

Healthy brain aging and nutrition

Invecchiamento, nutrizione
salute mentale

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DO WE BELIEVE THAT NUTRITION AND INTEGRATORS MAY PREVENT OR MODIFY THE NATURAL HISTORY OF A DISEASE?...

**SIAMO CONVINTI CHE LA DIETA/GLI
INTEGRATORI POSSANO AVERE UN RUOLO
PREVENTIVO IN MEDICINA O
INFLUENZARE/MODIFICARE IL DECORSO
NATURALE DI UNA MALATTIA?**



AN EXAMPLE



DASH: DIETARY APPROACHES TO STOP HYPERTENSION

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WHAT IS...

BENEFITS

FOLLOWING DASH

HEALTHY LIFESTYLE

GETTING STARTED

LINKS

What Is the DASH Eating Plan?

Dietary Approaches to Stop Hypertension (DASH) is a flexible and balanced eating plan. DASH was one of three eating plans that were compared in research studies sponsored by the National Heart, Lung, and Blood Institute (NHLBI).

The goal of this research was to study the effects of diet on [high blood pressure](#). The results showed that the DASH eating plan lowers blood pressure. The plan:

- Is low in saturated fat, cholesterol, and total fat
- Focuses on fruits, vegetables, and fat-free or low-fat dairy products
- Is rich in whole grains, fish, poultry, beans, seeds, and nuts
- Contains fewer sweets, added sugars and sugary beverages, and red meats than the typical American diet

The DASH eating plan also is lower in sodium (salt) than the typical American diet. The DASH research showed that an eating plan containing 2,300 milligrams (mg) of sodium per day lowered blood pressure. An eating plan containing only 1,500 mg of sodium per day even further lowered blood pressure.

Clinical Trials

[Clinical trials](#) are research studies that explore whether a medical strategy, treatment, or device is safe and effective for humans.

Related Topics

[High Blood Pressure](#)



**FACING NOW THE QUESTION
WITH AN OPEN MIND, AND
ACCEPTING THE CONCEPT
THAT NUTRITIONAL
INTERVENTIONS MAY BE
EFFICACIOUS...**

**SE AFFRONTIAMO ORA IL PROBLEMA CON
UNA MENTE PIÙ APERTA, ACCETTANDO
L'IDEA CHE GLI INTERVENTI NUTRIZIONALI
SIANO EFFICACI...**



SEVERAL OPEN QUESTIONS UNDERScore A LACK OF KNOWLEDGE

**VI SONO NUMEROSE
DOMANDE APERTE CHE
RIFLETTONO UN VUOTO DI
CONOSCENZA...**



WHAT IS THE TIMELINE BETWEEN NUTRITION DEFECTS AND DISEASE AND WHAT IS THE TIME WINDOW USEFUL FOR NUTRITIONAL INTERVENTION?

**QUALE È LA RELAZIONE TEMPORALE TRA
MALATTIA E SCORRETTA ALIMENTAZIONE
E QUALE È LA FINESTRA TEMPORALE
UTILE PER L'INTERVENTO
NUTRIZIONALE?**



THE EASIEST WAY: EXPLORING DEVELOPMENTAL AGES

**LA VIA INTUITIVAMENTE PIÙ FACILE: LO
STUDIO DELL'ETÀ DELLO SVILUPPO**



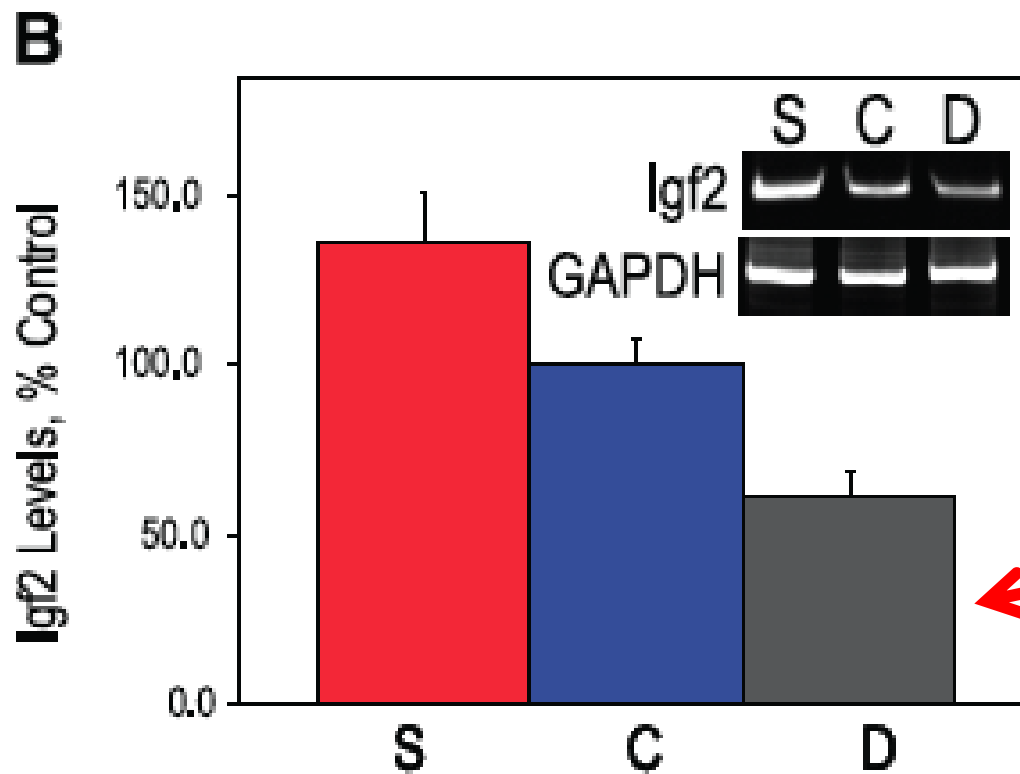
Prenatal choline availability modulates hippocampal and cerebral cortical gene expression

Tiffany J. Mellott,^{*} Maximillian T. Follettie,[‡] Veronica Diesl,[‡] Andrew A. Hill,[‡] Ignacio Lopez-Coviella,^{*,†} and Jan Krzysztof Blusztajn^{*,†,1}

The data show that prenatal choline modifies the expression of genes relevant to learning and memory processes during development.

I dati indicano che la supplementazione prenatale di colina influenza il pattern di espressione di geni che influenzano apprendimento e memoria durante lo sviluppo.





**Choline
deficiency
(7 days)
during
embrional
life**

Brain concentrations of a growth factor mRNA (for Igf2) after birth, at the end of development, following 7 days of choline deficiency during embrional life

Concentrazioni cerebrali a fine sviluppo di mRNA per un fattore di crescita dopo carenza prenatale di colina.

**NOW, CONSIDERING THE DIFFICULT
“CORE BUSINESS”, THE HEALTHY BRAIN
AGING, THE INVESTIGATION OF THE
TIME OF NUTRITIONAL INTERVENTION
HAS BEEN STUDIED, ALTHOUGH NOT
SYSTEMATICALLY.**

**ENTRANDO NELLO SPECIFICO DEL TEMA
“INVECCHIAMENTO E MALATTIE
NEURODEGENERATIVE” LO STUDIO DEI TEMPI
DELL’INTERVENTO NUTRIZIONALE È STATO
AFFRONTATO IN QUALCHE CONDIZIONE
SPERIMENTALE, MA NON SISTEMATICAMENTE.**



EPIDEMIOLOGY AND LITERATURE DATA

**CHE COSA DICONO L'EPIDEMIOLOGIA E
LA LETTERATURA INTERNAZIONALE?**



Nutrition and neurodegeneration: epidemiological evidence and challenges for future research

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British Journal of Clinical Pharmacology © 2013



Due to the lack of a cure and thanks to data showing favourable brain activity of various nutrients it is reasonable to investigate life style and nutritional interventions during normal and pathological brain aging.

In assenza di un trattamento curativo, è razionale e adeguatamente sicuro indagare l'intervento sullo stile di vita e sulle abitudini alimentari nell'invecchiamento cerebrale normale e patologico.



The traditional Randomized Controlled Clinical Trial design may not be suitable to study nutritional interventions

New population based studies and big data analysis may be more apt to approach such topics.

I tradizionali studi clinici randomizzati sono però poco adatti ad affrontare tale tipo di problema scientifico.

Occorreranno indagini di nuovo disegno e studi di popolazione, non facili da organizzare ed interpretare.



**The key question what can
be the biological mechanism
of interaction between
nutrients and brain activity?
The brave new world of the
“omics”**

**La domanda centrale: quale può
essere il meccanismo d'interazione
tra nutrienti e cervello?
Il nuovo pianeta degli “omics”**



**PROTEOMICS, METABOLOMICS,
LIPIDOMICS, TRANSCRIPTOMICS,
EPIGENETICS, NUTRIGENOMICS**

**“OMICS” AS A NEW LEVEL OF
COMPLEXITY IN BIOLOGICAL
RESEARCH**

**PROTEOMICA, METABOLOMICA,,
LIPIDOMICA,, TRASCRIPTOMICA,,
EPIGENETICA, E NUTRIGENOMICA**

**GLI “...OMICS”, UN NUOVO LIVELLO DI
COMPLESSITÀ DELLA RICERCA**



AN INTRODUCTION AND AN EXAMPLE LIMITED TO EPIGENETICS

**UNA PREMESSA E UN ESEMPIO
LIMITATI ALL'EPIGENETICA**

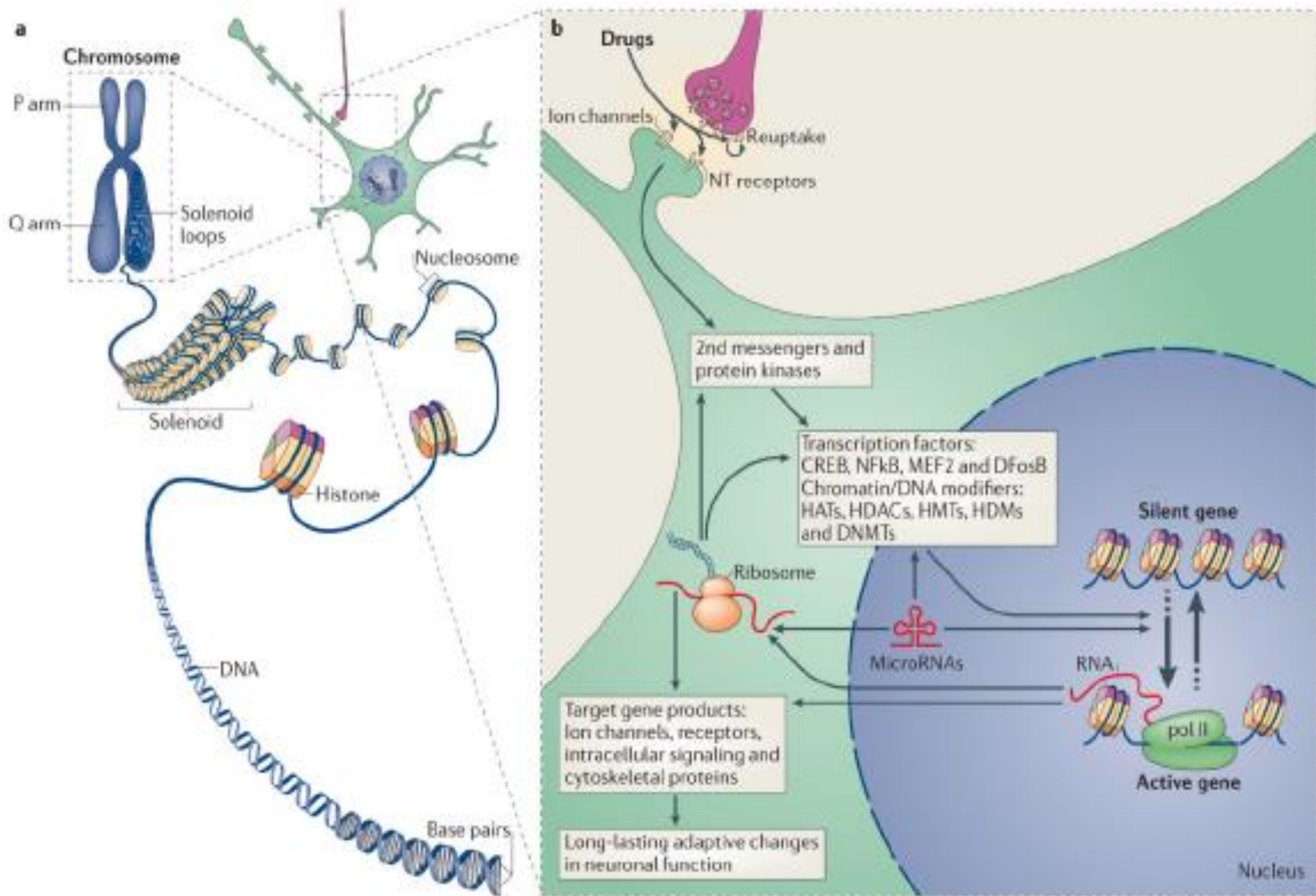




WINDING UNWINDING A RIBBON

**AVVOLGERE E
SVOLGERE UN
NASTRO**







NIH Public Access

Author Manuscript

J Mol Neurosci. Author manuscript; available in PMC 2014 March 26.

Published in final edited form as:

J Mol Neurosci. 2014 February ; 52(2): 202–215. doi:10.1007/s12031-013-0122-5.

Nutri-epigenetics Ameliorates Blood–Brain Barrier Damage and Neurodegeneration in Hyperhomocysteinemia: Role of Folic Acid

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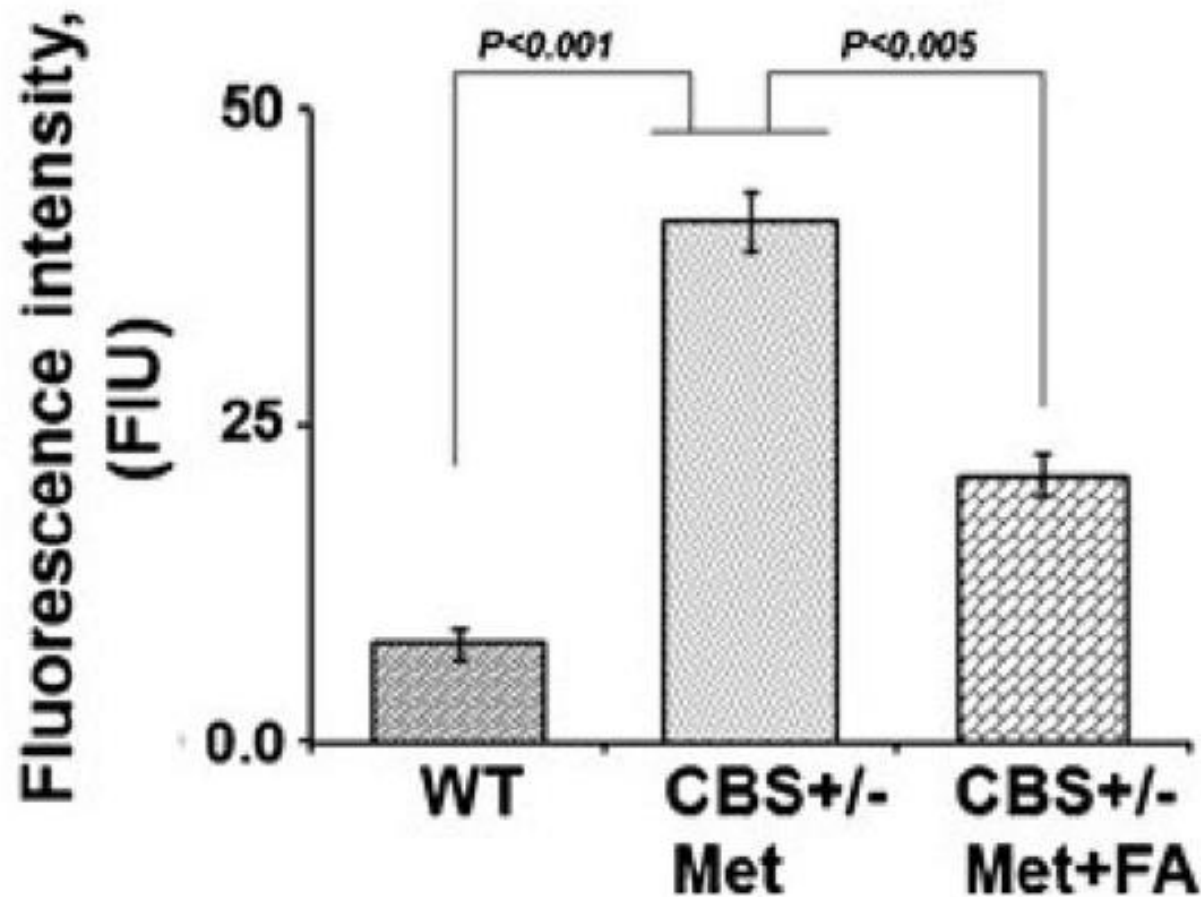
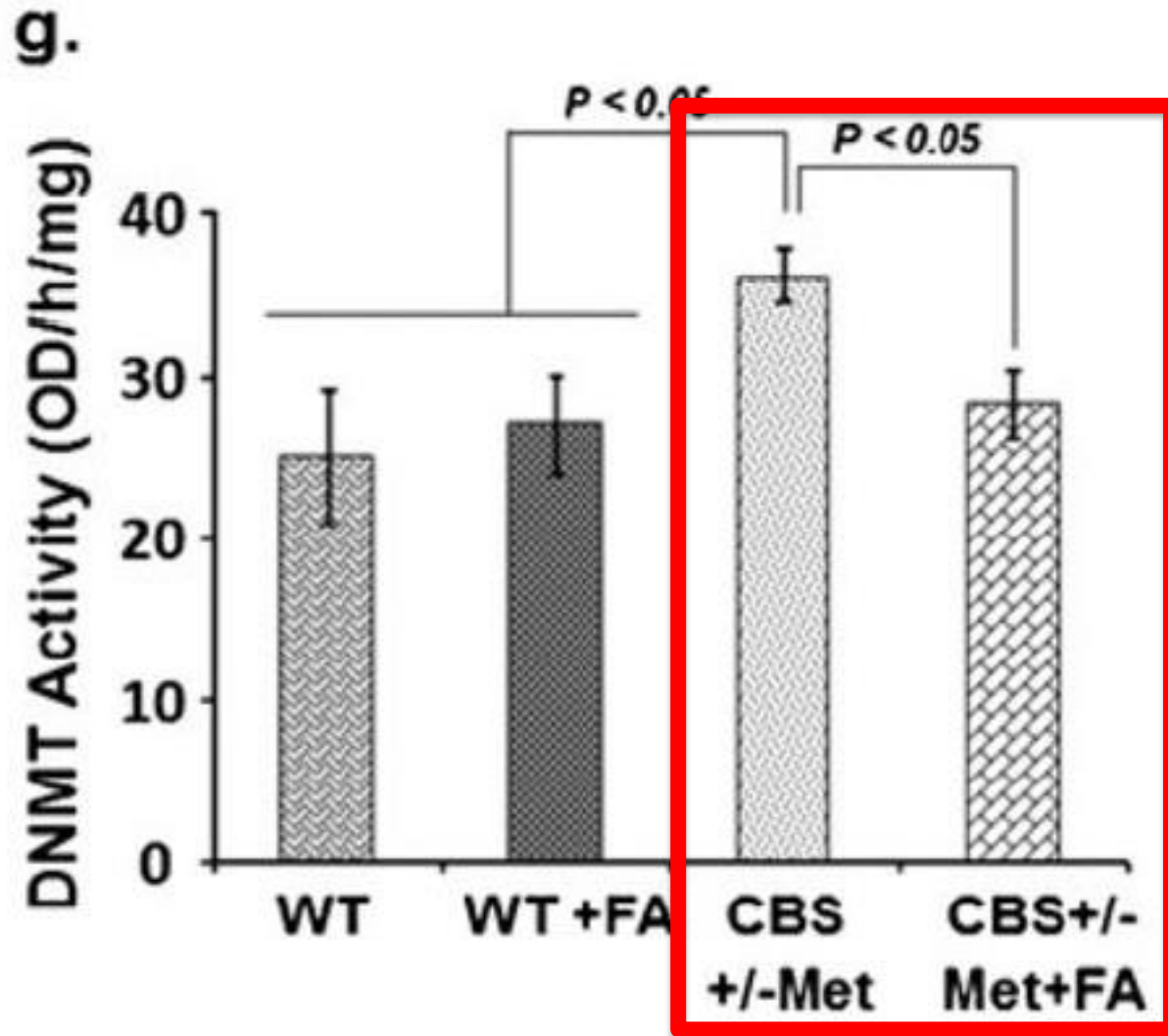


Fig 8.

Effect of folic acid on macromolecular leakage of pial venules. **a** Fluorescence images recorded after infusion of BSA-FITC in WT, CBS^{+/-} + Met, and CBS^{+/-} + Met+FA mice. **b** Representative bar graph for BSA leakage assessed by the fluorescence intensity of fluorescein isothiocyanate-bovine serum albumin in the *rectangular area of interest* shown on images

Effect of folic acid on DNA methyltransferase activity



AN EXAMPLE OF NUTRITIONAL INTERVENTION IN A MOUSE MODEL OF NEURODEGENERATION

**UN ESEMPIO DI UN INTERVENTO
NUTRIZIONALE COMPLESSO IN UN
MODELLO MURINO DI
NEURODEGENERAZIONE**



Contents lists available at ScienceDirect

Neuropharmacology

journal homepage: www.elsevier.com/locate/neuropharm



Neuroprotective and cognitive enhancing effects of a multi-targeted food intervention in an animal model of neurodegeneration and depression

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Neuropharmacology 79 (2014) 738**e749**



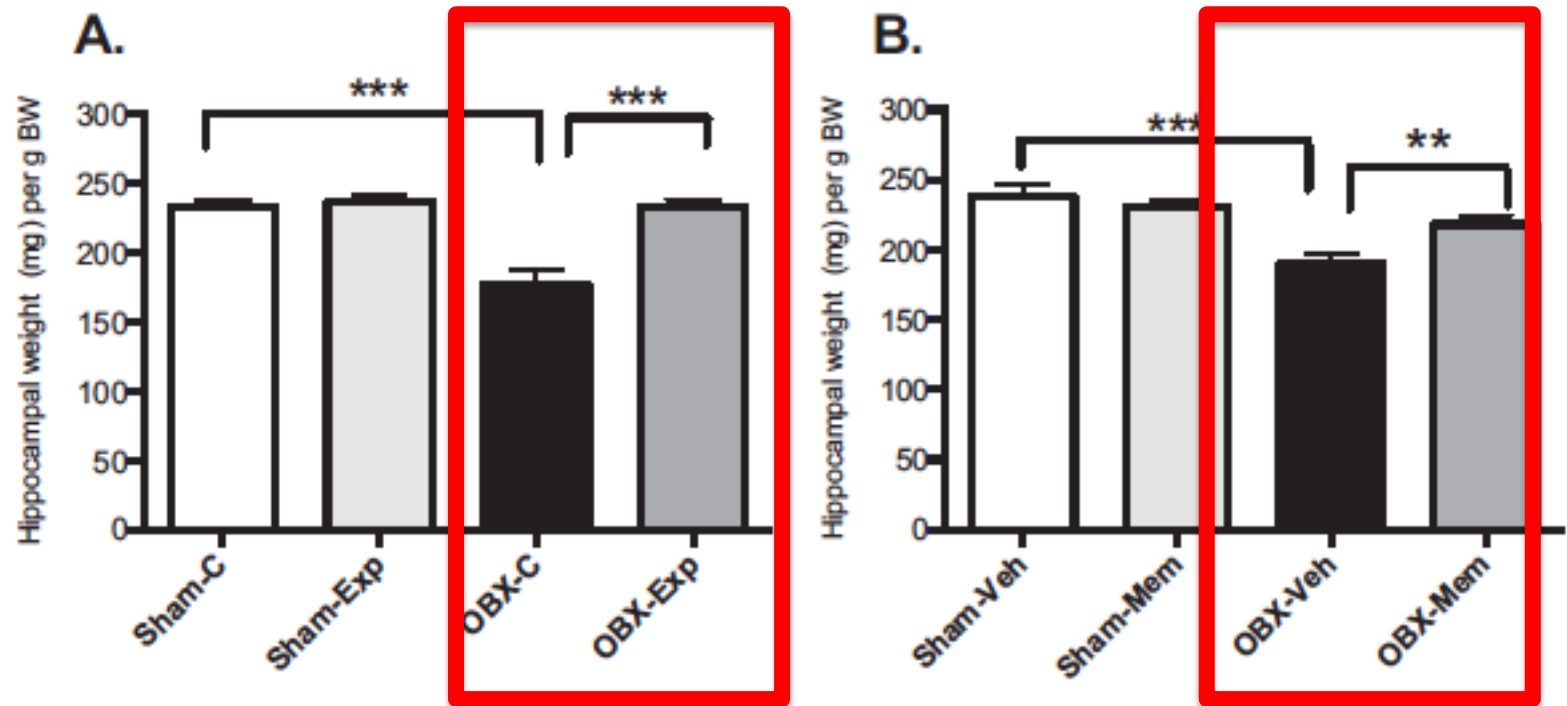
Experimental and control diet compositions. Rats were given 20 g of the diet per day. The delivered dose is on a mg/kg of food.

Active ingredient	Control (AIN-93) g/kg diet	Experimental diet
Zinc	0.03	1.63
Curcumin	0	0.25
Piperine	0	0.06
Melatonin	0	0.03
Choline	1.09	9.5
Uridine	0	15.48
Soy oil	7%	3% soya+4% tuna oil (25% DHA/6% EPA)

Neuropharmacology 79 (2014) 738**e749**



EXPERIMENTAL DIET (A) AND MEMANTINE (B) ATTENUATED OBX-INDUCED HIPPOCAMPAL ATROPHY.



Neuropharmacology 79 (2014) 738e749



This proof of concept study shows that both a neuroprotective drug treatment and the nutritional intervention improved the brain atrophy and memory in lesioned mice.

I dati mostrano che sia l'intervento dietetico sia memantina hanno migliorato la memoria e l'atrofia cerebrale dei topi con atrofia dell'ippocampo



PRECLINICAL DATA OPENED THE PATHWAY TO CLINICAL STUDIES

**I DATI PRECLINICI HANNO
FORNITO IL RAZIONALE
PER STUDI CLINICI**



The Effect of Souvenaid on Functional Brain Network Organisation in Patients with Mild Alzheimer's Disease: A Randomised Controlled Study

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¹ Alzheimer Center & Department of Neurology, Neuroscience Campus Amsterdam, VU University Medical Center, Amsterdam, The Netherlands, ² Department of Clinical Neurophysiology, Neuroscience Campus Amsterdam, VU University Medical Center, Amsterdam, The Netherlands, ³ Nutricia Research, Utrecht, The Netherlands, ⁴ Laboratory of Cognitive and Computational Neuroscience, UCM-UPM Center for Biomedical Technology, Madrid, Spain

Conclusions: The current results suggest that Souvenaid preserves the organisation of brain networks in patients with mild AD within 24 weeks, hypothetically counteracting the progressive network disruption over time in AD. The results strengthen the hypothesis that Souvenaid affects synaptic integrity and function. Secondly, we conclude that advanced EEG analysis, using the mathematical framework of graph theory, is useful and feasible for assessing the effects of interventions.

January 2014

**BEYOND THE
"VOLEMOSE BENE"**

**SIAMO DUNQUE OLTRE
IL "VOLEMOSE BENE",
MA...**



Epigenetics: Relevance and Implications for Public Health

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Annu. Rev. Public. Health. 2014.35:105-122



***I'm aware that you all are afraid of the change.
I do not know the future nor what will be the
end of this story. I'm here to tell you how the
story begins. I will show the people a world
with no borders where everything is possible.
Soon everything that you know will change.***

***"So che mi state ascoltando, avverto la vostra presenza, so che
avete paura di cambiare. Io non conosco il futuro, non sono
venuto qui a dirvi come andrà a finire; sono venuto a dirvi come
comincerà. Adesso ... farò vedere a tutta questa gente quello che
non volete che vedano, mostrerò loro un mondo senza frontiere
e confini, un mondo in cui tutto è possibile
Presto tutto quello che conoscete cambierà"***

Morpheus in MATRIX





DIET, LIFE STYLE AND NUTRITIONAL INTERVENTIONS BASED ON INTEGRATORS

**DIETA, STILE DI VITA E
INTERVENTI NUTRIZIONALI
BASATI SULL'USO DI
INTEGRATORI**



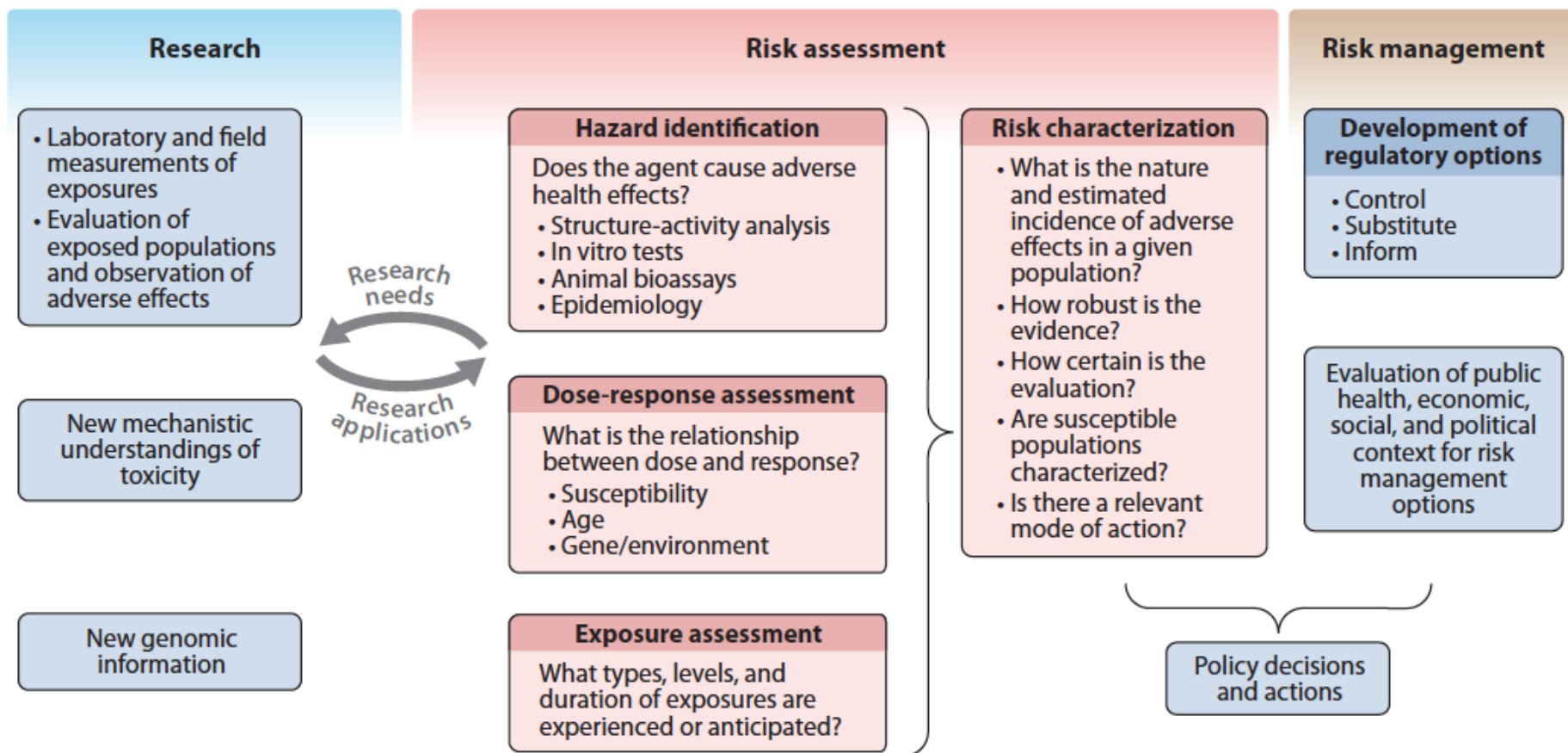
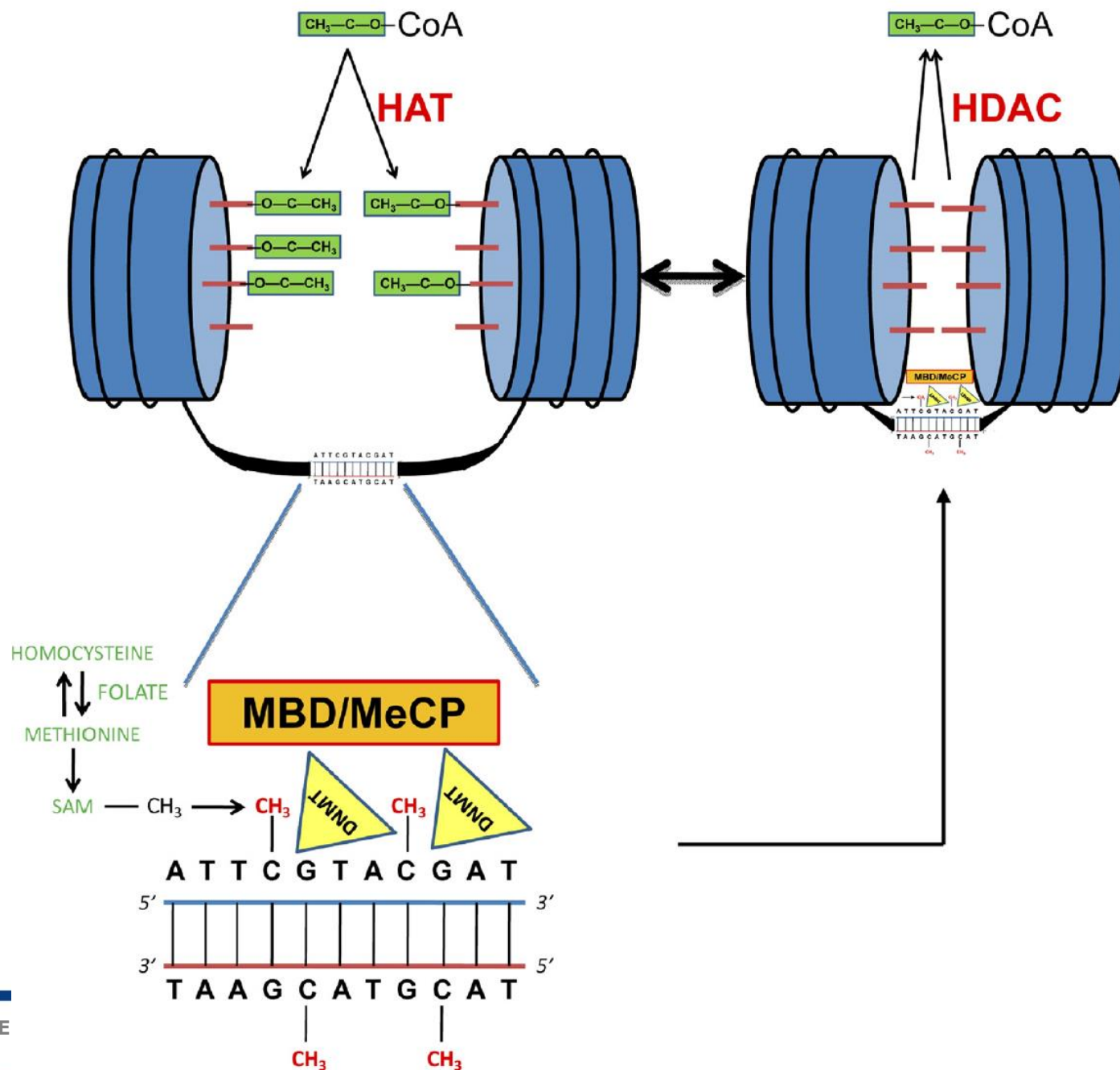


Figure 2

Risk assessment/risk management framework. This framework shows, under the red highlighting, the four key steps of risk assessment: hazard identification, dose-response assessment, exposure assessment, and risk characterization. It shows an interactive, two-way process where research needs from the risk assessment process drive new research, and new research findings modify risk assessment outcomes. This figure is reprinted with permission from Faustman & Omenn (28).





We are not following a
myth

Non siamo alla ricerca di
un mito

