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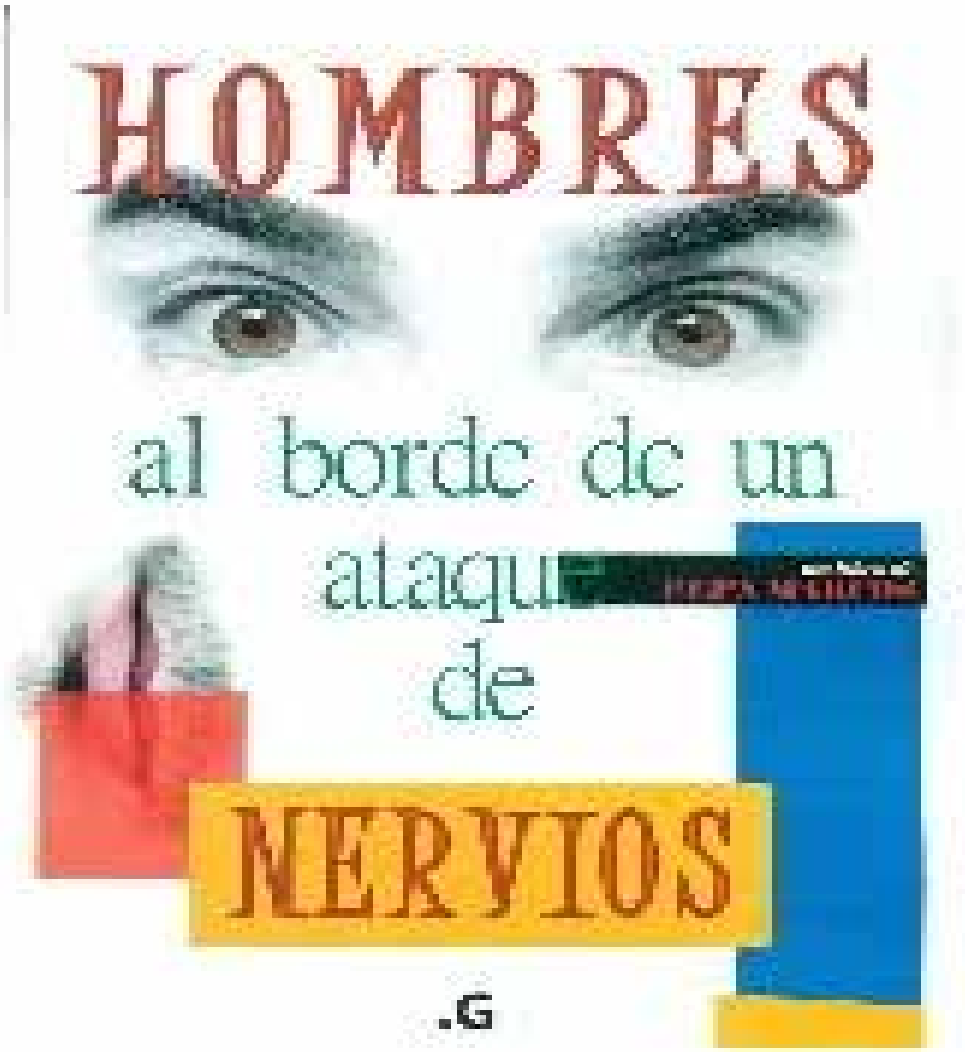
Dr. Jorge Abad
Servicio Neumología H.GTiP

ALTERACIONES METABOLICAS Y SAHS


HOMBRES
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de
NERVIOS
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http://dx.doi.org/10.5665/sleep.3210

Circulating FABP4 and FABP5 Levels Are Differently Linked to OSA Severity and Treatment

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NEW RESEARCH

SCIENTIFIC INVESTIGATIONS

JCSM
Journal of Clinical Sleep Medicine

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Impact of OSA on Biological Markers in Morbid Obesity and Metabolic Syndrome

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Background and Objective: There is compelling evidence that obstructive sleep apnoea (OSA) can affect metabolic syndrome (MetS) and cardiovascular risk, but the intermediate mechanisms through which it occurs have not been well defined. We explored the impact of OSA in morbidly obese patients with MetS on adipokines, pro-inflammatory markers, endothelial dysfunction, and atherosclerosis markers.

Methods: We included 52 morbidly obese patients in an observational study matched for age, gender and central obesity in 3 groups (OSA-MetS, Non-OSA-MetS, and Non OSA-non-MetS). Anthropometrical, blood pressure, and fasting blood measurements were obtained the morning after an overnight polysomnography. VEGF, soluble CD40 ligand (sCD40L), TNF-α, IL-6, leptin, adiponectin, and chemerin were determined in serum by ELISA. OSA was defined as apnea/hypopnea index ≥ 15 and MetS by NCEP-ATP III.

Results: Cases and control subjects did not differ in age, BMI, waist circumference, and gender (43 ± 10 years, 46 ± 5 kg/m^2, 128 ± 10 cm, 71% females). The cases had severe OSA with 47 (32-66) events/h, time spent < 90% SpO_2 7% (5%-31%). All groups presented similar serum cytokines, adipokines, VEGF, and sCD40L levels.

Conclusions: In a morbidly obese population with established MetS, the presence of OSA did not determine any differences in the studied mediators when matched by central obesity. Morbidly obese NonOSA-NonMetS had a similar inflammatory, adipokine VEGF, and sCD40L profile as those with established MetS, with or without OSA. Obesity itself could overwhelm the effect of sleep apnea and MetS in the studied biomarkers.

Keywords: Obstructive sleep apnoea, obesity, metabolic syndrome, adipokines, inflammatory markers, endothelial dysfunction

Citation: Salord N; Gasa M; Mayos M; Fortuna-Gutierrez AM; Montserrat JM; Sánchez-de-la-Torre M; Barceló A; Barbé F; Vilarrasa N; Monasterio C. Impact of OSA on biological markers in morbid obesity and metabolic syndrome. *J Clin Sleep Med* 2014;10(3):263-270.


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Abbreviations

AHI	apnea–hypopnea index
AMI	acute myocardial infarction
AP1	activator protein1
BH_4	tetrahydrobiopterin
CAD	coronary artery disease
CD	cluster of differentiation
cGMP	cyclic GMP
CNS	central nervous system
COPD	chronic obstructive pulmonary disease
eNOS	endothelial NOS (NOS3)
EPCs	endothelial progenitor cells
EPO	erythropoietin
Erk1/2	extracellular signal-regulated kinase
GPx	glutathione peroxidase
GSH	glutathione (reduced)
GSSG	glutathione disulfide (oxidized)
H_2O_2	hydrogen peroxide
HDL	high-density lipoprotein
HIF-1α	hypoxia inducible factor-1α
HNA	4-hydroxy-2-nonenal
HO-1	heme oxygenase 1
HSPs	heat shock proteins
ICAM-1	intracellular cell adhesion molecule 1
I/R	ischemia and reperfusion
IH	intermittent hypoxia
IL-8	interleukin 8
IL-6	interleukin 6
iNOS	inducible NOS (NOS2)
IPC	ischemic preconditioning
Keap1	Kelch-like ECH-associated protein 1
LAD	left anterior descending artery
LDL	low-density lipoprotein
MDA	malonaldehyde
MI	myocardial infarction
mPTP	mitochondrial permeability transition pore
NAC	N-acetylcysteine
NADPH	reduced nicotinamide adenine dinucleotide phosphate
nCPAP	nasal continuous positive airway pressure
NFκB	nuclear factor κB
nNOS	neuronal NOS (NOS1)
NO	nitric oxide
NOS	nitric oxide synthase
Nox	NADPH oxidase
Nrf2	nuclear factor (erythroid-derived 2)-like2
$O_2^{\cdot-}$	superoxide anion
ODI	oxygen desaturation index
$OH^{\cdot}$	hydroxyl radical
$OONO^-$	peroxynitrite
OSA	obstructive sleep apnea
oxLDL	oxidized LDL
p38 MAPK	p38 MAP kinase
PAC-1	specific marker for glycoprotein (GP)IIb/IIIa
PI3K	phosphatidylinositol-3-kinase
PKC	protein kinase C
PON-1	paraxonase-1
PSLG-1	P-selectin glycoprotein ligand 1
Redox	oxidation/reduction balance
RNS	reactive nitrogen species
ROS	reactive oxygen species
SDB	sleep disordered breathing
SH	thiol
SOD	superoxide dismutase
TBARs	thiobarbituric acid reactive substances
TNF-α	tumor necrosis factor α
VCAM-1	vascular cell adhesion molecule 1
VEGF	vascular endothelial growth factor
VEGF-R2 (KDR)	VEGF receptor 2

CLINICAL REVIEW

Oxidative stress in obstructive sleep apnea and intermittent hypoxia – Revisited – The bad ugly and good: Implications to the heart and brain

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Ischemia/reperfusion
Ischemic preconditioning
Acute myocardial infarction
Stroke
Endothelial progenitor cells
Coronary collaterals

SUMMARY

Obstructive sleep apnea (OSA), characterized by intermittent hypoxia (IH), is linked with increased reactive oxygen species/reactive nitrogen species (ROS/RNS) and oxidative stress, which adversely affect the associated cardio-/cerebro-vascular disease in OSA. Yet, animal and a small number of human studies support activation of cardio-/cerebro-protective mechanisms as well. ROS/RNS are intricate and multifaceted molecules with multiple functions. At low-moderate concentrations ROS/RNS are considered "good", by regulating vital cellular functions. At higher levels, they are considered "bad" by promoting oxidative stress and damaging vital macromolecules through ischemia and reperfusion (I/R) injury. Subsequently, ROS/RNS can get "ugly" by eliciting sterile inflammation and a multitude of deadly pathologies. What makes ROS/RNS good, bad, or ugly? A dynamic interplay between a large number of factors determines the outcomes. These include the types of ROS/RNS produced, their quantity, duration, frequency, intracellular localization, micro-environmental antioxidants, as well as the genetic make-up and life style related variables. This review presents the currently available data on redox biology in physiological/pathophysiological conditions and in OSA/IH, in order to better understand the apparently contradictory findings on damage vs. repair. These findings are discussed within the context of the prevailing views on I/R associated ROS/RNS, and their potential implications to OSA.

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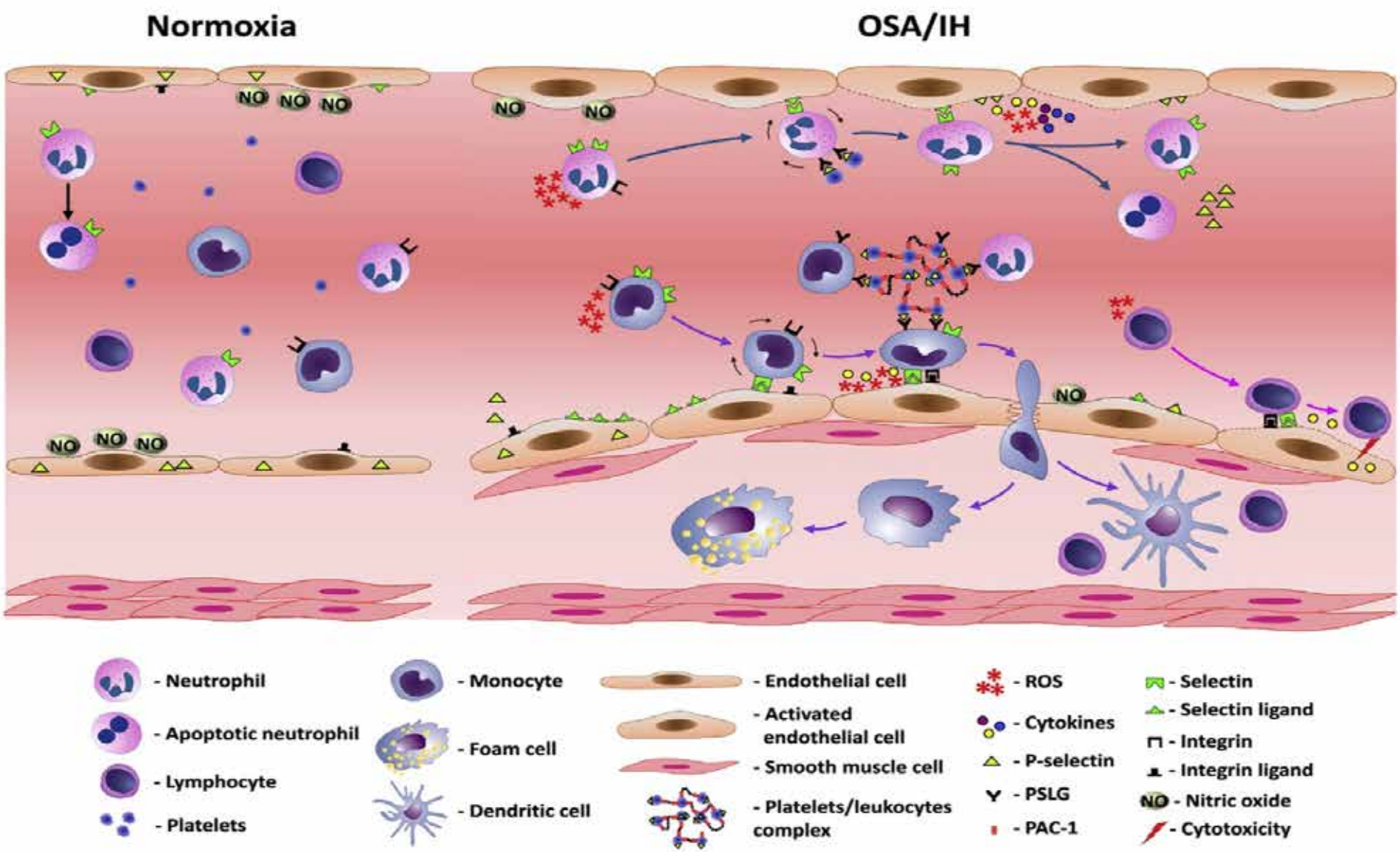
- Cada vez hay mas evidencia que los trastornos del sueño , tienen implicaciones en las alteraciones metabólicas.
- No conocemos los efectos de los relojes biológicos (ritmos circadianos) en la regulación del metabolismo

- La alteraciones metabólicas que provoca el SAHS y cualquier patológica del sueño son confusas y en ocasiones contradictorias
- Hay interrelaciones complejas , que por diferentes mecanismos actúa sobre le metabolismo .



Los leucocitos interaccionan con las cel.endoteliales en IH Los neutro, monocitos, linfos plaqueta etc. Se activan con la HI produciendo mayores cantidades de ROS, moléculas de adhesión , citoquinas y disminución de NO promoviendo daño endotelial .La IH produce Cel. espumosa y dendríticas induciendo aun mas la aterosclesoris

MECANISMOS PATOGENICOS


FRAGMENTACION DEL SUEÑO


Sensibilidad insulina y efectividad de la glucosa
OXYGEN
OXYGEN
HIPOXIA INTERMITENTE


Efecto Lipolítico,
Apoptosis Cel. Beta,
Inhibe Glucogénesis
SLEEP
DONUTS
DO'S
DON'T'S
DUFF BEER
D'OH
TV TIME
YOUR AD HERE
SEX
FAMILY TIME
ACTIVIDAD SIMPATICA

ESTRÉS OXIDATIVO

INFLAMACION SISTEMICA


Grelina :adiposidad
Leptina :elevada obesidad
Resistina y Adiponectina
ALTERACION HORMONAL

OBESIDAD

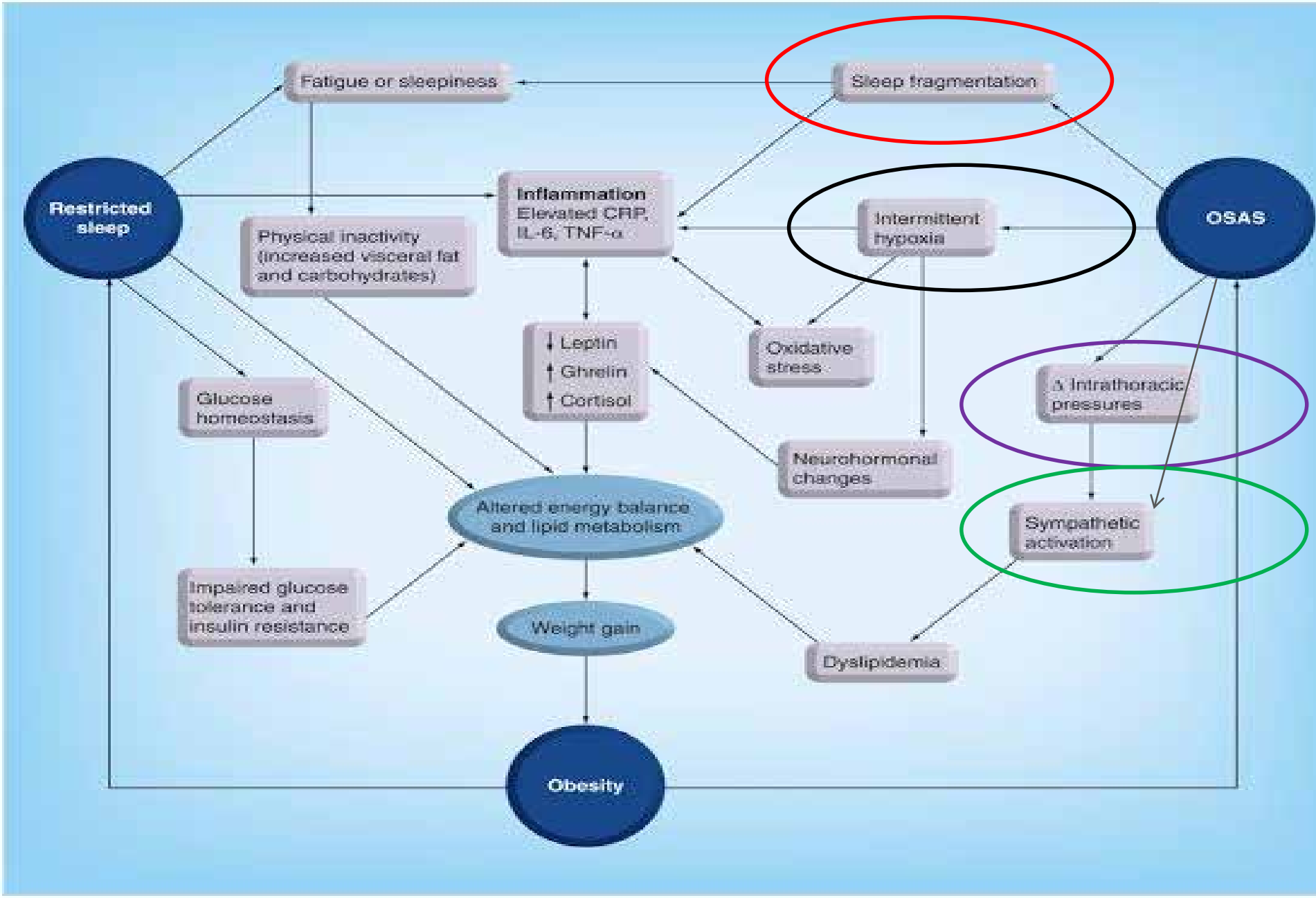
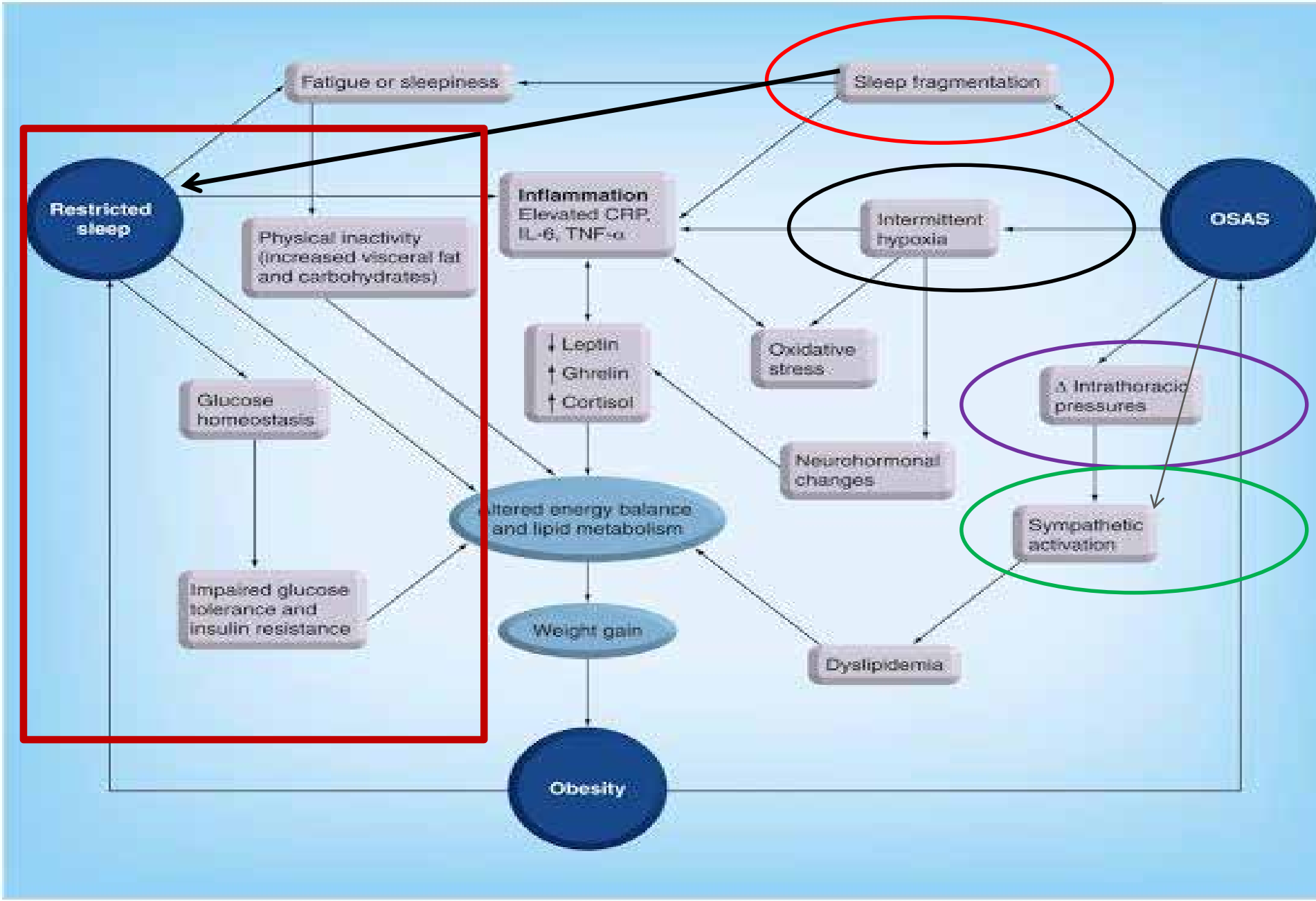


Figure 1. The circular model of sleep restriction, obstructive sleep apnea syndrome and obesity, emphasizing the central role of disrupted lipid metabolism

CRP: C-reactive protein; OSAS: Obstructive sleep apnea syndrome.



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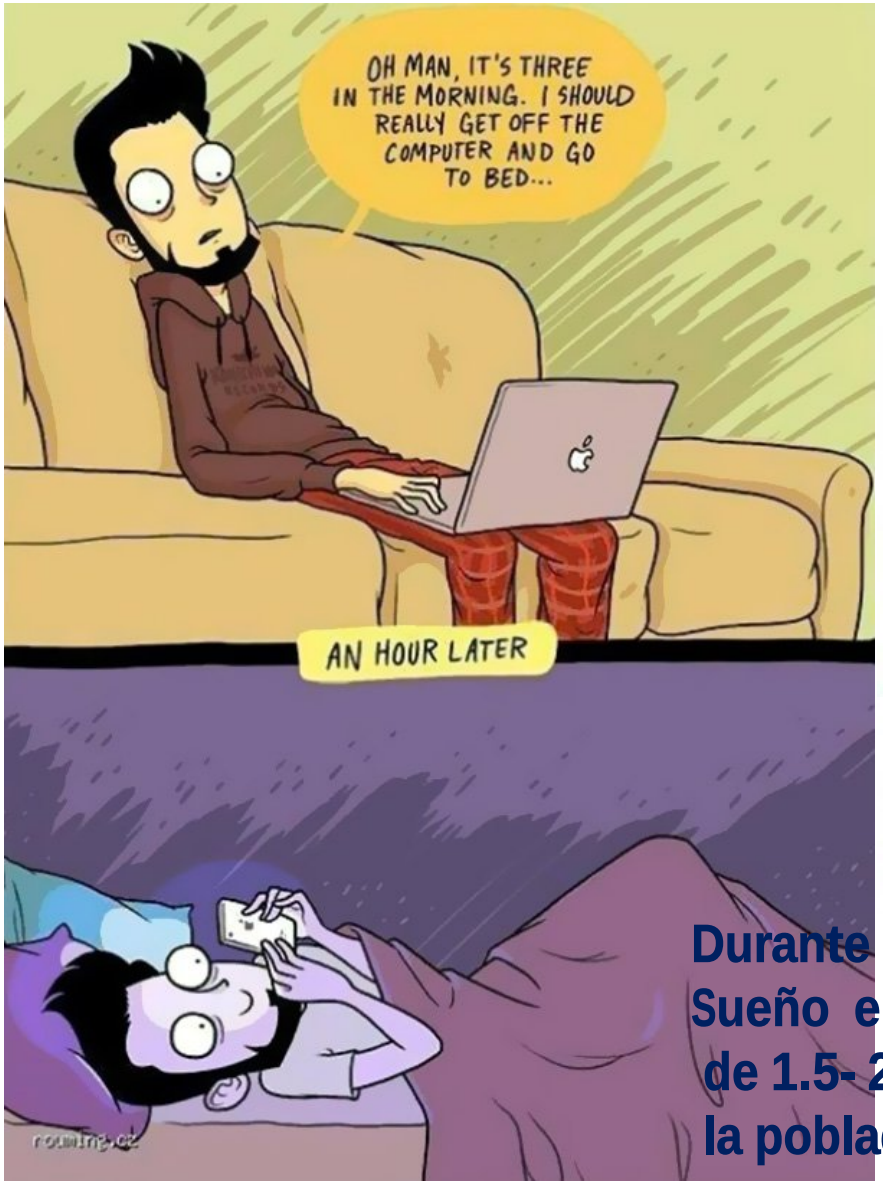
CRP: C-reactive protein; OSAS: Obstructive sleep apnea syndrome.



Durante los últimos 50 años la duración del Sueño en adultos y adolescentes ha disminuido de 1.5- 2 horas por noche en mas de un 30 % de la población americana

FRAGMENTACION DEL SUEÑO

- Impacto negativo sobre el metabolismo de la glucosa con:
  - Disminución la sensibilidad a la insulina y de la eficacia a la glucosa ,Inhibición de la secreción de insulina .
  - Aumento de la glucogénesis hepática
- Híperreactividad del eje HPA:
  - Aumento de los corticoides
  - Aumento de la grelina y disminución de la leptina,
  - Aumento de la ingesta de diurnas .
- Mayor estrés oxidativo y disminución e la capacidad antioxidante

pii: sp-00153-15 http://dx.doi.org/10.5665/sleep.5238

SLEEP DURATION AND CARDIOMETABOLIC HEALTH

Contribution of Inflammation, Oxidative Stress, and Antioxidants to the Relationship between Sleep Duration and Cardiometabolic Health

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School of Kinesiology and Health Science, York University, Toronto, Ontario, Canada

Objectives: To explore the interrelationship and mediating effect of factors that are beneficial (i.e., antioxidants) and harmful (i.e., inflammation and oxidative stress) to the relationship between sleep and cardiometabolic health.
Design: Cross-sectional data from the 2005–2006 National Health and Nutrition Examination Survey.
Setting: Nationally representative population sample from the US.
Participants: Age ≥ 20 y with sleep data; final analytical sample of n = 2,079.
Interventions: N/A.
Measurements and Results: Metabolic syndrome was classified according to the Joint Interim Statement, and sleep duration was categorized as very short, short, adequate, and long sleepers (≤ 4, 5–6, 7–8, and ≥ 9 h per night, respectively). The indirect mediation effect was quantified as large (≥ 0.25), moderate (≥ 0.09), modest (≥ 0.01), and weak (< 0.01). In general, inflammation was above the current clinical reference range across all sleep duration categories, whereas oxidative stress was elevated among short and very short sleepers. Select sleep duration–cardiometabolic health relationships were mediated by C-reactive protein (CRP), γ-glutamyl transferase (GGT), carotenoids, uric acid, and vitamins C and D, and were moderated by sex. Specifically, moderate-to-large indirect mediation by GGT, carotenoids, uric acid, and vitamin D were found for sleep duration–waist circumference and –systolic blood pressure relationships, whereas vitamin C was a moderate mediator of the sleep duration–diastolic blood pressure relationship.
Conclusions: Several factors related to inflammation, oxidative stress, and antioxidant status were found to lie on the casual pathway of the sleep duration–cardiometabolic health relationship. Further longitudinal studies are needed to confirm our results.
Keywords: antioxidants, cardiometabolic health, indirect mediation effect, inflammation and oxidative stress, sleep duration
Citation: Kanagasabai T, Ardern CI. Contribution of inflammation, oxidative stress, and antioxidants to the relationship between sleep duration and cardiometabolic health. *SLEEP* 2015;38(12):1905–1912.

Analizan en 2.076 sujetos ,la relación entre duración de sueño con la inflamación / estrés oxidativo y las capacidades antioxidantes

- Las personas que dormían 7 horas ,tenían niveles de inflamación optima ,con un equilibrio entre el estrés oxidativo y los mecanismos antioxidantes .

- Una corta duración de sueño se asociaba a un aumento de PCR, GGT, Ac úrico y vit. A y niveles bajos de vit. C ,D, E .

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Oxidative Medicine and Cellular Longevity
Volume 2015, Article ID 234952, 15 pages
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Review Article

Sleep Deprivation and Oxidative Stress in Animal Models: A Systematic Review

Gabriel Villafuerte,[1] Adán Miguel-Puga,[1] Eric Murillo Rodríguez,[2] Sergio Machado,[3] Elias Manjarrez,[4] and Oscar Arias-Carrión[1]

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[4]*Instituto de Fisiología, Benemérita Universidad Autónoma de Puebla, 72570 Puebla, PUE, Mexico*

Ø *¿Hay diferencia en las propiedades antioxidantes entre sueño paradójico y sueño profundo?*

- El sueño profundo : baja actividad metabólica y menor consumo de O2.
- El sueño paradójico : se asocia a una elevada actividad metabólica y mayor consumo de O2.
- El sueño paradójico juega un papel importante como elemento antioxidante.
- Su disminución aumenta el estrés oxidativo.

Ø *¿Que regiones son preferiblemente afectadas por el estrés oxidativo después de la deprivacion de sueño?*

- El cerebro no se ve afectado de forma uniforme por la privación de sueño.

- Hay una peroxidacion lipídica en el hipocampo ,tálamo e hipotálamo .Pero disminución de la peroxidacion en la corteza

Ø *El papel antioxidante del sueño ¿Se observa solo en el cerebro?* .

- El sueño , regula los genes responsables de la síntesis de unas serie de proteínas antioxidantes.

- El sueño cambia la actividad metabólica.

- Durante el sueño hay una disminución de la actividad metabólica ,reduciéndose la carga oxidativa y por lo tanto un beneficio para para el cerebro, corazón …..

Ø ¿El estrés oxidativo induce al sueño?

- El nivel de estrés oxidativo puede inducir el sueño.

- Hay una serie de moléculas endógenas que se acumulan en vigilia y esto podría activar un mecanismo antioxidante.

SLEEP SCIENCE 8 (2015) 143–152

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Review article

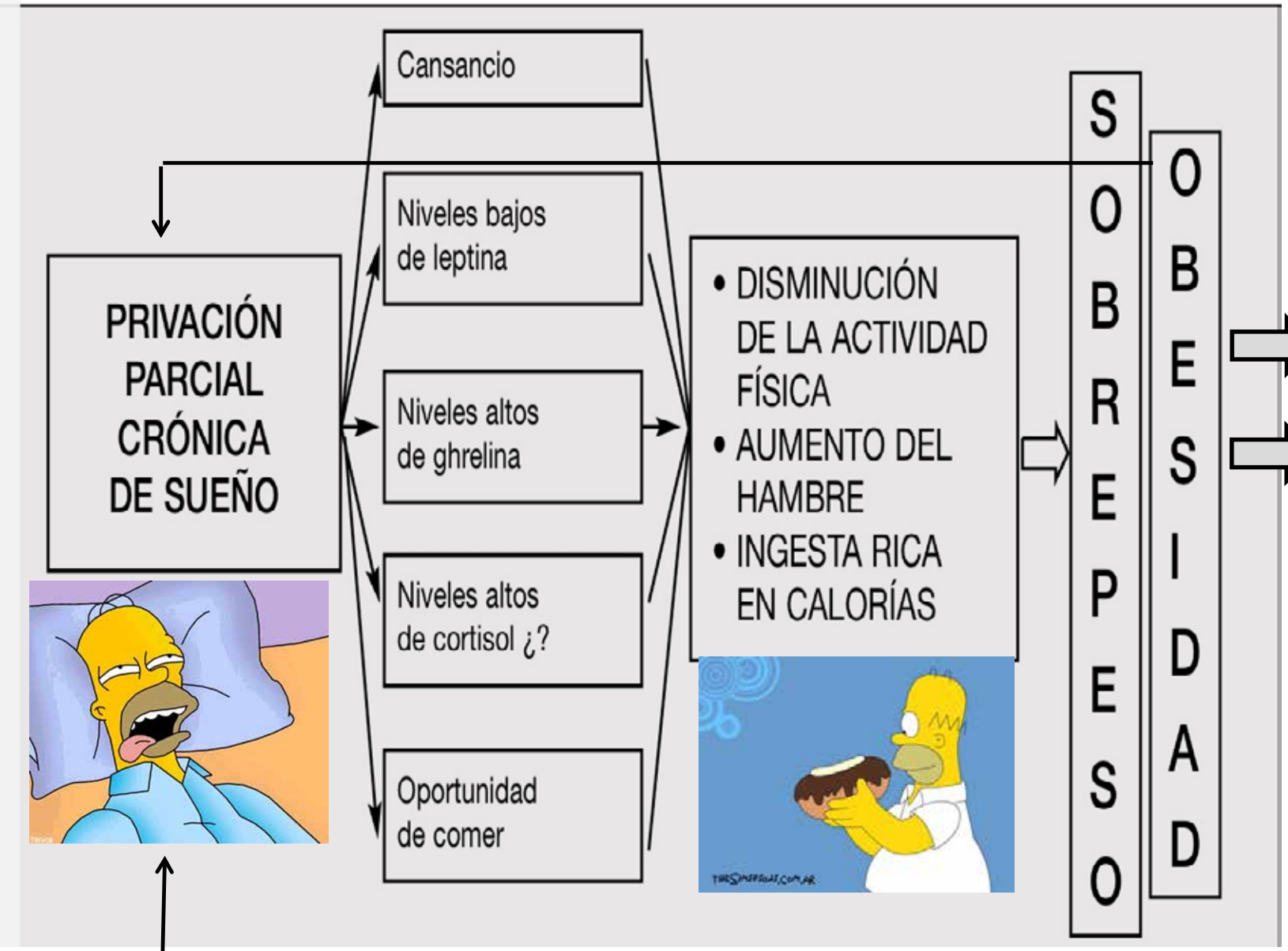
Interactions between sleep, stress, and metabolism: From physiological to pathological conditions

*Camila Hirotsu**, *Sergio Tufik*, *Monica Levy Andersen*

Department of Psychobiology, Universidade Federal de São Paulo, São Paulo, Brazil

- Dormir solo 4 horas durante 6 noches consecutivas en hombres jóvenes , mostró un aumento de los niveles de cortisol .
- La falta de sueño se relaciona con alteración del eje HPA. → Con efectos nocivos sobre el cuerpo .
- Sueño corto → mayor riesgo de obesidad y diabetes

- Reducción significativa de la insulina con una semana de restricción de sueño.
- La reducción del sueño produce una disminución de la leptina (18%)y aumento de la grelina (28%) que modifica la ingesta de los alimentos.



Antonio Vela Bueño Sueño y estre Res, esp Obesidad 2007


GIRTH
FAT
PRIDE


FARMER HOMER'S
SWEET SWEET
SUGAR

- Marshall en 2009 proporciono la primera evidencia de que el SAHS moderado es un factor de riesgo independiente para desarrollar diabetes . Después de un seguimiento durante 4 años , el 20% de los pacientes SAHS moderado / grave habían sido diagnosticados de DM.

Official Journal of the Asian Pacific Society of Respirology
Respirology

ORIGINAL ARTICLE

Obstructive sleep apnoea and the risk of type 2 diabetes: A meta-analysis of prospective cohort studies

XIA WANG,[1] YANPING BI,[3] QIAN ZHANG[2] AND FANG PAN[2]

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ABSTRACT

Background and objective: **There has been increasing recognition that obstructive sleep apnoea (OSA) is associated with incident type 2 diabetes. The aim of this study was to assess the association between the severity of OSA and the risk of type 2 diabetes by performing a meta-analysis of all available prospective cohort studies.**

SUMMARY AT A GLANCE

A meta-analysis of all eligible prospective cohort studies showed that moderate-severe obstructive sleep apnoea was associated with a greater risk of developing type 2 diabetes.

- Este metaanálisis incluían 5.953 pacientes con un seguimiento de 2,7-16 años
- El SAHS moderado grave se asocia con un mayor riesgo de DM cuando se compara con los no SAHS .
- Los SAHS leves no mostraron un riesgo superior a los no SAHS.

Briançon-Marjollet *et al. Diabetology & Metabolic Syndrome* (2015) 7:25
DOI 10.1186/s13098-015-0018-3

DIABETOLOGY & METABOLIC SYNDROME

REVIEW Open Access

The impact of sleep disorders on glucose metabolism: endocrine and molecular mechanisms

Anne Briançon-Marjollet[1,2], Martin Weiszenstein[3], Marion Henri[1,2], Amandine Thomas[1,2], Diane Godin-Ribuot[1,2†] and Jan Polak[3,4,5*†]

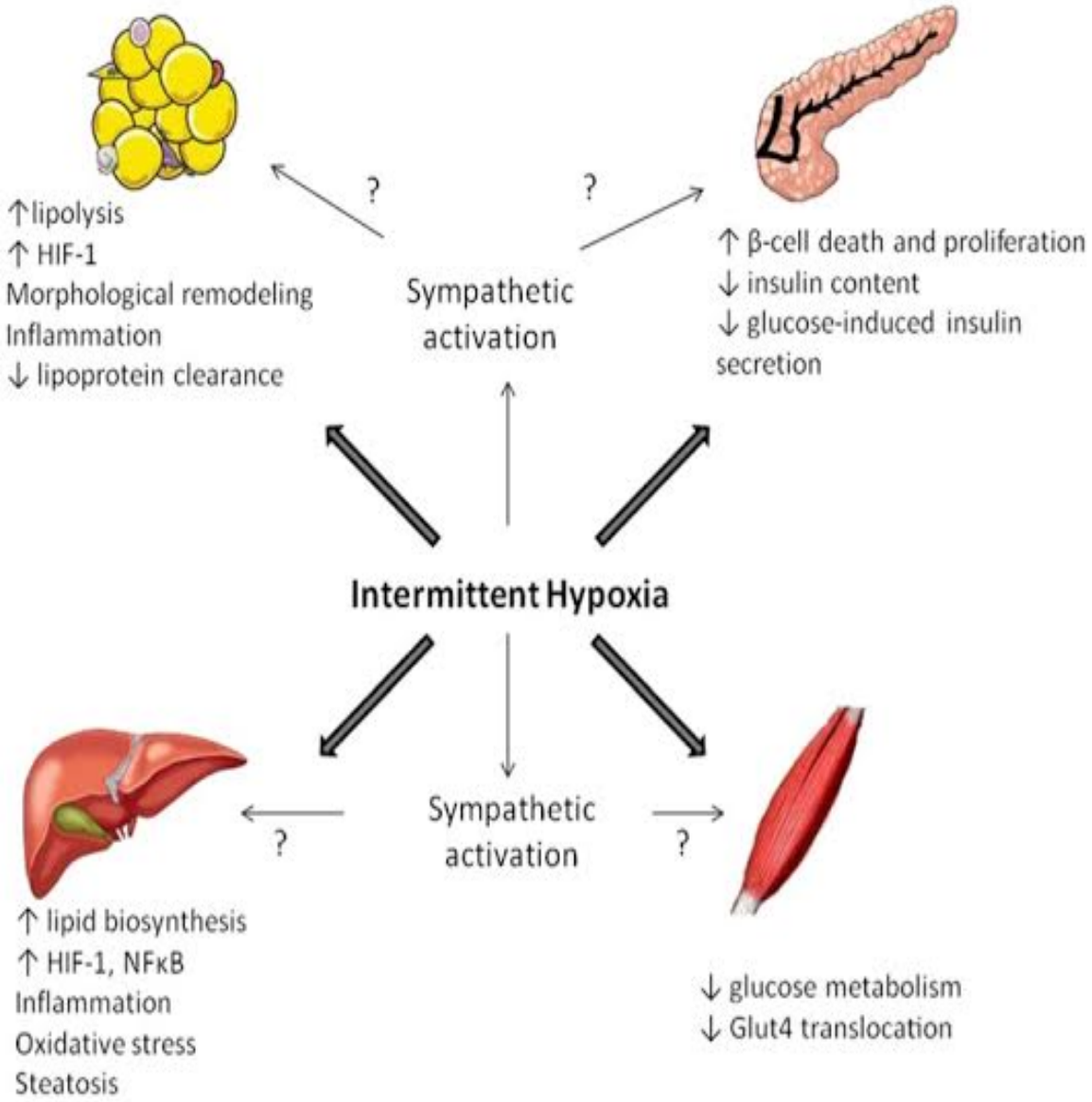
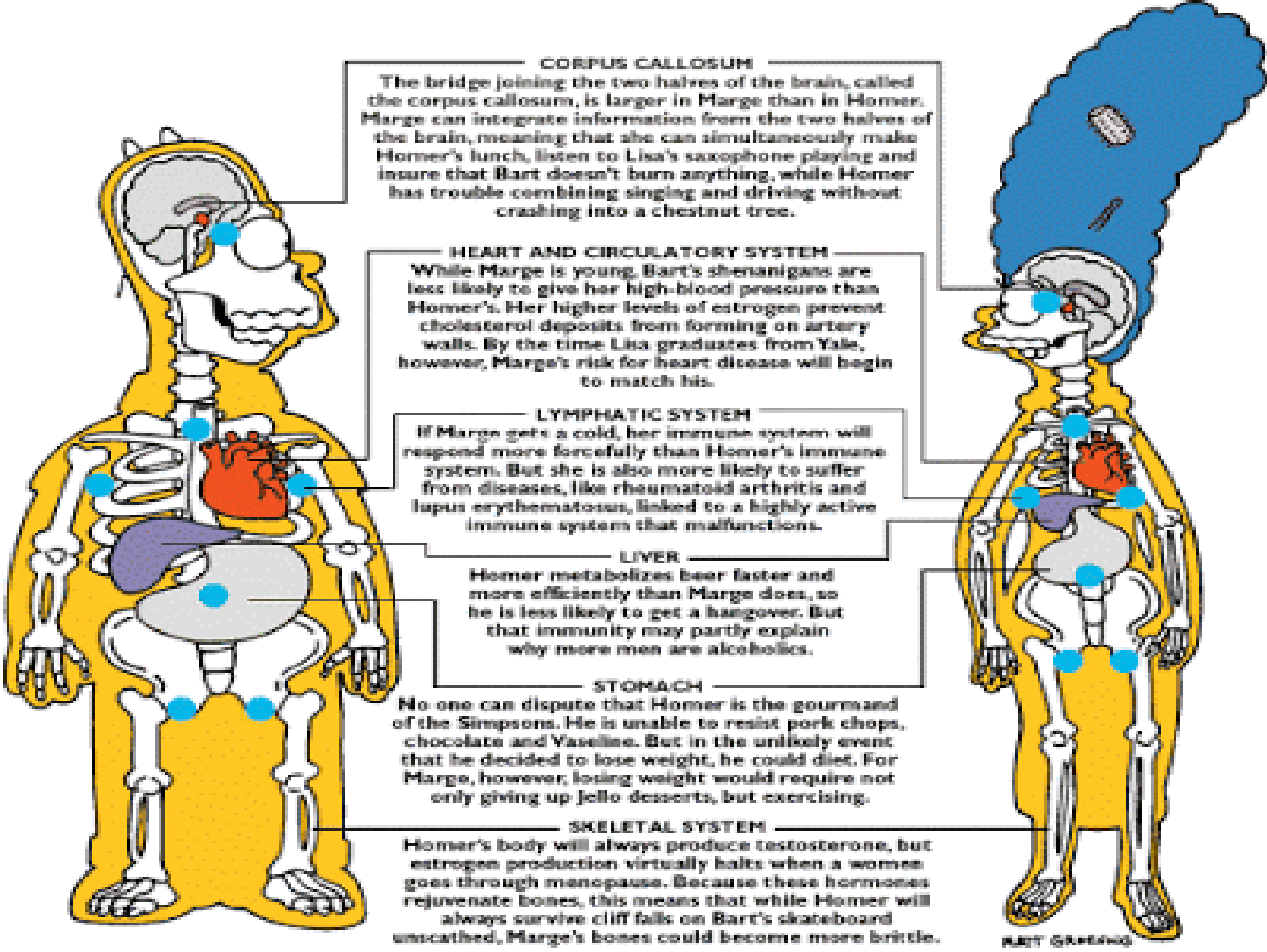


Figure 2 Mechanisms linking intermittent hypoxia to impaired glucose metabolism. Intermittent hypoxia acts on pancreatic insulin production and secretion as well as on insulin target organs such as adipose tissue, liver and skeletal muscle. These combined effects induce impaired glucose tolerance, insulin resistance and dyslipidemia. Intermittent hypoxia effects may be direct and/or mediated through the activation of the sympathetic nervous system. HIF-1α (hypoxia inducible factor 1-alpha), NF-κB (nuclear factor-κB), GLUT4 (glucose transporter type 4).


CORPUS CALLOSUM
The bridge joining the two halves of the brain, called the corpus callosum, is larger in Marge than in Homer. Marge can integrate information from the two halves of the brain, meaning that she can simultaneously make Homer's lunch, listen to Lisa's saxophone playing and insure that Bart doesn't burn anything, while Homer has trouble combining singing and driving without crashing into a chestnut tree.
HEART AND CIRCULATORY SYSTEM
While Marge is young, Bart's shenanigans are less likely to give her high-blood pressure than Homer's. Her higher levels of estrogen prevent cholesterol deposits from forming on artery walls. By the time Lisa graduates from Yale, however, Marge's risk for heart disease will begin to match his.
LYMPHATIC SYSTEM
If Marge gets a cold, her immune system will respond more forcefully than Homer's immune system. But she is also more likely to suffer from diseases, like rheumatoid arthritis and lupus erythematosus, linked to a highly active immune system that malfunctions.
LIVER
Homer metabolizes beer faster and more efficiently than Marge does, so he is less likely to get a hangover. But that immunity may partly explain why more men are alcoholics.
STOMACH
No one can dispute that Homer is the gourmand of the Simpsons. He is unable to resist pork chops, chocolate and Vaseline. But in the unlikely event that he decided to lose weight, he could diet. For Marge, however, losing weight would require not only giving up Jello desserts, but exercising.
SKELETAL SYSTEM
Homer's body will always produce testosterone, but estrogen production virtually halts when a women goes through menopause. Because these hormones rejuvenate bones, this means that while Homer will always survive cliff falls on Bart's skateboard unscathed, Marge's bones could become more brittle.

pii: sp-00651-14 http://dx.doi.org/10.5665/sleep.5312

SLEEP DISORDERED BREATHING

A Randomized Controlled Trial of Continuous Positive Airway Pressure on Glucose Tolerance in Obese Patients with Obstructive Sleep Apnea

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Study Objectives: Obstructive sleep apnea (OSA) is associated with an increased prevalence of metabolic syndrome (MetS), even in patients with morbid obesity. Our goal was to address whether continuous positive airway pressure (CPAP) treatment improved glucose metabolism in this population.

Methods: A prospective randomized controlled trial was performed in severe OSA patients with morbid obesity without diabetes in two university referral hospitals. Patients received conservative (CT) versus CPAP treatment for 12 weeks. MetS components, homeostasis model assessment of insulin resistance (HOMA-IR) and oral glucose tolerance were assessed at baseline and after treatment.

Results: A total of 80 patients completed the study (42 CPAP and 38 CT patients). After 12 w of CPAP treatment, weight loss was similar in both groups and physical activity, prevalence of MetS, and HOMA-IR did not change in either group. In the CPAP group impaired glucose tolerance (IGT) reversed in nine patients and IGT developed in none, whereas IGT reversed in five patients and IGT developed in five patients in the CT group ($P = 0.039$ in the Fisher test). Changes in 2-h plasma glucose after glucose load were greater in the CPAP group than in the CT group (CPAP: -0.5 ± 1.5 versus CT: 0.33 ± 1.9, $P = 0.007$).

Conclusions: The improvement of glucose tolerance in morbidly obese patients with severe obstructive sleep apnea, without changes in homeostasis model assessment of insulin resistance, supports an improvement in peripheral insulin resistance after continuous positive airway pressure treatment.

Clinical Trials Registration: NCT 01029561.

Keywords: continuous positive airway pressure, glucose tolerance, insulin resistance, obstructive sleep apnea

Citation: Salord N, Fortuna AM, Monasterio C, Gasa M, Pérez A, Bonsignore MR, Vilarrasa N, Montserrat JM, Mayos M. A randomized controlled trial of continuous positive airway pressure on glucose tolerance in obese patients with obstructive sleep apnea. *SLEEP* 2016;39(1):35–41.

- Es el primer estudio que investiga el efecto de la CPAPn sobre el meta. de la glucosa en población especifica .
- Los SAHS grave con obesidad mórbida en tratamiento con CPAPn durante doce semanas ,mejoraban la tolerancia a la glucosa .
- Estos resultados apoyan la mejoría de la resistencia periférica a la insulina después del tratamiento con CPAPn

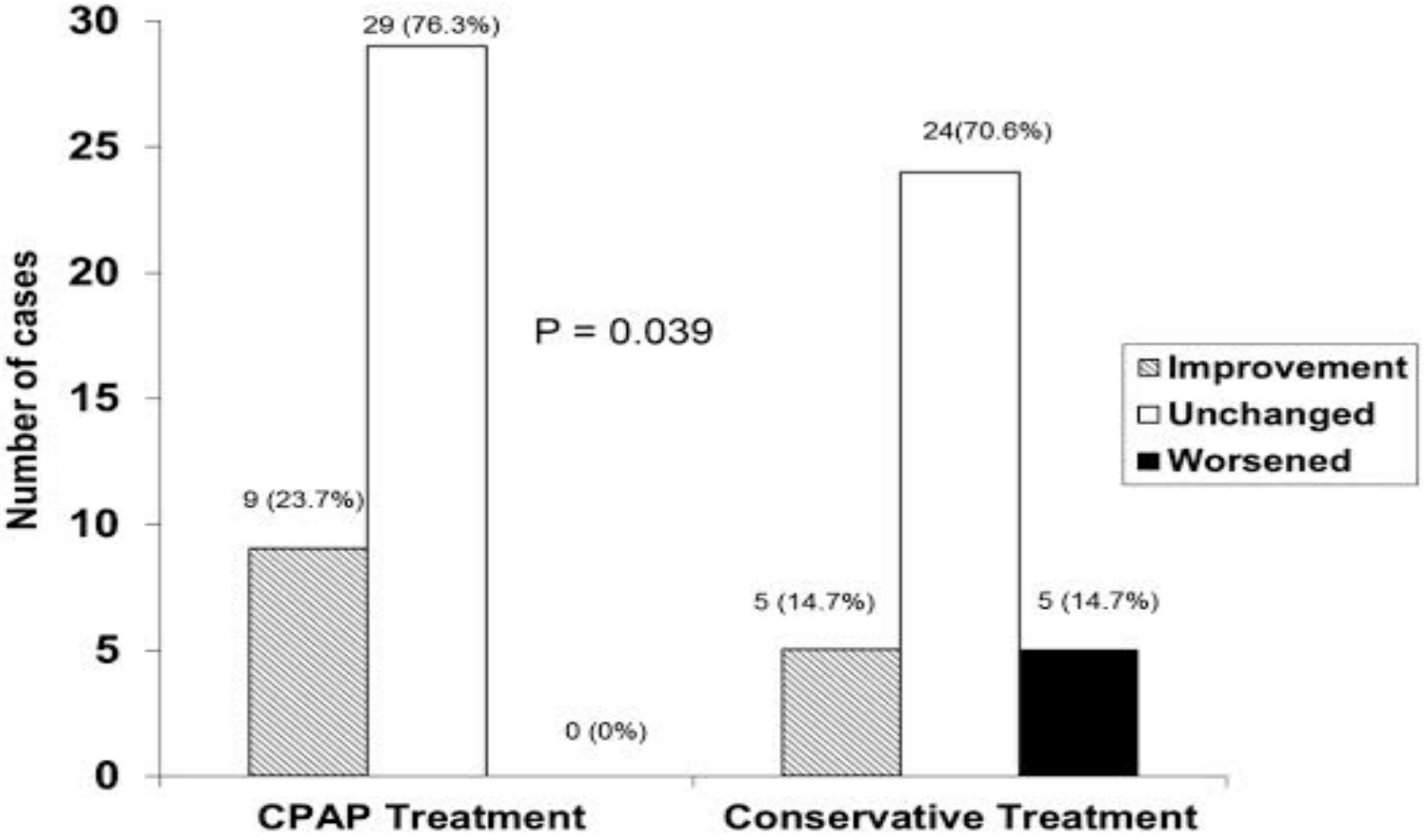

Figure 2—Effect of 12 w continuous positive airway pressure and conservative treatment on glucose tolerance in subjects with morbid obesity and severe sleep apnea. Improvement was considered if a patient with glucose intolerance had normal tolerance at the end of the study. Worsened was considered if a patient with normal tolerance turned to intolerant at the end of the study.

ORIGINAL ARTICLE

Eight Hours of Nightly Continuous Positive Airway Pressure Treatment of Obstructive Sleep Apnea Improves Glucose Metabolism in Patients with Prediabetes

A Randomized Controlled Trial

Sushmita Pamidi[1], Kristen Wroblewski[2], Magdalena Stepien[3], Khalid Sharif-Sidi[3], Jennifer Kilkus[3], Harry Whitmore[3], and Esra Tasali[3]

[1]Respiratory Division, Department of Medicine, McGill University, Montreal, Quebec, Canada; and [2]Department of Public Health Sciences and [3]Department of Medicine, University of Chicago, Chicago, Illinois

- Demuestran que 8 horas de tratamiento con CPAPn durante dos semana reduce la respuesta general al test de tolerancia a la glucosa oral y mejora la sensibilidad a la insulina .

- Utilizar 8 horas diarias de CPAPn proporciona a los paciente prediabeticos beneficios cardiometabolicos y puede prevenir complicaciones cardiovasculares.

- Parece que hay una correlación positiva entre las horas de uso de CPAPn y los cambios metabólicos

Sleep

ORIGINAL ARTICLE

Effects of CPAP on body weight in patients with obstructive sleep apnoea: *a meta-analysis of randomised trials*

Luciano F Drager,[1,2,3] André R Brunoni,[1] Raimundo Jenner,[1] Geraldo Lorenzi-Filho,[2] Isabela M Benseñor,[1,3] Paulo A Lotufo[1,3]

- Incluyeron 3.181 pacientes de 25 ensayos randomizados

- Este estudio resalta que la introducción del CPAPn promueve un pequeño pero significativo aumento del IMC y peso

- El incremento del peso en SAHS después del tto con CPAPn no esta influenciado por la edad ,genero, IMC ,peso , severidad del OSA , el diseño del estudio, duración y cumplimiento de la CPAP o la presencia de dieta o actividad física

HIPOTESIS

- Posible cambio en las hormonas que controla la saciedad y el hambre (orexinas).
- El CPAPn restaura sueño profundo y por lo tanto incrementa el anabolismo.
- SAHS activa la lipólisis de tejido adiposo y favorecería la perdida de peso .
- El SAHS produce un mayor gasto energético

Medicina Clínica

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Original breve

Redistribución de grasa intraabdominal en el tratamiento con presión positiva continua de la vía aérea a largo plazo en los pacientes con síndrome de apnea-hipopnea durante el sueño

Intraabdominal fat redistribution in long-term continuous positive airway pressure treatment in obstructive sleep apnea patients

Raquel Català[a], Raimón Ferré[b], Sandra Sangenís[a], Anna Cabré[b], Salvador Hernández-Flix[a], Lluís Masana[b]

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- El tratamiento con CPAPn a largo plazo produce una redistribución de grasa intraabdominal.

- En los pacientes tratados con La CPAPn disminuye el tejido adiposo subcutáneo sin cambios en la grasa intraabdominal preaórtica (PIF).En los pacientes no tratados con CPAPn aumenta el PIF.

- Estos hallazgos apoyan que el tratamiento con CPAPn se asocia con un perfil antropométrico de menor riesgo cardiovascular.

- Utilización de la ecografía


NEUMOLOGO
DE GUARDIA
GRASA SUBCUTANEA,
GRASA PERIVISCERAL....
ROSQUILLAAAASSS....
DESAYUNO..AAAHHH!! !!

ORIGINAL ARTICLE

Associations between Obstructive Sleep Apnea, Sleep Duration, and Abnormal Fasting Glucose

The Multi-Ethnic Study of Atherosclerosis

Jessie P. Bakker[1], Jia Weng[1], Rui Wang[1], Susan Redline[1], Naresh M. Punjabi[2], and Sanjay R. Patel[1]

[1]Division of Sleep and Circadian Disorders, Departments of Medicine and Neurology, Brigham and Women's Hospital and Harvard Medical School, Boston, Massachusetts; and [2]Division of Pulmonary and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland

- Encuentra una asociación independiente en los SAHS moderados/severos entre obesidad , duración del sueño y niveles de glucosa en ayunas en población Afroamericana y raza blanca.

- Por el contrario esta relación es mucho mas débil en subgrupos Hispanos y Asiáticos.

- Sugiriendo que la etnicidad puede modificar el efecto del SAHS en los niveles de glucosa en ayunas .

Intermittent hypoxia alters gut microbiota diversity in a mouse model of sleep apnoea

Isabel Moreno-Indias[1,2,9], Marta Torres[3,4,9], Josep M. Montserrat[3,4,5], Lidia Sanchez-Alcoholado[1,2], Fernando Cardona[1,2], Francisco J. Tinahones[1,2], David Gozal[6], Valeryi A. Poroyko[6], Daniel Navajas[4,7,8], Maria I. Queipo-Ortuño[1,2] and Ramon Farré[4,5,7]

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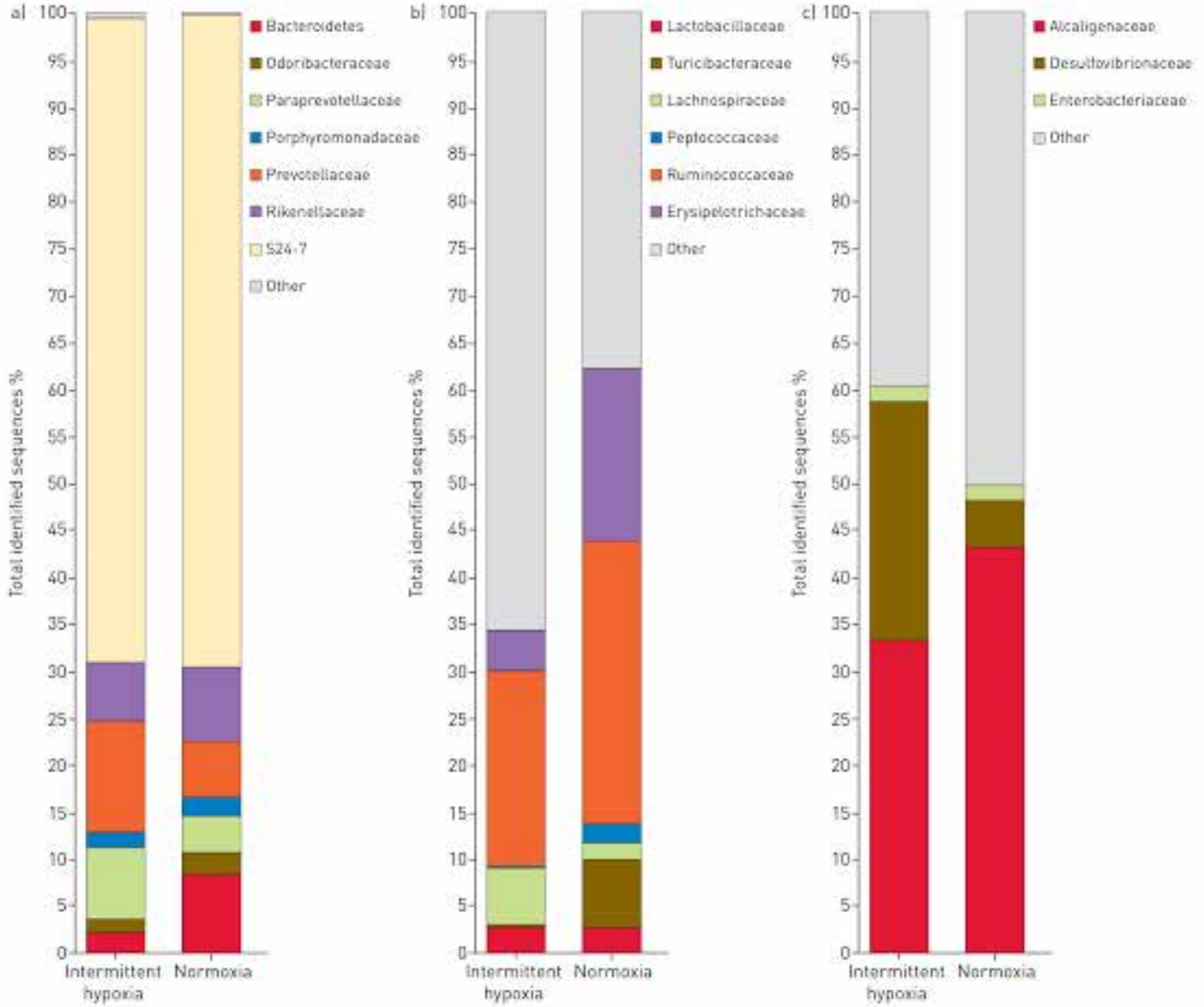

FIGURE 5 Family level microbial classification of bacteria from intermittent hypoxia and normoxia faecal samples. a) Bacteroidetes family, b) Firmicutes family and c) Proteobacteria family.

- Los ciclos de hipoxia y reoxigenacion del SAHS podría modificar el microbiana intestinal .

- Las alteraciones en la flora intestinal inducida por HI podría ser relevantes en las alteraciones metabólicas, obesidad y síndrome metabólico

- Se sugiere que la relación de equilibrio del microbioma intestinal puede verse comprometido en pacientes con SAHS.

- Se abre un campo en al investigación de como la HI y/o fragmentación del sueño , puede afectar al microbioma intestinal e influir sobre metabolismo del sujeto.


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DIRECTOR: FRED ZINNEMANN

Impact of obstructive sleep apnoea on insulin resistance in nonobese and obese children

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EDITORIAL
SLEEP AND PAEDIATRIC PULMONOLOGY

The puzzle of metabolic effects of obstructive sleep apnoea in children

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E-mail: marisa@ibim.cnr.it

- La obesidad , como la fragmentación del sueño se asocian a alteraciones metabólicas incluyendo la resistencia a la insulina y el perfil lipídico.

- La gravedad de la hipoxemia nocturna ejerce un efecto menor.

- Es el mayor estudio publicado sobre los efectos metabólicos en niños y tienen que considerarse como uno de los mas importantes

GRACIAS