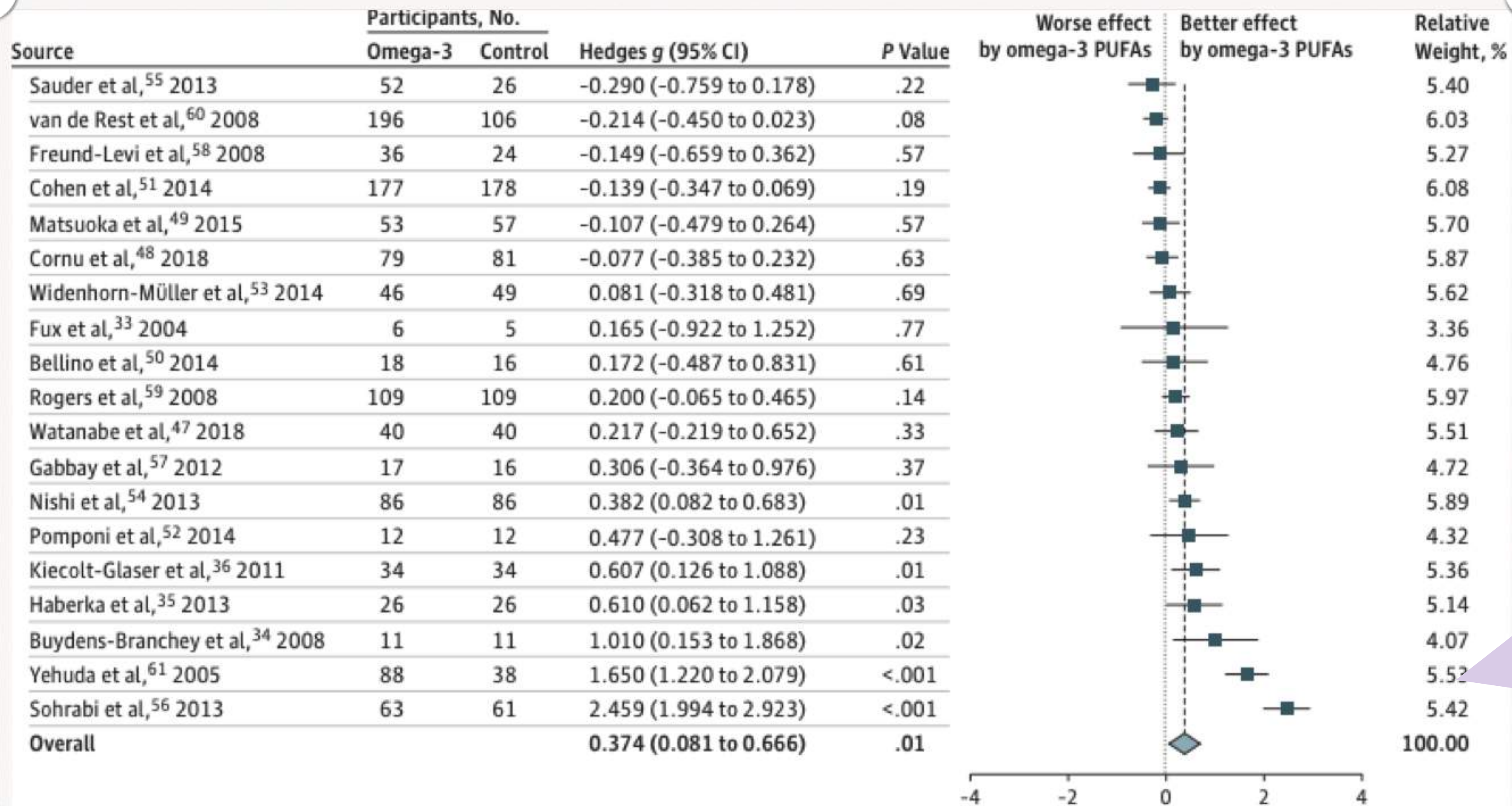
EPA ≥ 60% (≤1 g/d)

DHA E ANSIEDADE

Original Investigation | Psychiatry

Association of Use of Omega-3 Polyunsaturated Fatty Acids With Changes in Severity of Anxiety Symptoms A Systematic Review and Meta-analysis

JAMA Network | Open

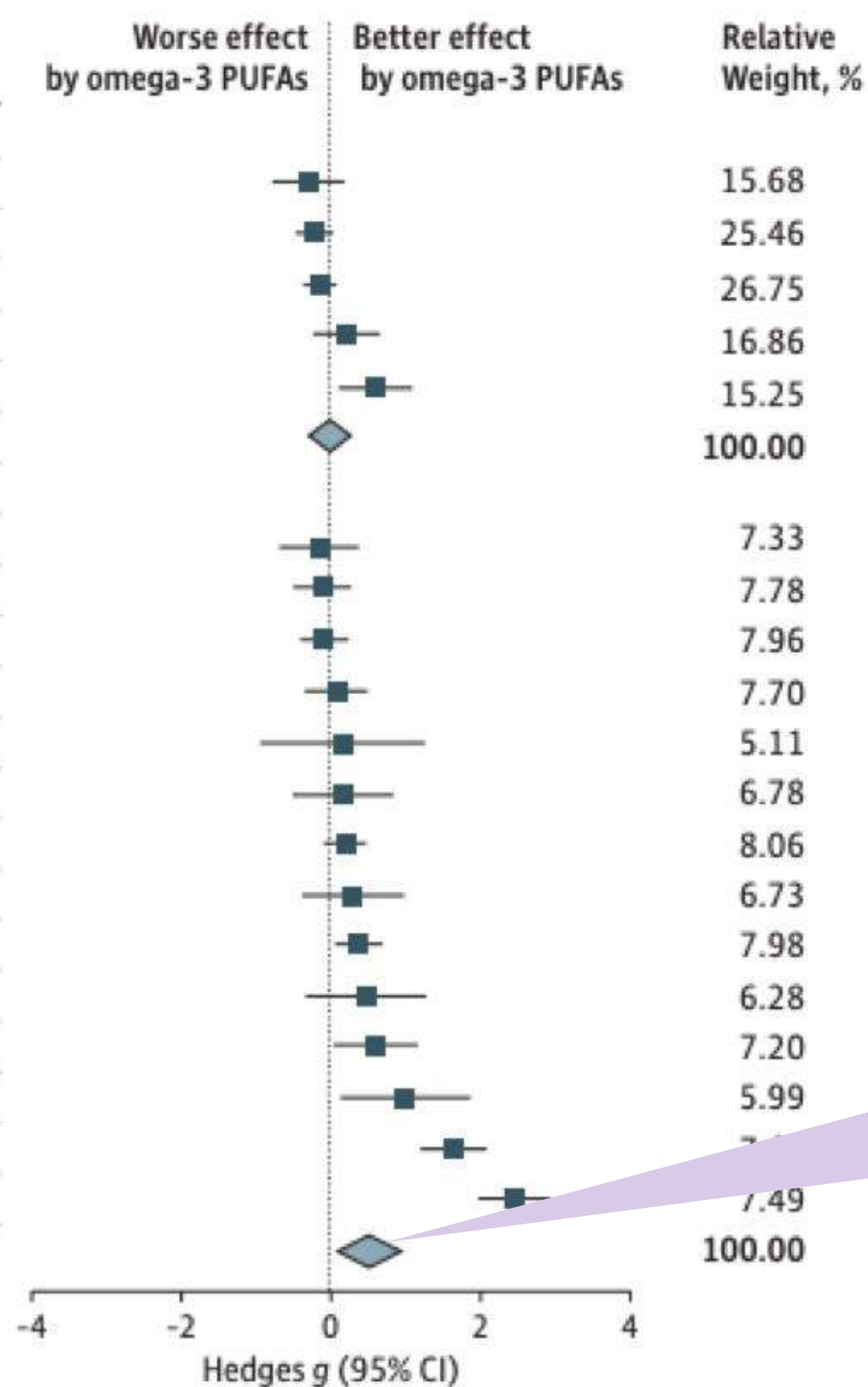


Meta-analise de 19 ensaios clínicos (n = 2240)

Melhora significativa dos sintomas de ansiedade em pacientes recebendo ômega-3 comparado ao controle.

DHA E ANSIEDADE

Source	Participants, No.		Hedges g (95% CI)	P Value
	Omega-3	Control		
No specific clinical conditions				
Sauder et al, ⁵⁵ 2013	52	26	-0.290 (-0.759 to 0.178)	.22
van de Rest et al, ⁶⁰ 2008	196	106	-0.214 (-0.450 to 0.023)	.08
Cohen et al, ⁵¹ 2014	177	178	-0.139 (-0.347 to 0.069)	.19
Watanabe et al, ⁴⁷ 2018	40	40	0.217 (-0.219 to 0.652)	.33
Kiecolt-Glaser et al, ³⁶ 2011	34	34	0.607 (0.126 to 1.088)	.01
Overall			-0.008 (-0.266 to 0.250)	.95
Specific clinical diagnoses				
Freund-Levi et al, ⁵⁸ 2008	36	24	-0.149 (-0.659 to 0.362)	.57
Matsuoka et al, ⁴⁹ 2015	53	57	-0.107 (-0.479 to 0.264)	.57
Cornu et al, ⁴⁸ 2018	79	81	-0.077 (-0.385 to 0.232)	.63
Widenhorn-Müller et al, ⁵³ 2014	46	49	0.081 (-0.318 to 0.481)	.69
Fux et al, ⁴⁷ 2004	6	5	0.165 (-0.922 to 1.252)	.77
Bellino et al, ⁵⁰ 2014	18	16	0.172 (-0.487 to 0.831)	.61
Rogers et al, ⁵⁹ 2008	109	109	0.200 (-0.065 to 0.465)	.14
Gabbay et al, ⁵⁷ 2012	17	16	0.306 (-0.364 to 0.976)	.37
Nishi et al, ⁵⁴ 2013	86	86	0.382 (0.082 to 0.683)	.01
Pomponi et al, ⁵² 2014	12	12	0.477 (-0.308 to 1.261)	.23
Haberka et al, ³⁵ 2013	26	26	0.610 (0.062 to 1.158)	.03
Buydens-Branchey et al, ³⁴ 2008	11	11	1.010 (0.153 to 1.868)	.02
Yehuda et al, ⁶¹ 2005	88	38	1.650 (1.220 to 2.079)	<.001
Sohrabi et al, ⁵⁶ 2013	63	61	2.459 (1.994 to 2.923)	<.001
Overall			0.512 (0.119 to 0.906)	.01



JAMA Network | Open

Efeito significativo em quem tinha diagnostico clínico .

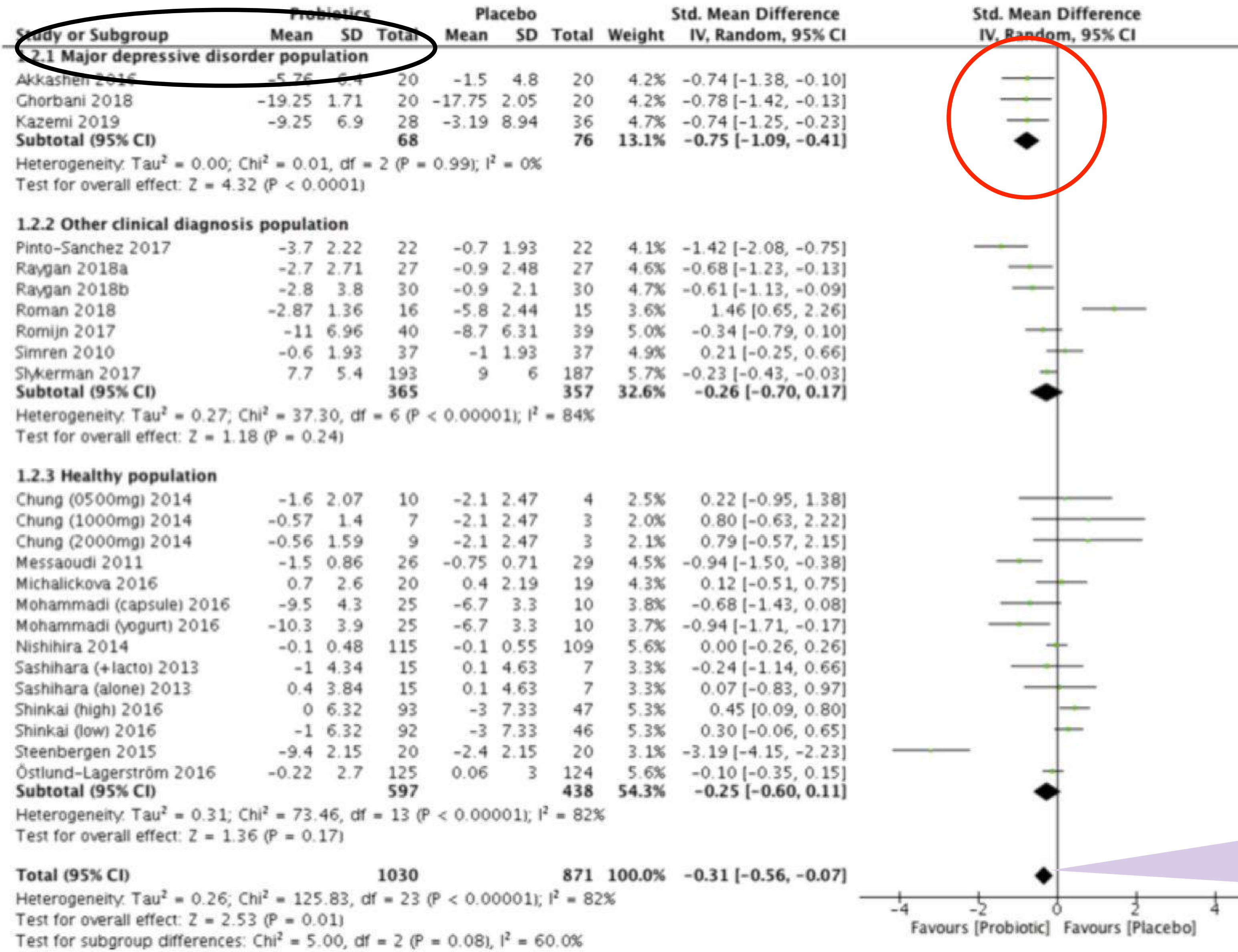


Alterar o eixo intestino-cérebro com probióticos pode ser uma abordagem para melhorar a gravidade da depressão.

PROBIÓTICOS

Efeito benéfico **SIGNIFICATIVO** nos sintomas depressivos em **pacientes com depressão**, mas não naqueles com outras condições clínicas e na população em geral.

Múltiplas cepas de probióticos mostrou **mais eficaz na redução dos sintomas depressivos**.



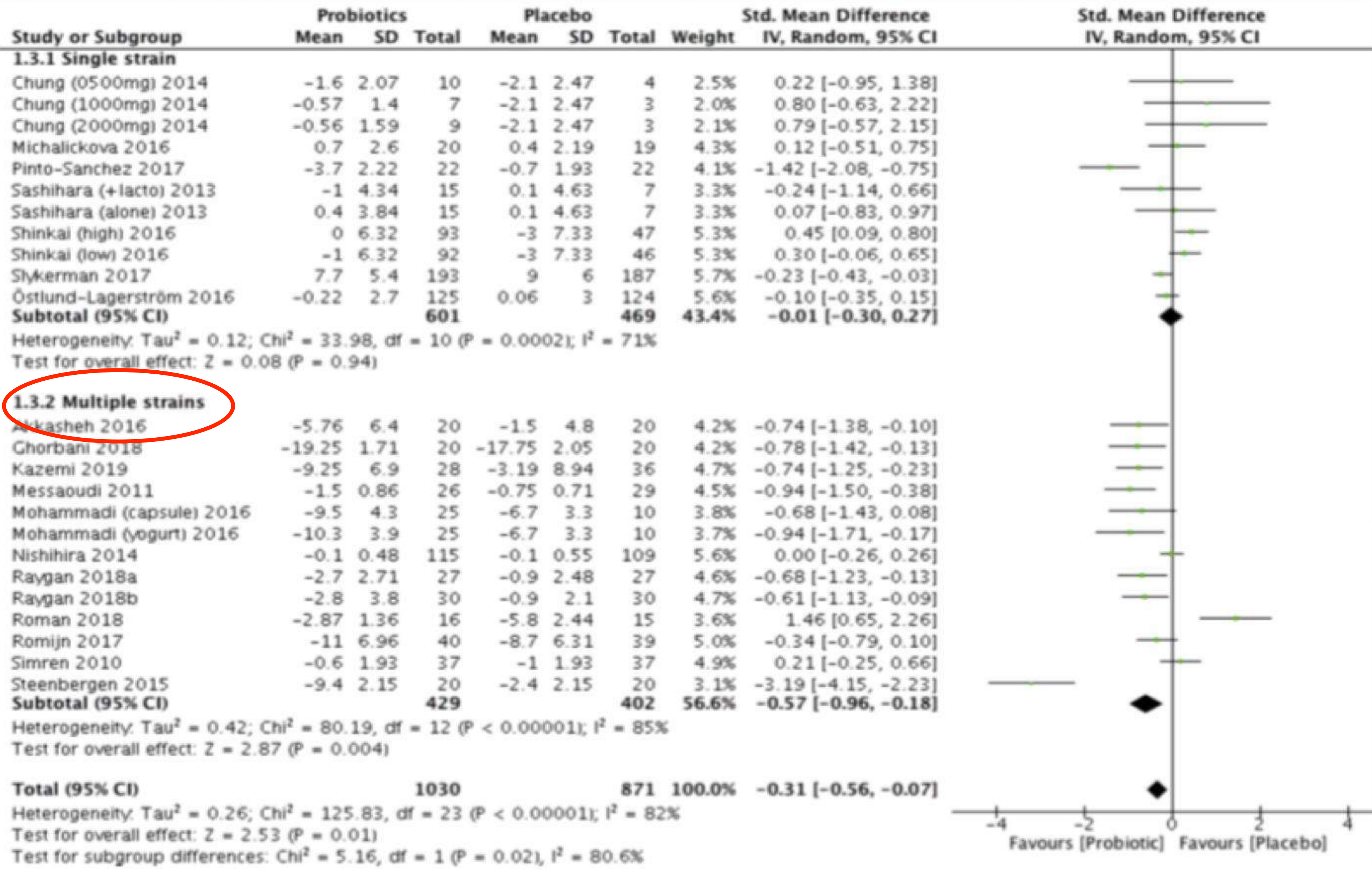
DEPRESSÃO MAIOR

OUTRO DIAGNÓSTICO

POPULAÇÃO SAUDÁVEL

DIAMANTE DA METANALISE FAVORÁVEL À HIPÓTESE

Fig. 3. Subgroup analysis of the effect of probiotics on depressive symptoms in different population groups.



CEPAS ÚNICAS

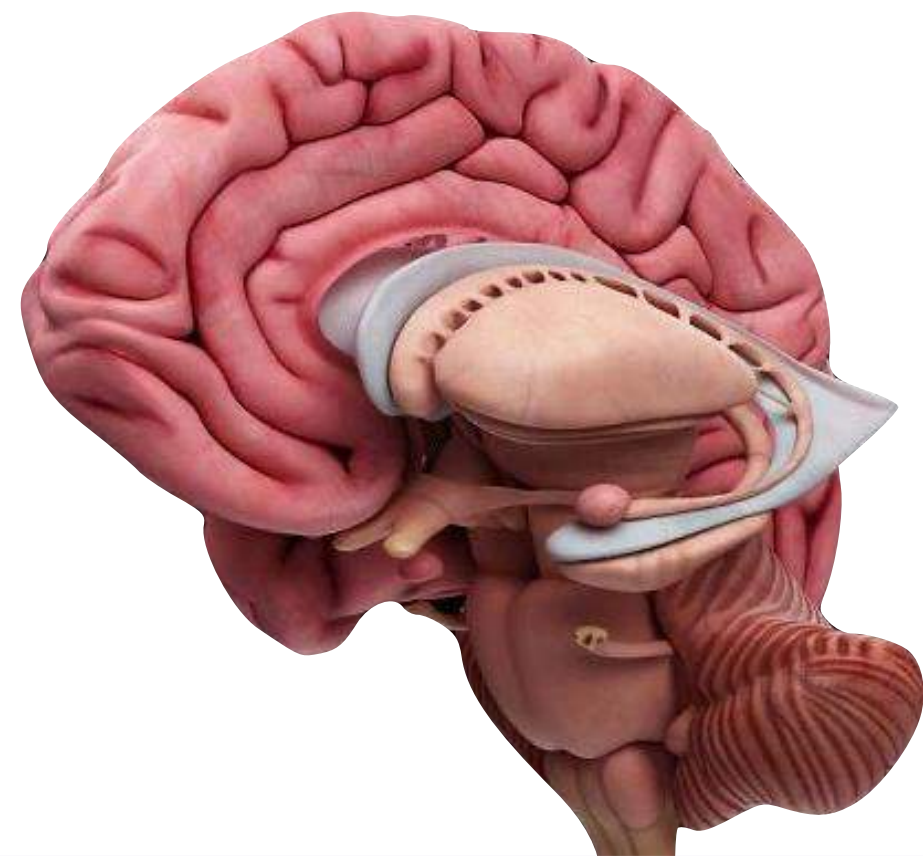
MÚLTIPLAS CEPAS

Fig. 4. Subgroup analysis of the effect of probiotics on depressive symptoms based on the number of strains.

MECANISMOS RELACIONADOS A DISTÚRBIOS MENTAIS:

INFLAMAÇÃO
ESTRESSE OXIDATIVO
MICROBIOTA INTESTINAL
NEUROPLASTICIDADE
EPIGENÉTICA

NEUROPLASTICIDADE: HIPOCAMPO



Menor DENSIDADE NUTRICIONAL e maior ingestão de alimentos não saudáveis foram associados, independentemente, a um **volume menor do hipocampo esquerdo**.

Jacka et al. *BMC Medicine* (2015) 13:215
DOI 10.1186/s12916-015-0461-x



Western diet is associated with a smaller hippocampus: a longitudinal investigation

Felice N. Jacka^{1,2,3,4*}, Nicolas Cherbuin⁵, Kaarin J. Anstey⁵, Perminder Sachdev⁵ and Peter Butterworth⁵

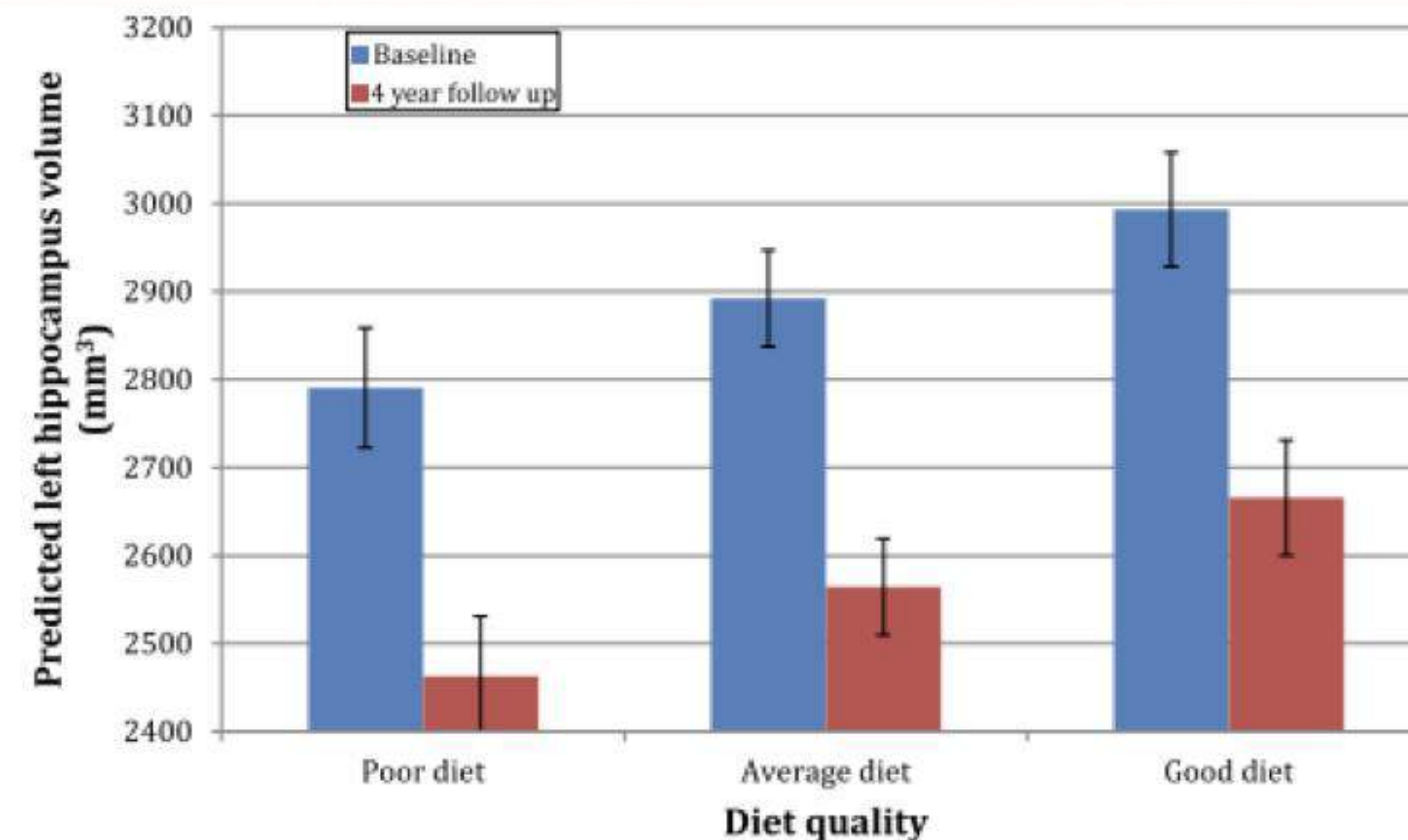


Fig. 1 Predicted left hippocampal volume (with standard errors represented by error bars) at baseline and 4-year follow-up for respondents classified with poor, average and good quality diet based on scores on the Western and prudent dietary factor scores (*poor* defined as 1 SD below mean on prudent and 1 SD above mean on Western dietary factor scores; *average* defined as mean/0 on both prudent and Western dietary factor scores; *good* defined as 1 SD above mean on prudent and 1 SD below mean on Western dietary factor scores)

A Prospective Study of Diet Quality and Mental Health in Adolescents

Felice N. Jacka^{1,2*}, Peter J. Kremer³, Michael Berk^{1,2,4,5}, Andrea M. de Silva-Sanigorski⁶, Marjorie Moodie⁷, Eva R. Leslie³, Julie A. Pasco⁸, Boyd A. Swinburn⁹

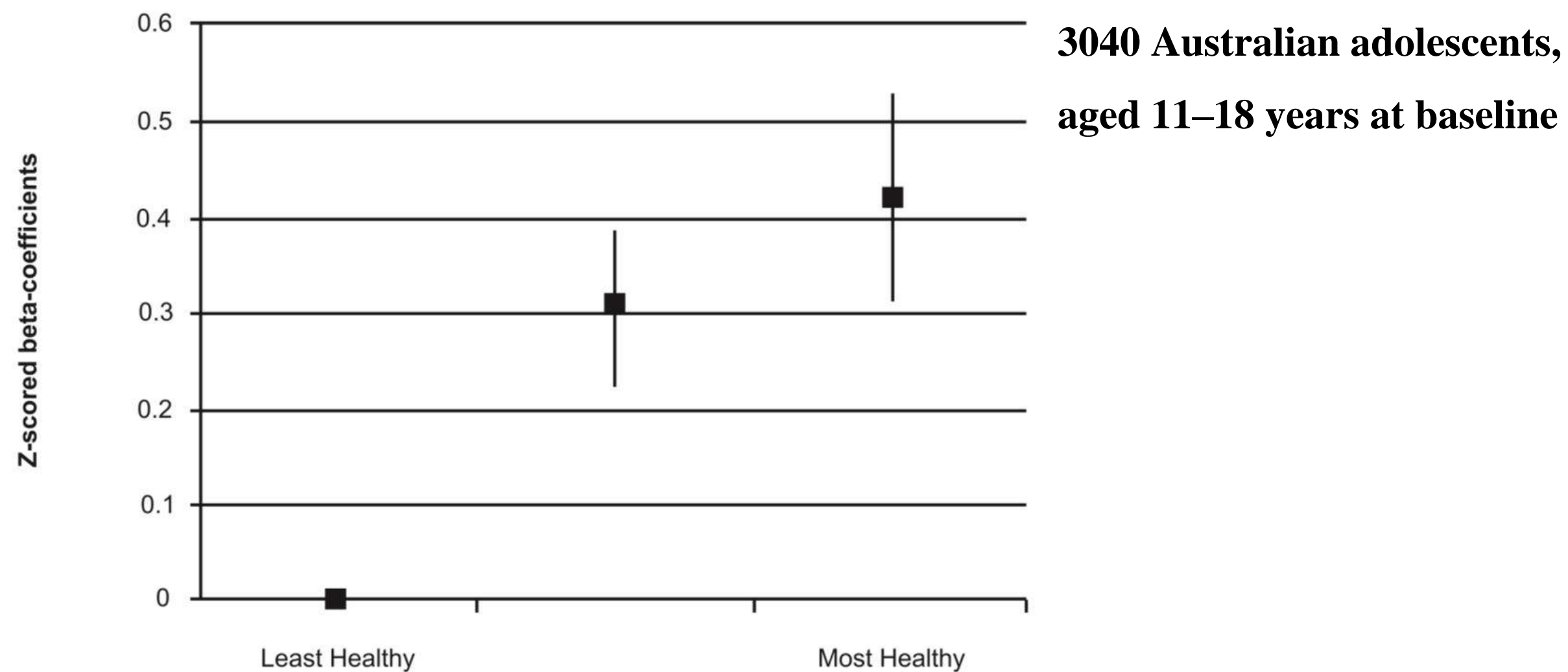


Figure 1. Cross-sectional associations between **Healthy diet scores and PedsQL scores** (z-score standardized) after adjustments for gender, age, dieting behaviours, BMI, SES and PA. doi:10.1371/journal.pone.0024805.g001

Pontuações + altas de dieta com baixa ingestão de junk food e bebidas açucaradas significaram MELHOR SCORE na escala de SAÚDE MENTAL, mesmo após ajustes de covariáveis que incluíam comportamentos alimentares, índice de massa corporal e atividade física.

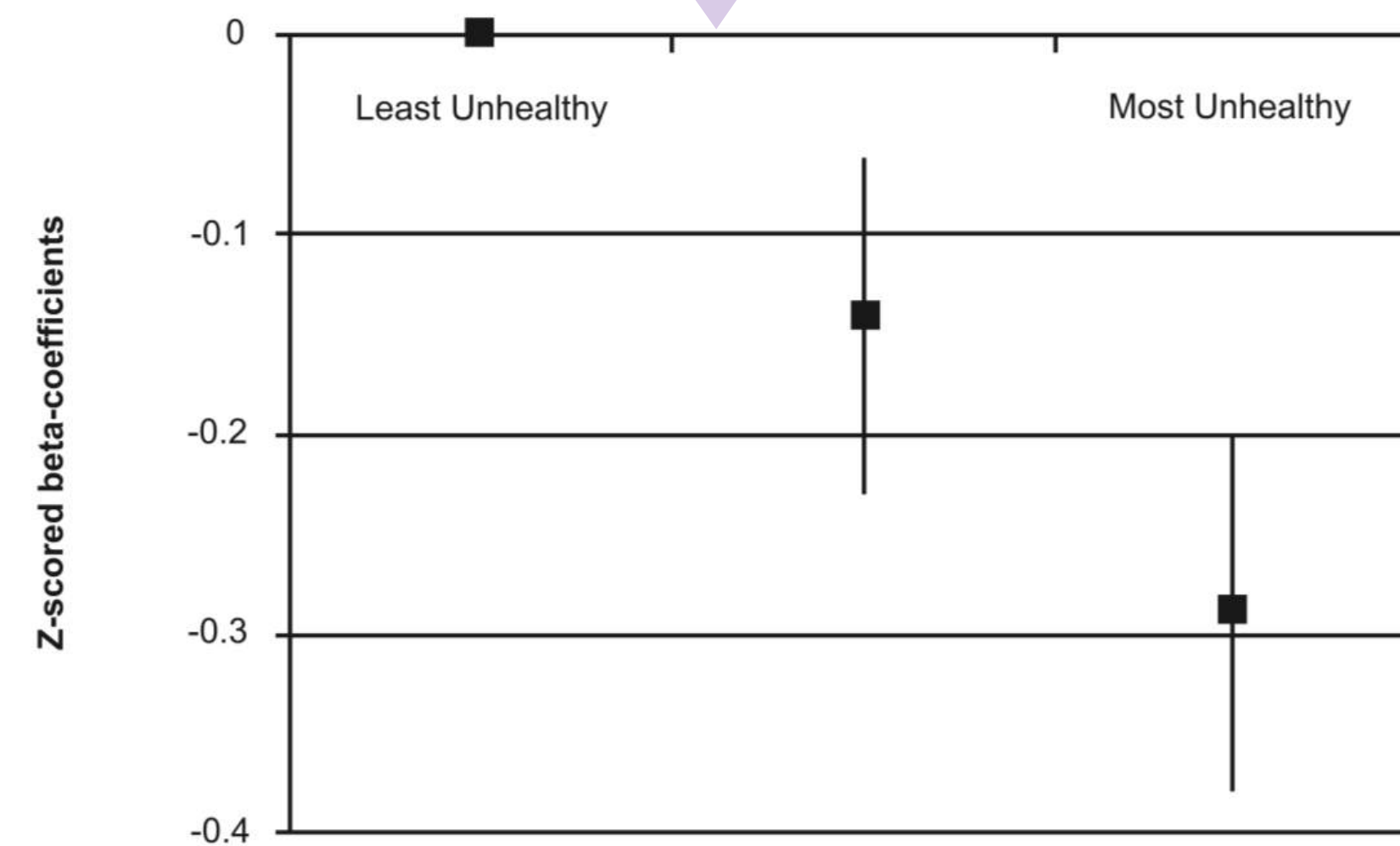


Figure 2. Cross-sectional associations between **Unhealthy diet scores and PedsQL scores** (z-score standardized) after adjustments for gender, age, dieting behaviours, BMI, SES and PA. doi:10.1371/journal.pone.0024805.g002

OPEN Sugar intake from sweet food and beverages, common mental disorder and depression: prospective findings from the Whitehall II study

Received: 21 November 2016
Accepted: 1 June 2017
Published online: 27 July 2017

Anika Knüppel¹, Martin J. Shipley, Clare H. Llewellyn & Eric J. Brunner

From: Sugar intake from sweet food and beverages, common mental disorder and depression: prospective findings from the Whitehall II study

	Incident common mental disorder ^b after 2 years, OR (95% CI)			
	events/person observations	Model 0 ^c	Model 1 ^d	Model 2 ^e
Sugar intake from sweet food/beverages				
Lowest Tertile	220/2090	1.0 (reference)	1.0 (reference)	1.0 (reference)
Middle Tertile	205/1836	1.08 (0.85, 1.38)	1.08 (0.85, 1.38)	1.04 (0.81, 1.33)
Highest Tertile	202/1615	1.31 (1.02, 1.68)	1.30 (1.01, 1.67)	1.18 (0.90, 1.55)
Total	627/5541			
<i>P</i> for trend		0.039	0.047	0.233
	Incident common mental disorder ^b after 5 years, OR (95% CI)			
	events/person observations	Model 0 ^f	Model 1 ^d	Model 2 ^e
Lowest Tertile	477/4451	1.0 (reference)	1.0 (reference)	1.0 (reference)
Middle Tertile	446/3958	1.05 (0.90, 1.23)	1.07 (0.91, 1.25)	1.04 (0.88, 1.22)
Highest Tertile	463/3532	1.26 (1.07, 1.48)	1.28 (1.08, 1.51)	1.20 (1.01, 1.43)
Total	1386/11941			
<i>P</i> for trend		0.006	0.005	0.047

AFTER 2 YEARS

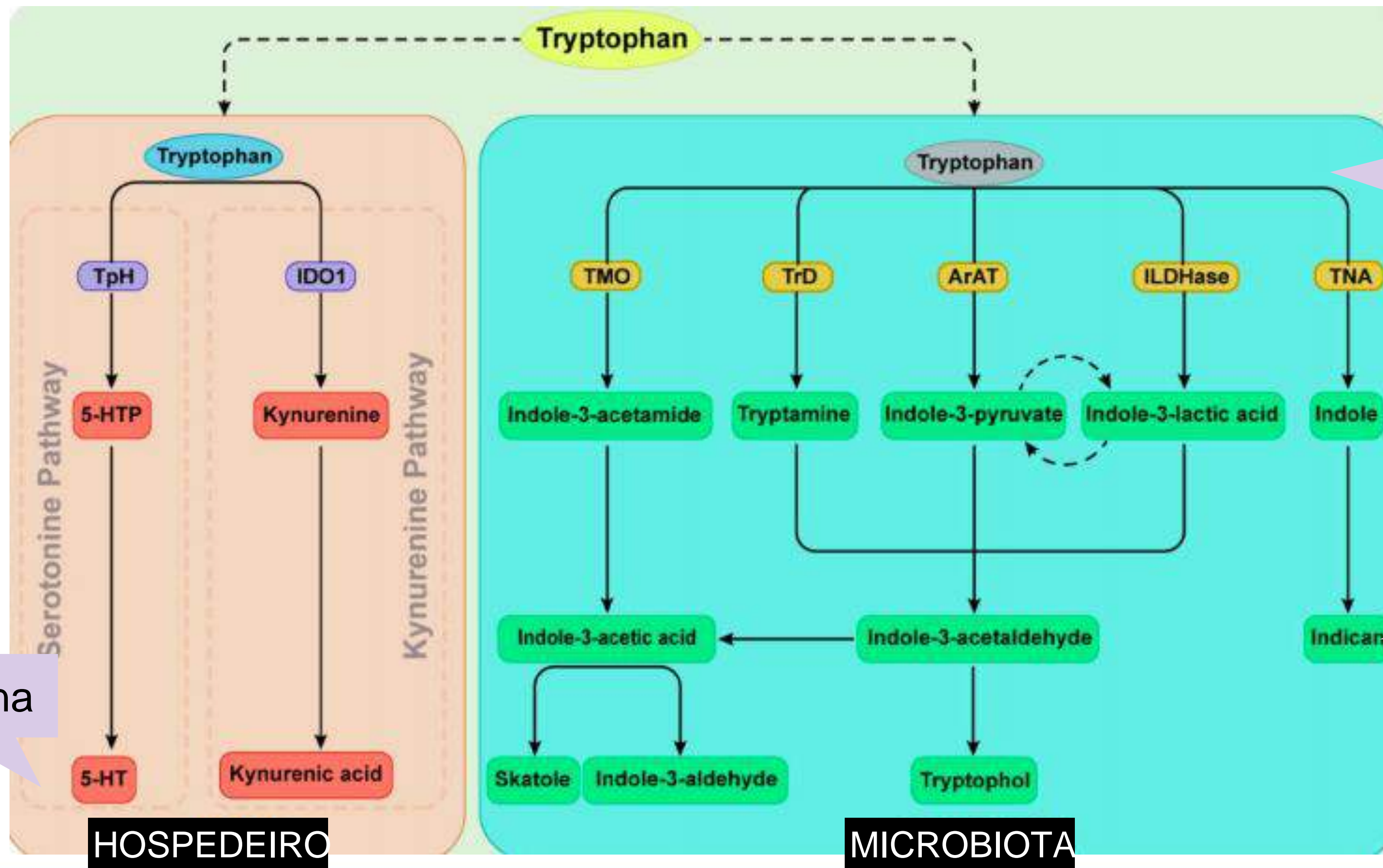
AFTER 5 YEARS

Será que
suplementos
seriam uma
saída?



TRIPTOFANO E MICROBIOTA

Não é só sobre a disponibilidade dietética de triptofano!



Serotonina

HOSPEDEIRO

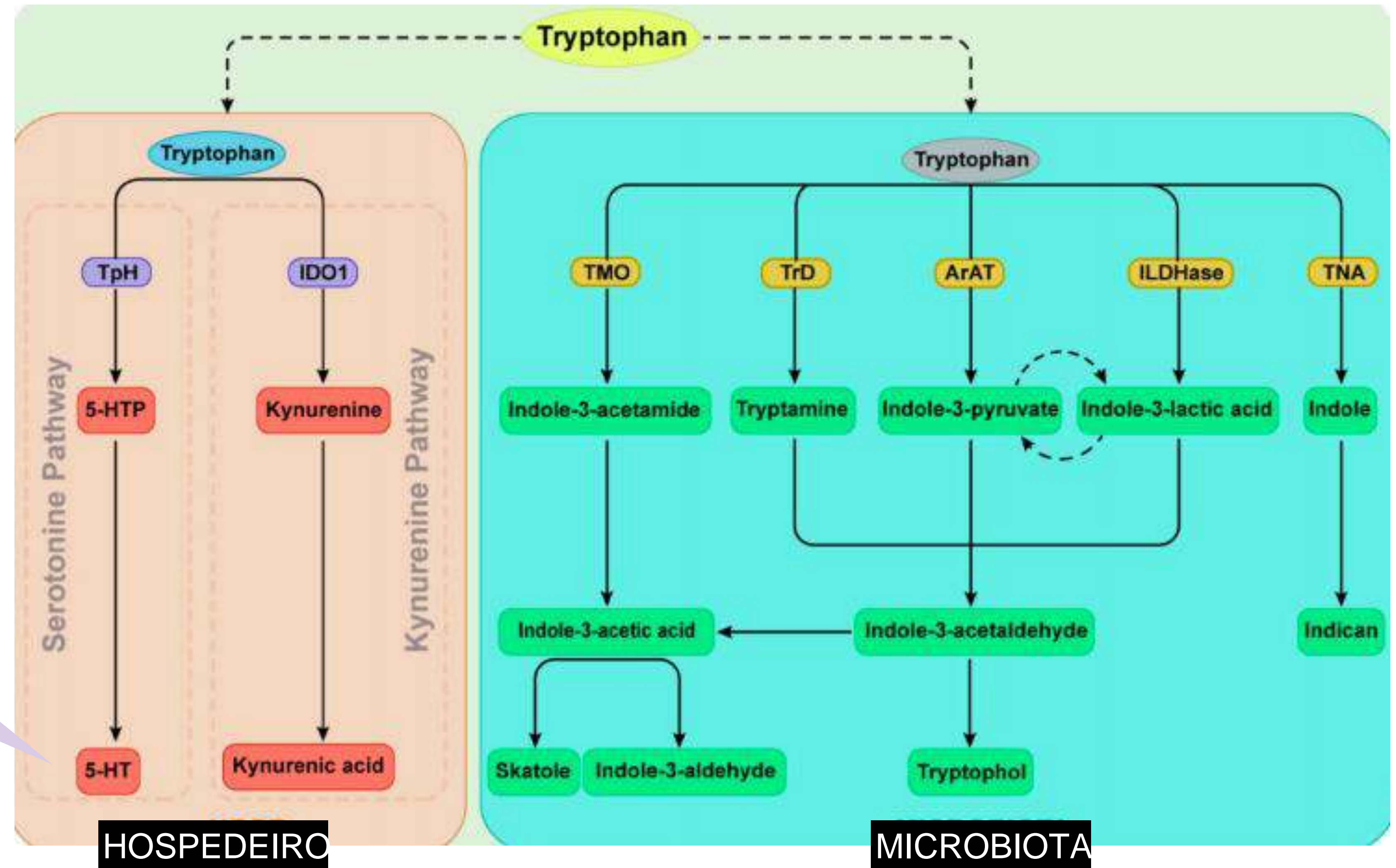
MICROBIOTA

No intestino, a microbiota pode utilizar o triptofano para outras vias, afetando a disponibilidade desse aminoácido para a síntese de serotonina.

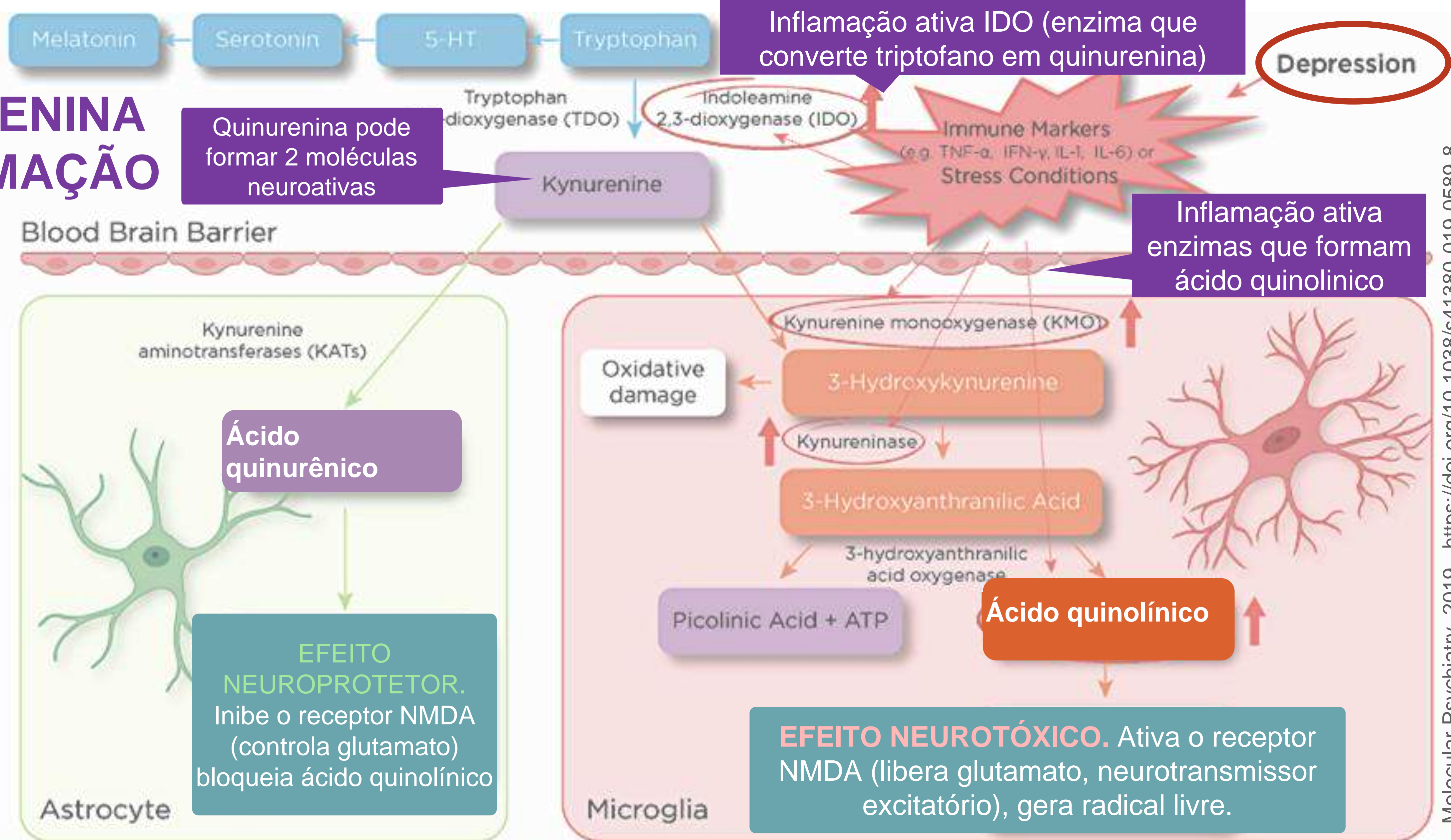
Indicador de quadros de disbiose.

TRIPTOFANO E VIA DA QUINURENINA

No hospedeiro o triptofano também pode ser desviado para a via da quinurenina.



QUINURENINA E INFLAMAÇÃO



Depression

Quinurenina pode formar 2 moléculas neuroativas

Inflamação ativa IDO (enzima que converte triptofano em quinurenina)

Inflamação ativa enzimas que formam ácido quinolinico

Ácido quinurênico

EFEITO NEUROPROTETOR.
Inibe o receptor NMDA (controla glutamato) bloqueia ácido quinolínico

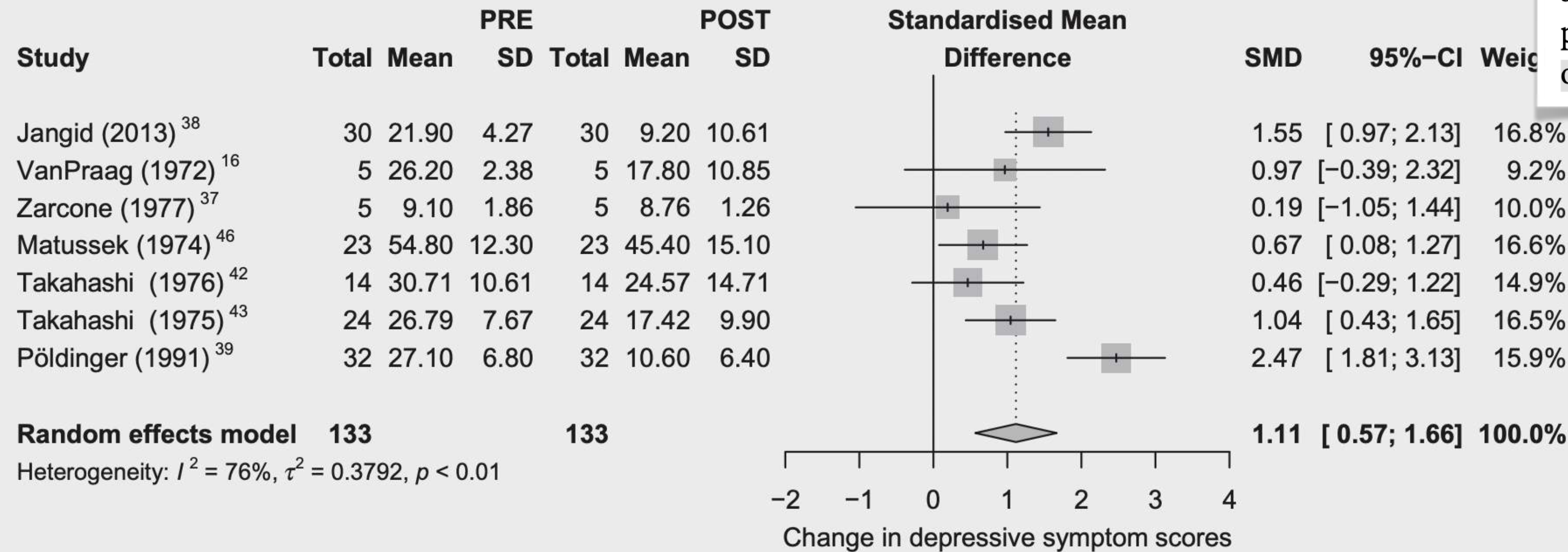
EFEITO NEUROTÓXICO. Ativa o receptor NMDA (libera glutamato, neurotransmissor excitatório), gera radical livre.

Molecular Psychiatry, 2019 - <https://doi.org/10.1038/s41380-019-0589-8>

5-HTP E DEPRESSÃO

Nutrition in Clinical Care

Effects of 5-hydroxytryptophan on distinct types of depression: a systematic review and meta-analysis



view varied in design. The most common designs were case series, which are problematic owing to the small sample size and the lack of a placebo-controlled comparison. None of the studies included a direct measure of changes in serotonergic function. Besides, the cross-

NENHUM ESTUDO INCLUIU MEDIDAS DIRETAS DE ALTERAÇÃO EM FUNÇÃO SEROTONÉRGICA.

Figure 4 Forest plot of questionnaire results in included studies. Results are presented with standardized mean difference (mean pretreatment – mean post-treatment).

doi: 10.1093/nutrit/nuz039

Nutrition Reviews® Vol. 78(1):77–88

Os resultados da meta-análise revelaram um efeito positivo da suplementação de 5-HTP na depressão. Muitos estudos foram de baixa qualidade metodológica e com tamanhos dos efeitos heterogêneos.

Table 3 OHAT (Office of Health Assessment and Translation) tool of bias detection ratings for the included studies

		1. Was administered dose or exposure level adequately randomized?	2. Was allocation to study groups adequately concealed?	3. Did selection of study participants result in appropriate comparison groups?	4. Did the study design or analysis account for important confounding and modifying variables?	5. Were experimental conditions identical across study groups?	6. Were the research personnel and human subjects blinded to the study group during the study?	7. Were outcome data complete without attrition or exclusion from analysis?	8. Can we be confident in the exposure characterization?	9. Can we be confident in the outcome assessment?	10. Were all measured outcomes reported?	11. Were there no other potential threats to internal validity?	
doi: 10.1093/nutrit/nuz039													
<i>Nutrition Reviews</i> ® Vol. 78(1):77–88													
Jangid et al (2013) ³⁸	CaS	NA	NA	NA	DLB	NA	NA	NA	LB	DLB	DLB	DHB	No placebo
Pöldinger et al (1991) ³⁹	CaS	NA	NA	NA	DLB	NA	NA	NA	DLB	DLB	DLB	DHB	No placebo
Kaneko et al (1979) ⁴⁰	HCT	LB	DLB	NA	NA	NA	DHB	DLB	LB	DLB	HB	DHB	No placebo
Nakajima et al (1978) ⁴¹	CaS	NA	NA	NA	DLB	NA	NA	NA	LB	DLB	HB	DHB	No placebo
Zarcone et al (1977) ³⁷	Co	NA	NA	DLB	DLB	NA	NA	LB	LB	LB	DLB	HB	Crossover design
Takahashi et al (1976) ⁴²	CaS	NA	NA	NA	DLB	NA	NA	NA	LB	DLB	HB	DHB	No placebo
Takahashi et al (1975) ⁴³	CaS	NA	NA	NA	LB	NA	NA	NA	LB	DLB	HB	DHB	No placebo
Fujiwara and Otsuki (1974) ⁴⁴	CaS	NA	NA	NA	HB	NA	NA	NA	LB	DLB	HB	DHB	No placebo
Matussek et al (1974) ⁴⁶	HCT	LB	DLB	NA	NA	NA	DHB	LB	LB	LB	DLB	DHB	No placebo
Barlet and Pailard (1974) ⁴⁵	HCT	DLB	DLB	NA	NA	NA	DLB	DLB	LB	HB	DLB	LB	
Brodie et al (1973) ⁴⁷	CaS	NA	NA	NA	LB	NA	NA	NA	DLB	LB	HB	DHB	No placebo
van Praag et al (1972) ¹⁶	HCT	DLB	DLB	NA	NA	NA	DLB	DLB	LB	DLB	DLB	DLB	
Sano (1972) ⁴⁸	CaS	NA	NA	NA	HB	NA	NA	NA	DLB	HB	DLB	DHB	No placebo

DHB= DEFINITELY HIGH BIAS POSSIBILITY

Abbreviations: CaS, case series; Co, cohort study; HCT, human-controlled or not controlled trial; DHB, definitely high bias possibility (red); HB, high bias possibility (light red); LB, low bias possibility (light green); DLB, definitely low bias possibility (green); NA, not applicable (grey).

SMILES trial

O'Neil et al. *BMC Psychiatry* 2013, **13**:114
<http://www.biomedcentral.com/1471-244X/13/114>

A randomised, controlled trial of a dietary intervention for adults with major depression (the "SMILES" trial): study protocol

Adrienne O'Neil^{1,2*}, Michael Berk^{1,3,4}, Catherine Itsiopoulos⁵, David Castle⁶, Rachele Opie⁵, Josephine Pizzinga¹, Laima Brazionis⁷, Allison Hodge⁸, Cathrine Mihalopoulos⁹, Mary Lou Chatterton⁹, Olivia M Dean^{1,4,10} and Felice N Jacka^{1,4}

67 adultos com diagnóstico de depressão maior

CONTROLE

Sessões de suporte social, com mesma duração da intervenção.

Conversas guiadas de temas neutros ou atividades alternativas, como jogos, com a intenção de manter o participante engajado.

INTERVENÇÃO

7 sessões individuais de aconselhamento dietético personalizado, incluindo entrevistas motivacionais e estabelecimento de metas, por um nutricionista clínico.

Cestas de alimentos com os principais componentes da dieta, receitas e planos de refeições.

12 semanas

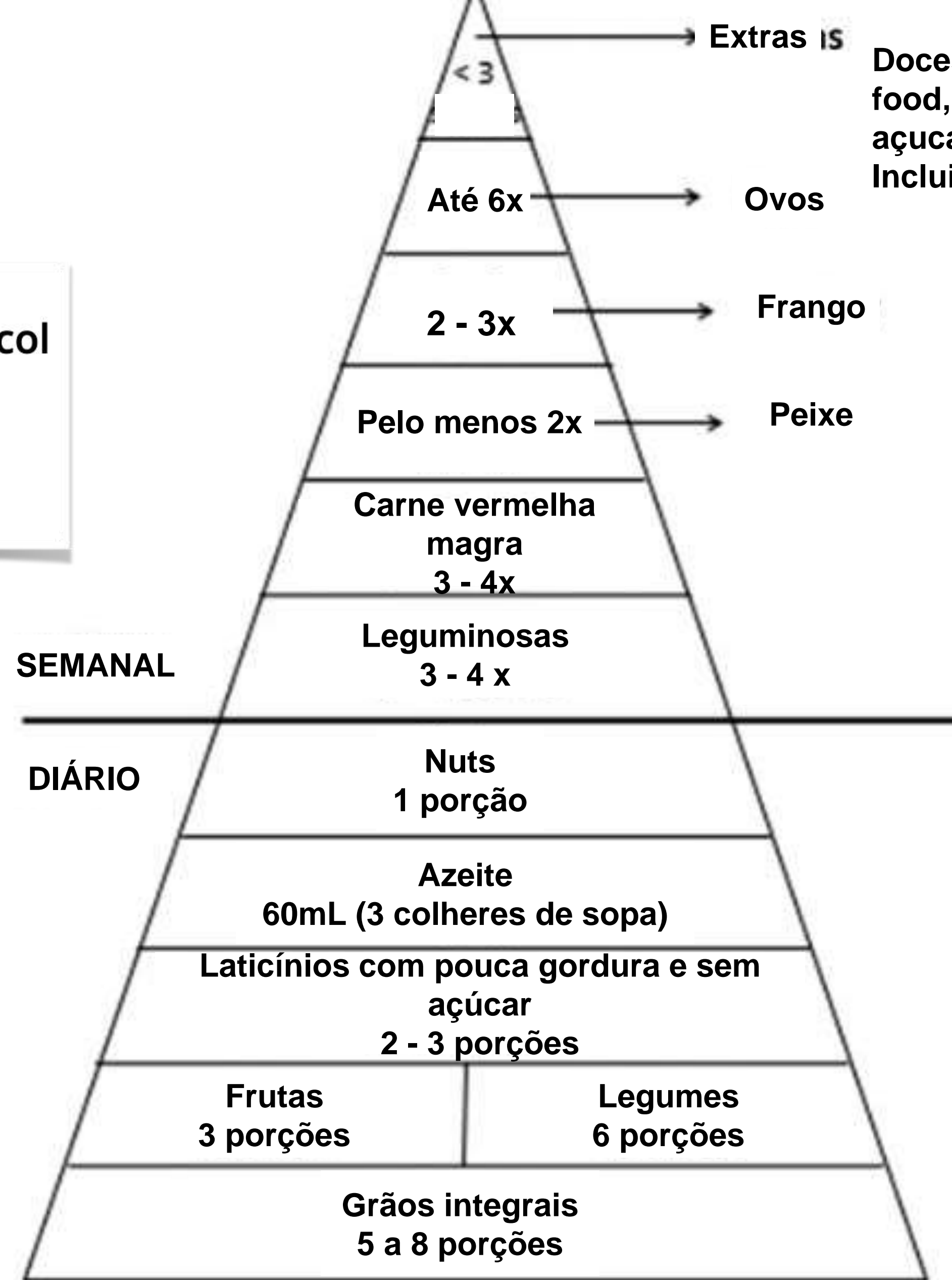
Primeiro ensaio clínico randomizado projetado para avaliar o impacto de uma intervenção dietética na redução da sintomatologia depressiva em adultos com depressão clínica.

SMILES trial

A modified Mediterranean dietary intervention for adults with major depression: Dietary protocol and feasibility data from the SMILES trial

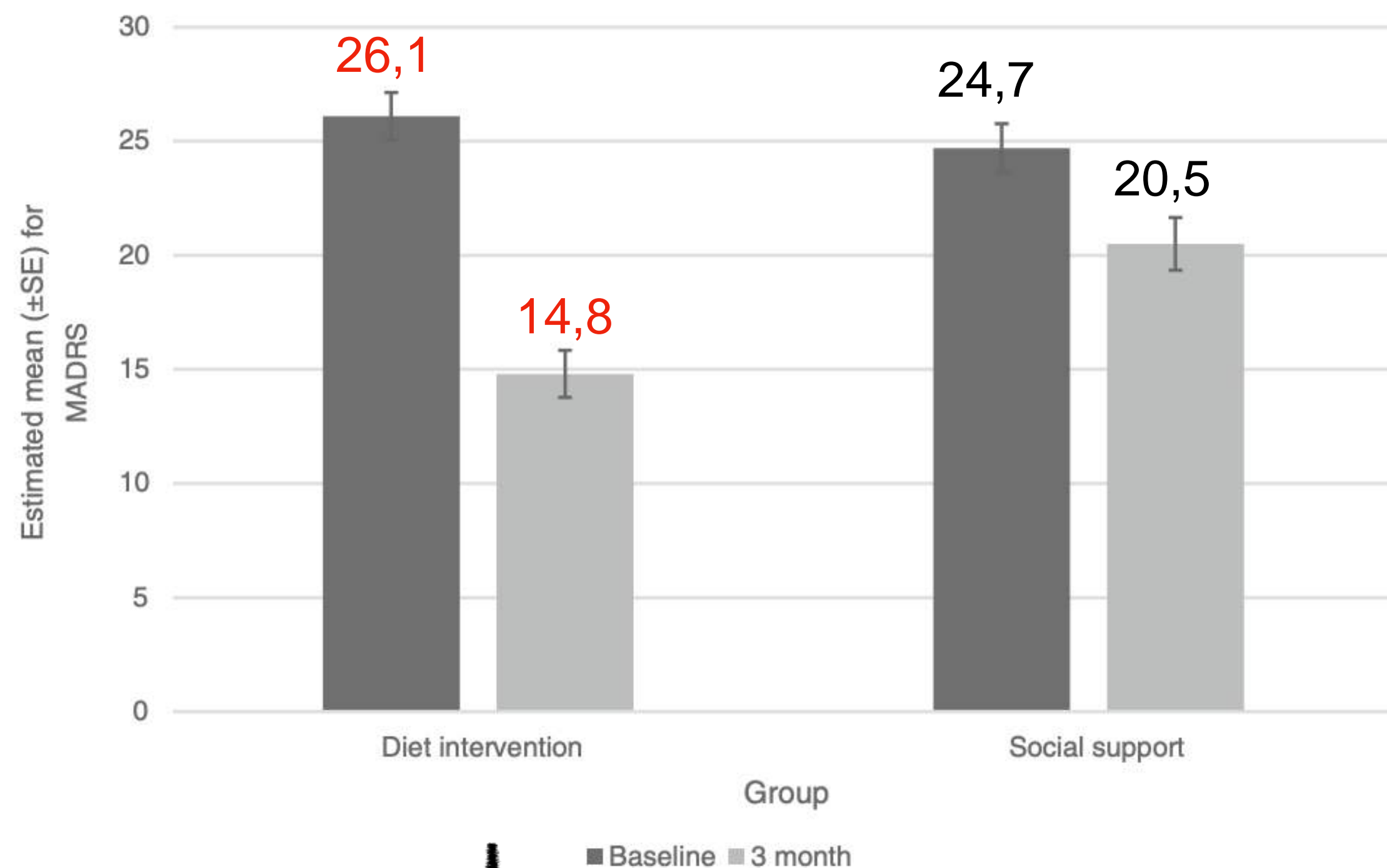
Rachelle S. Opie, Adrienne O'Neil, Felice N. Jacka, Josephine Pizzinga & Catherine Itsiopoulos

FOCO NA QUALIDADE DA DIETA!



Doces, cereais refinados, frituras, fast-food, carnes processadas e bebidas açucaradas
Inclui-se bebidas alcóolicas aqui

SMILES TRIAL - RESULTADOS



*MADRS: Escala de Classificação de Depressão de Montgomery – Åsberg

O grupo intervenção apresentou redução nos sintomas de depressão (tamanho de efeito -1,16) independente de IMC, atividade física, tabagismo, autoeficácia.

Jacka et al. *BMC Medicine* (2017) 15:23
DOI 10.1186/s12916-017-0791-y

BMC Medicine



A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial)

Felice N. Jacka^{1,4,9,10,13*}, Adrienne O'Neil^{1,2,13}, Rachelle Opie^{5,13}, Catherine Itsiopoulos⁵, Sue Cotton³, Mohammedreza Mohebibi¹, David Castle^{4,11}, Sarah Dash^{1,13}, Cathrine Mihalopoulos⁷, Mary Lou Chatterton⁷, Laima Brazionis^{5,6}, Olivia M. Dean^{1,4,12,13}, Allison M. Hodge⁸ and Michael Berk^{1,3,12,13}

Em 12 semanas, 32,3% (n = 10) do grupo de suporte dietético e 8% (n = 2) do grupo de controle alcançaram critérios de remissão para depressão (diferença significativa entre grupos: p = 0,028).

ESTUDO HELFIMED

163 adultos de 18 a 65 anos com sintomas depressivos autoreferidos

CONTROLE

Grupos sociais quinzenais (jogos, conversas, clube do livro ou outras atividades)

INTERVENÇÃO

Educação nutricional, cestas de alimentos e oficinas de culinária com base no **estilo mediterrâneo**

+ 900 DHA e 200 EPA

3 MESES

900 DHA e 200 EPA

6 MESES

A 6-month randomised controlled trial investigating effects of Mediterranean-style diet and fish oil supplementation on dietary behaviour change, mental and cardiometabolic health and health-related quality of life in adults with depression (HELFIMED): study protocol

Dorota Zarnowiecki¹, Jihyun Cho¹, Amy Wilson³, Svetlana Bogomolova³, Anthony Villani², Catherine Itsiopoulos⁴, Theo Niyonsenga¹, Kerin O'Dea¹, Sarah Blunden⁵, Barbara Meyer⁶, Leonie Segal¹ and Natalie Parletta^{1,7*}

Zarnowiecki *et al.* *BMC Nutrition* (2016) 2:52
DOI 10.1186/s40795-016-0095-1



ESTUDO HELFI MED

NUTRITIONAL NEUROSCIENCE
2019, VOL. 22, NO. 7, 474-487
<https://doi.org/10.1080/1028415X.2017.1411320>

A Mediterranean-style dietary intervention supplemented with fish oil improves diet quality and mental health in people with depression: A randomized controlled trial (HELFI MED)

Natalie Parletta ^a, Dorota Zarnowiecki ^a, Jihyun Cho ^a, Amy Wilson ^b, Svetlana Bogomolova ^b, Anthony Villani ^c, Catherine Itsiopoulos ^d, Theo Niyonsenga ^{a,e}, Sarah Blunden ^f, Barbara Meyer ^g, Leonie Segal ^a, Bernhard T. Baune ^h, and Kerin O'Dea ^a

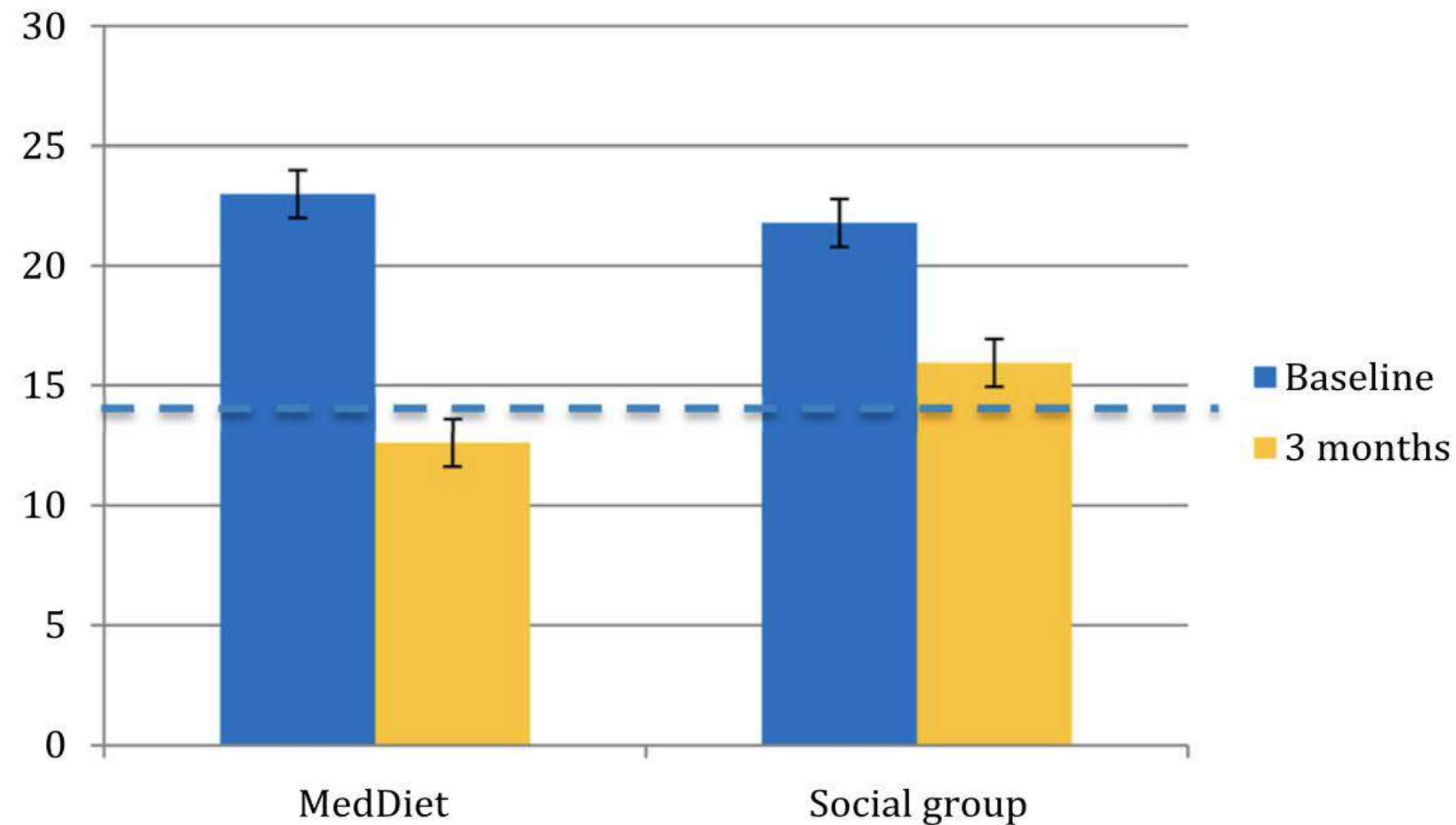


Figure 3 DASS depression scores in each group at baseline and 3 months ($P = 0.027$). Bars represent standard error of the mean. Dotted line represents cut-off for 'extremely severe depression'.

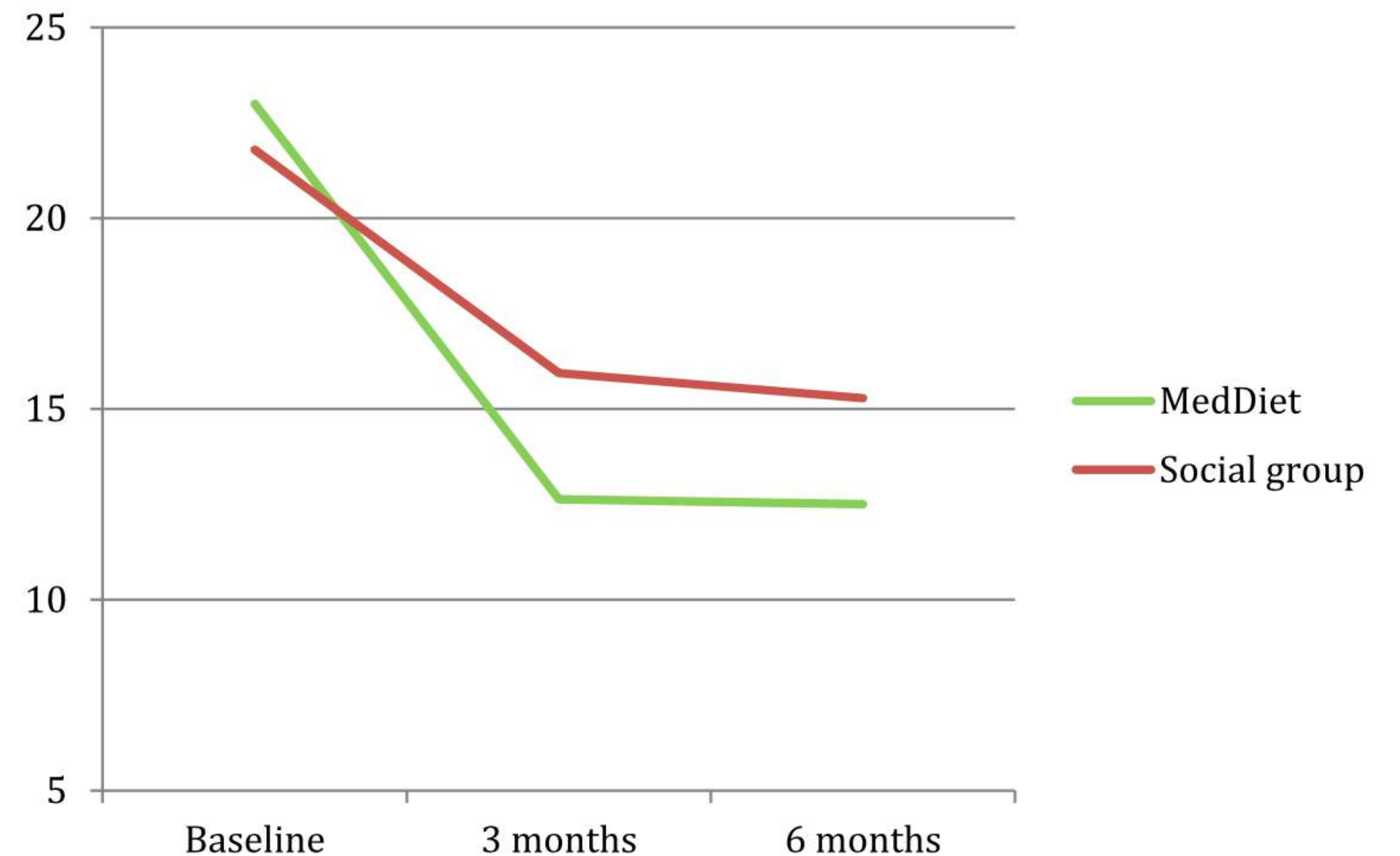
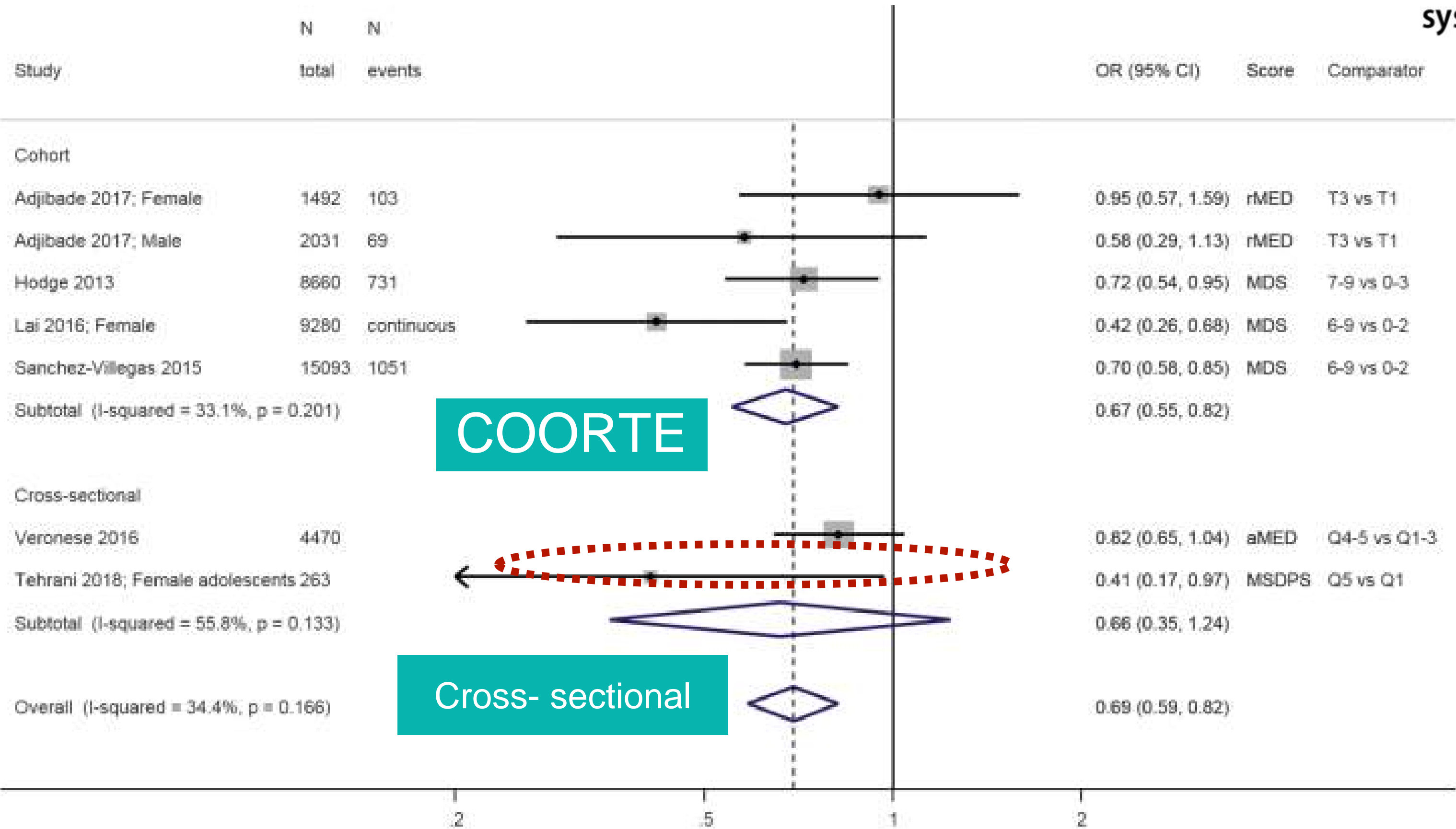


Figure 4 DASS depression scores at baseline, 3 and 6 months.

DIETA MEDITERRÂNEA E DEPRESSÃO

REVIEW ARTICLE

Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies



A dieta mediterrânea reduziu o risco de depressão em 31%.

Fig. 1 Meta-analysis of studies investigating the association between a traditional Mediterranean diet and depressive outcomes. Estimates are ORs, RRs or HRs of depression for people with highest adherence

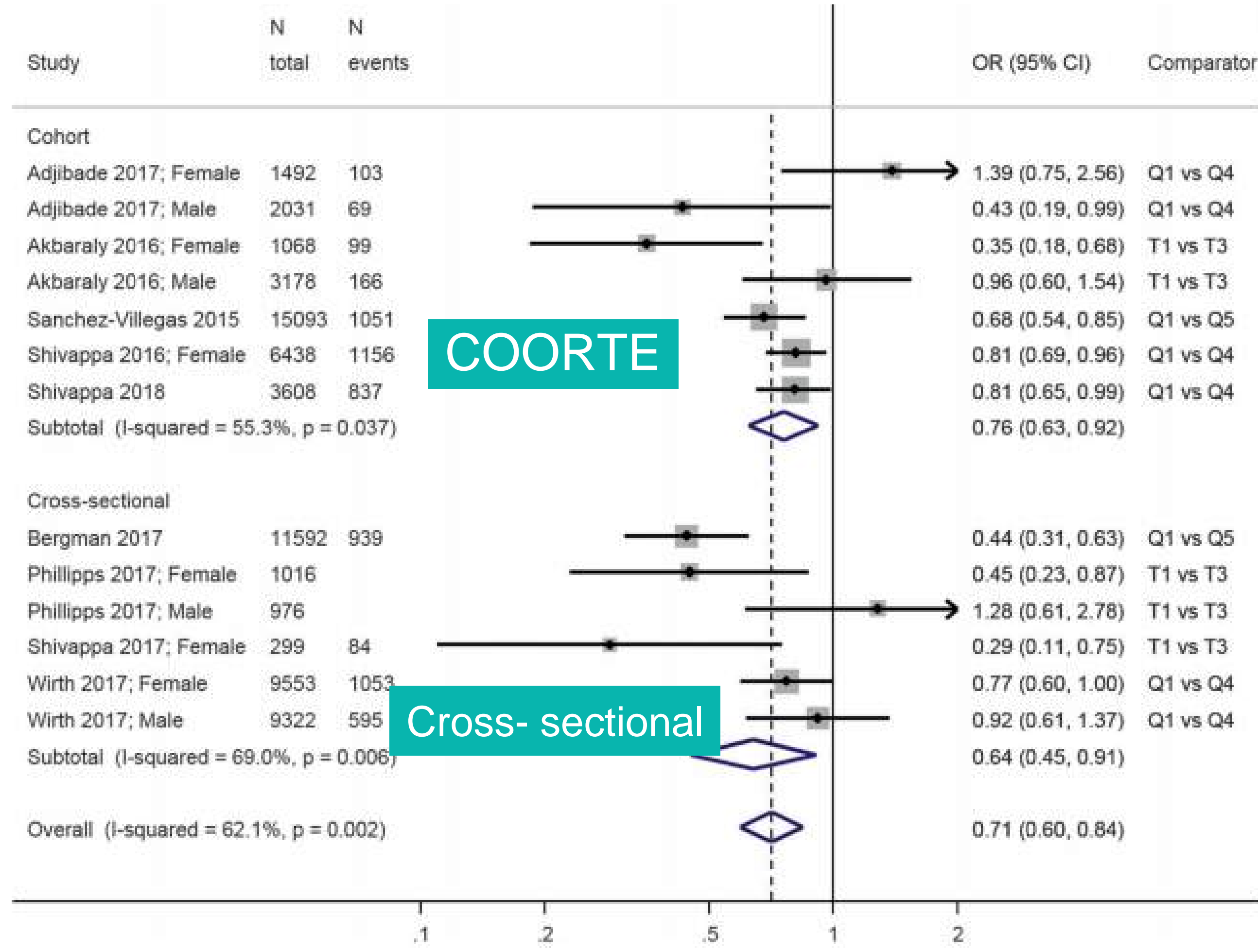
compared to lowest adherence (categories or quantiles specified). MDS Mediterranean diet score, rMED relative MDS, aMED alternative MDS, T tertile, Q quintile

ÍNDICE INFLAMATÓRIO E DEPRESSÃO

Molecular Psychiatry (2019) 24:965–986
<https://doi.org/10.1038/s41380-018-0237-8>

REVIEW ARTICLE

Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies



COORTE

Cross-sectional

O menor índice inflamatório reduziu o risco de depressão em 29%

PAPEL DA NUTRIÇÃO?

Original Article | Published: 06 January 2009

Depression and anxiety among US adults: associations with body mass index

Molecular Psychiatry (2019) 24:965–986
<https://doi.org/10.1038/s41380-018-0237-8>

REVIEW ARTICLE

Corrected: Correction

Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies

Almudena Sánchez-Villegas^{6,7}

ORIGINAL ARTICLES

THE JOURNAL OF PEDIATRICS • www.jpeds.com

Soft Drinks Consumption Is Associated with Behavior Problems in 5-Year-Olds

Shakira F. Suglia, ScD¹, Sara Solnick, PhD², and David Hemenway, PhD³

PLOS ONE

Omega-3 Fatty Acid Deficiency in Infants before Birth Identified Using a Randomized Trial of Maternal DHA Supplementation in Pregnancy

Kelly A. Mulder, D. Janette King, Sheila M. Innis*

Nutrition and Metabolism Program, Child and Family Research Institute, Department of Paediatrics, Faculty of Medicine, University of British Columbia, Vancouver, British Columbia, Canada



International Journal of Environmental Research and Public Health

Article

Sugar-Sweetened Beverages Adversely Associated with Deficit/Hyperactivity Disorder

REVIEW ARTICLE

Open Access

Efficacy of omega-3 PUFAs in depression: A meta-analysis

PLOS ONE

Impaired Executive Function Mediates the Association between Maternal Pre-Pregnancy Body Mass Index and Child ADHD Symptoms

Claudia Buss

Curt A. Sandman

Published: June 15, 2018

OPEN ACCESS Freely available online

PLOS ONE

A Prospective Study of Diet Quality and Mental Health in Adolescents

Felice N. Jacka^{1,2*}, Peter J. Kremer³, Michael Berk^{1,2,4,5}, Andrea M. de Silva-Sanigorski⁶, Marjorie Moodie⁷, Eva R. Leslie³, Julie A. Pasco⁸, Boyd A. Swinburn⁹

The American Journal of CLINICAL NUTRITION

Maternal folate status in early pregnancy and child emotional and behavioral problems: the Generation R Study

Jolien Steenweg-de Graaff, Sabine J Roza, Eric AP Steegers, Albert Hofman, Frank C Verhulst, Vincent WV Jaddoe, Henning Tiemeier

The American Journal of Clinical Nutrition, Volume 95, Issue 6, June 2012, Pages 1413–1421, <https://doi.org/10.3945/ajcn.111.030791>

Published: 09 May 2012 Article history

RESUMINDO

COMPOSTOS BIOATIVOS
FIBRA
ÔMEGA-3



PADRÃO OCIDENTAL
(Dieta inflamatória)



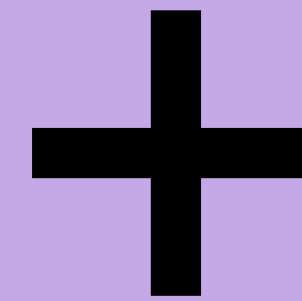
PROTEÍNA/COLINA/CARNITINA
GORDURA SATURADA E AÇÚCAR
ADITIVOS, ADOÇANTES

DESEQUILIBRIO INTESTINAL
AUMENTO DE BACTÉRIAS GRAM-
E DIMINUIÇÃO ALPHA DIVERSIDADE

DIMINUIÇÃO DE FOSFATASE ALCALINA
AUMENTO DE TMAO

CITOCINAS INFLAMATÓRIAS

LIPOPOLISSACARIDEOS
(LPS)



AUMENTO DA
PERMEABILIDADE INTESTINAL

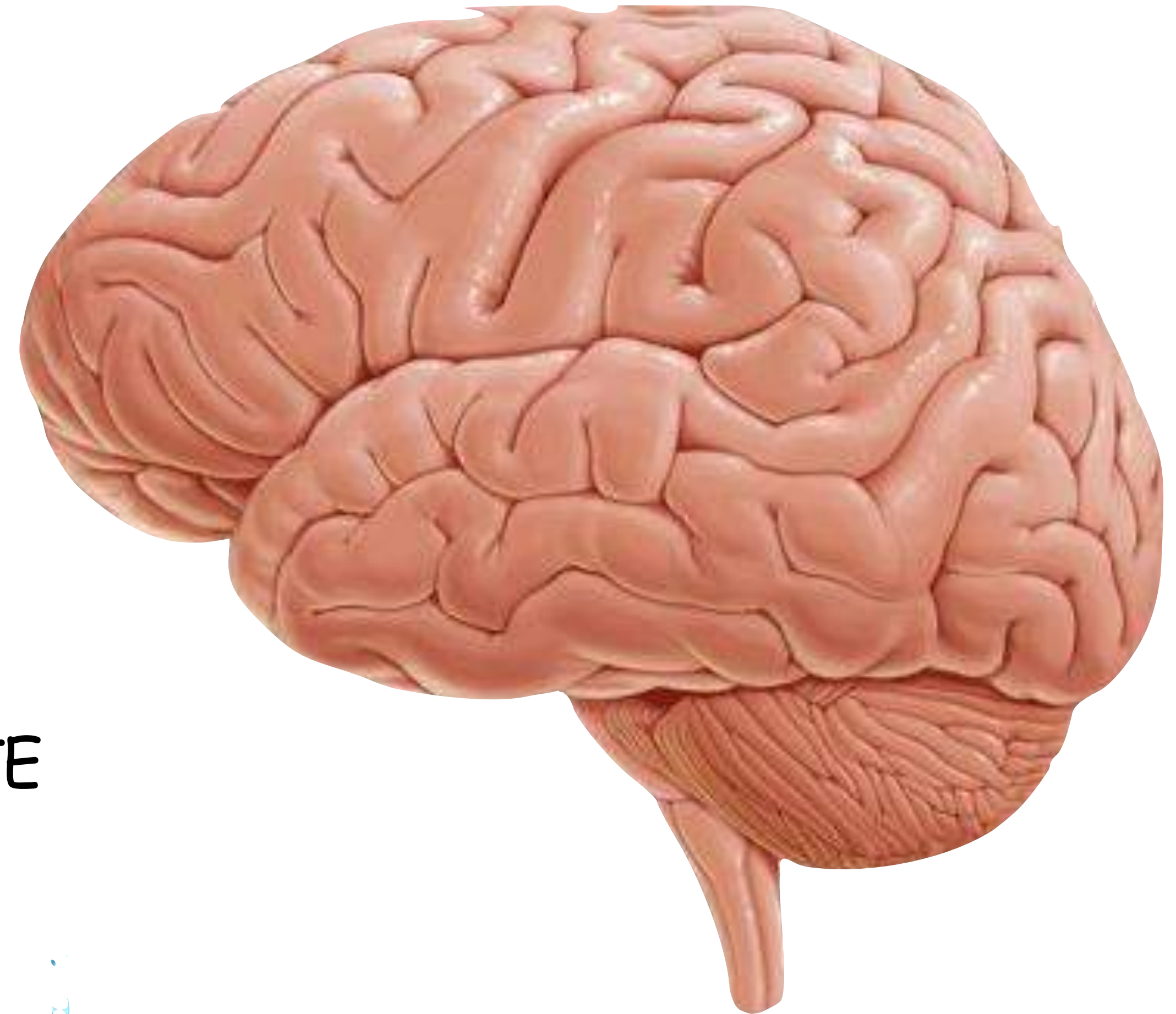
INFLAMAÇÃO SISTÊMICA; ENDOTOXEMIA METABÓLICA

AUMENTO DO RISCO DE ALTERAÇÕES METABÓLICAS E PSIQUIÁTRICAS

MUITO
Obrigada 

TODA TROCA DE CONHECIMENTO E
EXPERIÊNCIA DEPENDE DE UMA MENTE
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