



# Dr. Bolouri Research Center, AB

Haydeh Bolouri (PhD)

Neuroscientist

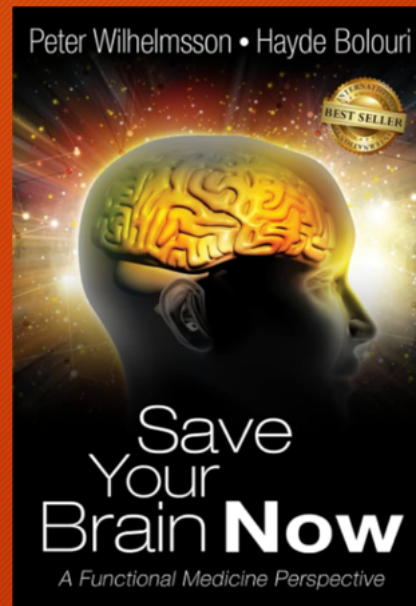
October 2024

[www.drbolouri.net](http://www.drbolouri.net)



# Your Dynamic Masterpiece, Your Brain!

The whole idea of the universe would have been a failure if it were not for the brain!





# Scientific background

Molecular Cell Biology and Immunology, University of Gothenburg



Traumatic Brain Injury, University of Gothenburg



Medicine doctor in Neuroscience (post doctoral fellowship)



Educational & Confocal microscopy and stereology



Senior research in Dermato-Cosmetic Science





# Research field

- Traumatic brain injuries (TBI & mTBI): Concussions in NFL
- Violence to the head: Blast overpressure (Swedish Armed forces)



# Traumatic Brain Injury (TBI)

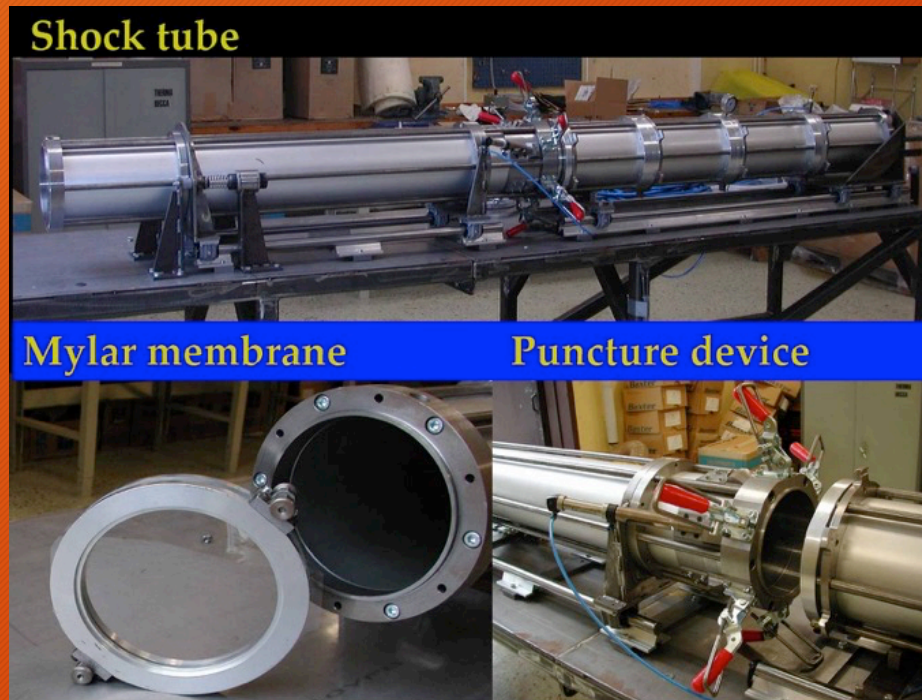
## CONCUSSIVE TBI, NFL



- *Concussion in professional football: animal model of brain injury--part 15 Neurosurgery. 2009, Viano DC, Hamberger A, Bolouri H, Säljö A.*
- *Concussion in professional football: morphology of brain injuries in the NFL concussion model- Part 16. Neurosurgery. 2009. Hamberger A, Viano DC, Saljo A, Bolouri H.*
- *Animal model for sport-related concussion; ICP and cognitive function. Acta Neurol Scand. 2011, Oct 29. Bolouri H, Säljö A, Viano DC, Hamberger A.*
- *Evaluation of Three Animal Models for Concussion and Serious Brain Injury. Annals of Biomedical Engineering, 2011. Viano DC, Hamberger A, Bolouri H, Saljo A.*



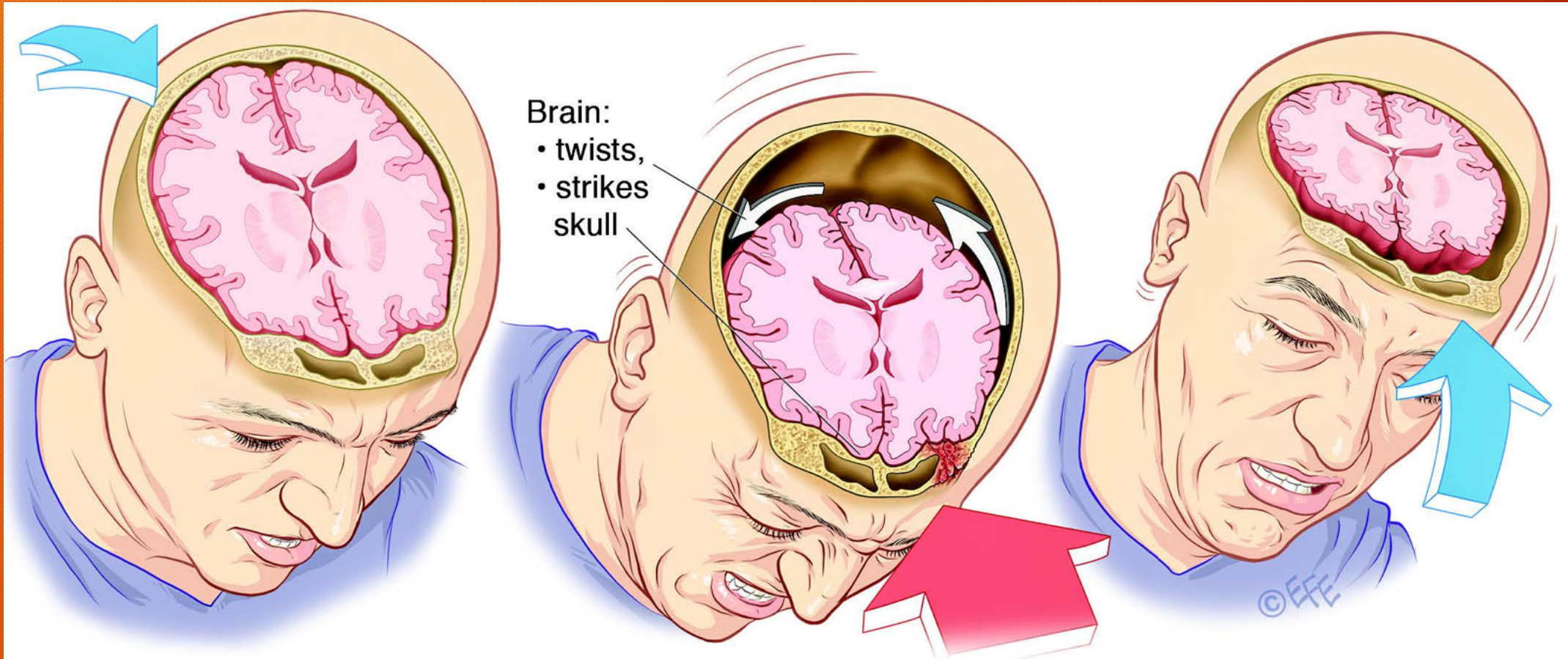
# BLAST INDUCED TBI SWEDISH ARMED FORCES



- *Neuropathology and pressure in the pig brain resulting from low-impulse noise exposure. J Neurotrauma. 2008 Dec; 25(12):1397. Säljö A, Arrhén F, Bolouri H, Mayorga M, Hamberger A.*
- *Low-level blasts raise intracranial pressure and impair cognitive function in rats. J Neurotrauma. 2009. Säljö A, Svensson B, Mayorga M, Hamberger A, Bolouri H.*
- *Low-level blast raises intracranial pressure and impairs cognitive function in rats. Säljö A, Bolouri H, Mayorga M, Svensson B, Hamberger A.J. Neurotrauma. 2010 Feb;27(2):383-9.*
- *Mechanisms and Pathophysiology of the low-level blast brain injury in animal models. Neuroimage, 2011. Epub 2010 May Säljö A, Mayorga M, Bolouri H, Svensson B, Hamberger A.*

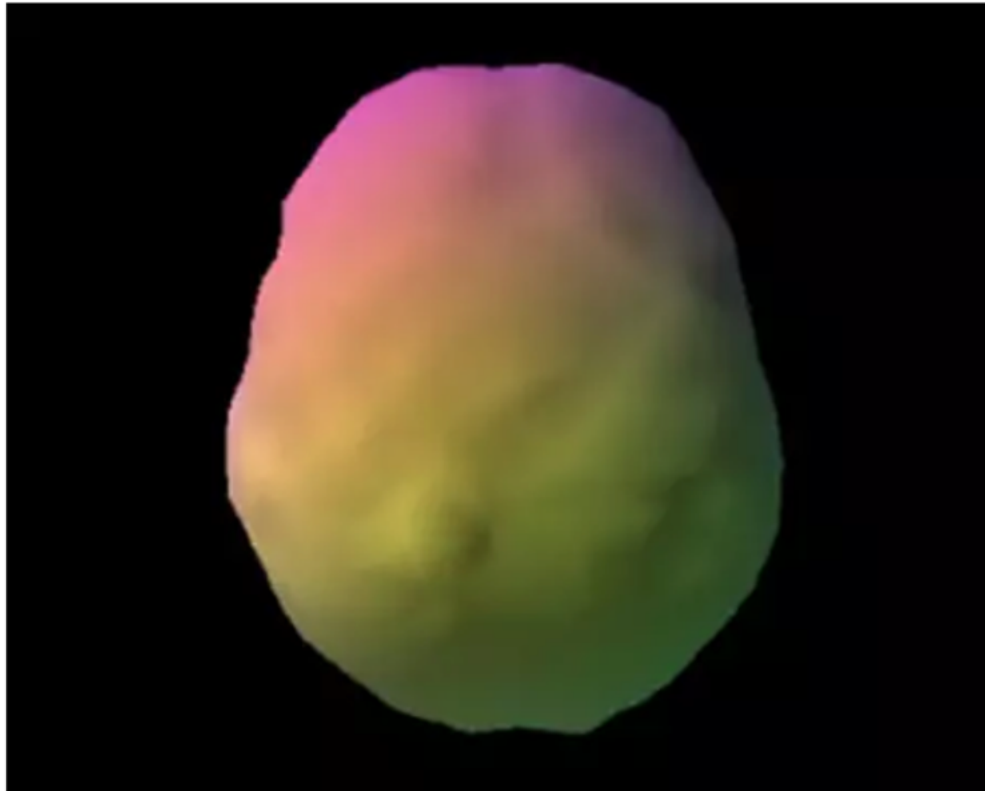


# What is concussion?

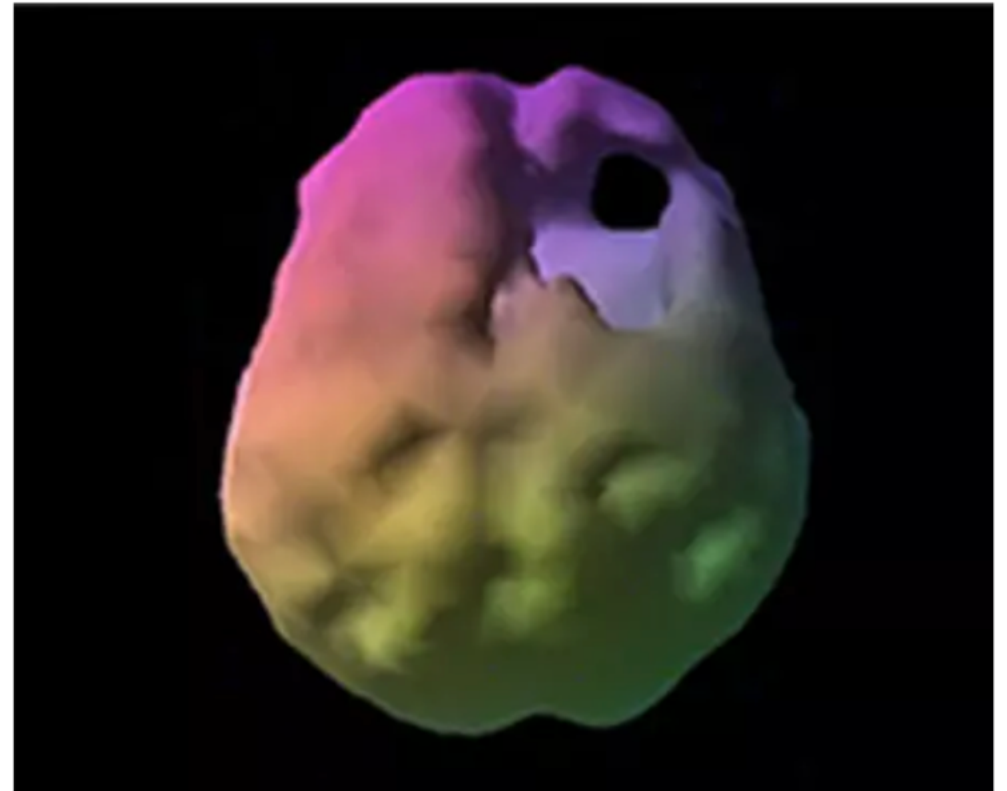




# Single-Photon-Emission-Computed-Tomography (SPECT)



**Healthy Brain Scan**



**Concussion Brain Scan**



Ann Neurol. 2013 Dec 13. doi: 10.1002/ana.24087. [Epub ahead of print]

## **Innate defence regulator peptide 1018 protects against perinatal brain injury.**

Bolouri H, Sävman K, Wang W, Thomas A, Maurer N, Dullaghan E, Fjell CD, Ek CJ, Hagberg H, Hancock RE, Brown KL, Mallard C.

### **Author information**

### **Abstract**

**Objective:** There is currently no pharmacological treatment that provides protection against brain injury in neonates. It is known that activation of an innate immune response is a key, contributing factor in perinatal brain injury, therefore, the neuroprotective therapeutic potential of innate defence regulator peptides (IDRs) was investigated. **Methods:** The anti-inflammatory effects of three IDRs was measured in LPS-activated murine microglia. IDRs were then assessed for their ability to

- Inflammatory-induced hibernation in the fetus: Priming of the fetal sheep metabolism correlates with developmental brain injury (Plos One, 2011, vol. 6, issue 12) Matthias Keller, David P. Enot, Mark Hodson<sup>4</sup>, Emeka I. Igwe, Hans-Peter Deigner, Justin Dean, Hayde Bolouri, Henrik Hagberg, Carina Mallard
- Delayed cortical impairment following lipopolysaccharide exposure in fetal sheep. Ann Neurol. Dean JM, van de Looij Y, Sizonenko SV, Lodygensky GA, Lazeyras F, Bolouri H, Kjellmer I, Huppi PS, Hagberg H, Mallard C.
- Radixin expression in microglia after cortical stroke lesion. Glia, 2013; DOI 10.1002/glia, 22473. Åsa Persson<sup>1\*</sup>, Ahmed Osman<sup>1\*</sup>, Hayde Bolouri<sup>2</sup>, Carina Mallard<sup>2</sup>, H. Georg Kuhn<sup>1</sup>



# Brain Neurotrauma:

## Molecular, Neuropsychological, and Rehabilitation Aspects

Taylor and Francis Publishers in collaboration with American researchers and American university of Beirut, 2014

### 46 Animal Models for Concussion *Molecular and Cognitive Assessments—Relevance to Sport and Military Concussions*

*Hayde Bolouri and Henrik Zetterberg*

#### CONTENTS

46.1 Introduction: Background and Definitions .....	643
46.2 Sports-Related Concussion .....	644
46.3 Animal Models of TBI .....	645
46.3.1 Head Impacts .....	645
46.3.2 Blast-Related .....	646

#### Peer reviewer:

- Journal of Neuroscience
- Brain Research
- Psychological and behavioural management



# What is Functional medicine? Multimodal Approaches

As a catalyst in the transformation of healthcare, functional medicine treats root causes of disease and restores healthy function through a personalized patient experience.





<b>Conventional medicine</b> <b>High level of scientific evidence</b>	<b>Functional medicine</b> <b>High level of scientific evidence</b>
Best for emergency conditions	Best for chronic diseases
Symptom suppressant	Treatment of underlying causes
Drug oriented	Prevention
Diagnose-focused	Patient-centered

**Functional medicine is a vital partner to conventional medicine.**



# One condition, many causes

# One cause, many conditions

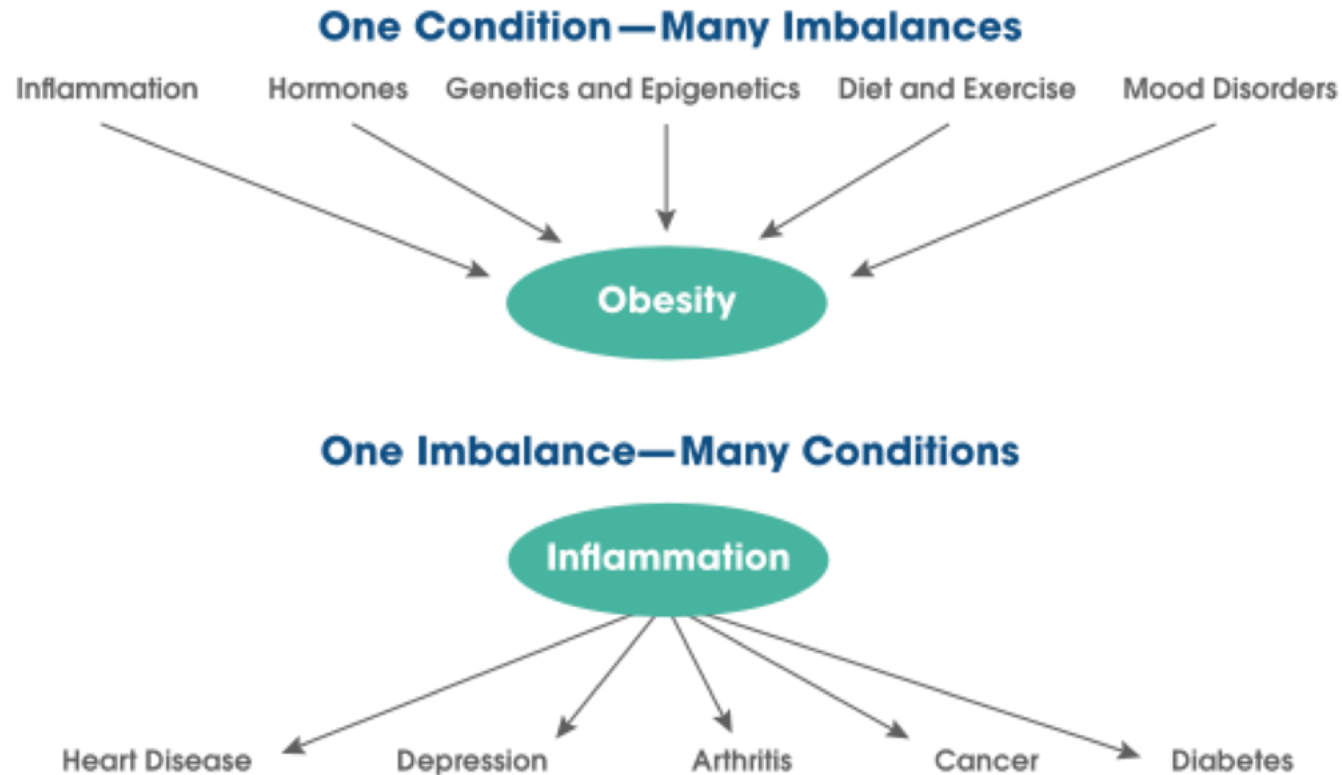


Figure 2. The relationship between Core Clinical Imbalances and Disease



# Autoimmune diseases

- Autoimmunity in chronic health conditions!?
- The immune system attacks its own cells!?
- It is inherited!?



# Inflammation

“95.4% of factory- farmed beef and lamb contained residual antibiotics”

[Food Sci Nutr](#). 2021 Nov; 9(11): 6152–6161.

PMCID: PMC8565197

Published online 2021 Sep 13. doi: [10.1002/fsn3.2568](https://doi.org/10.1002/fsn3.2568)

PMID: [34760246](https://pubmed.ncbi.nlm.nih.gov/34760246/)

Antibiotic residues in cattle and sheep meat and human exposure assessment in southern Xinjiang, China

[Yu Zhang](#),<sup>1</sup> [Jianjiang Lu](#),<sup>✉1</sup> [Yujun Yan](#),<sup>✉1</sup> [Jinhua Liu](#),<sup>1</sup> and [Manli Wang](#)<sup>1</sup>

▶ [Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) [PMC Disclaimer](#)

Associated Data

▶ [Supplementary Materials](#)

▶ [Data Availability Statement](#)

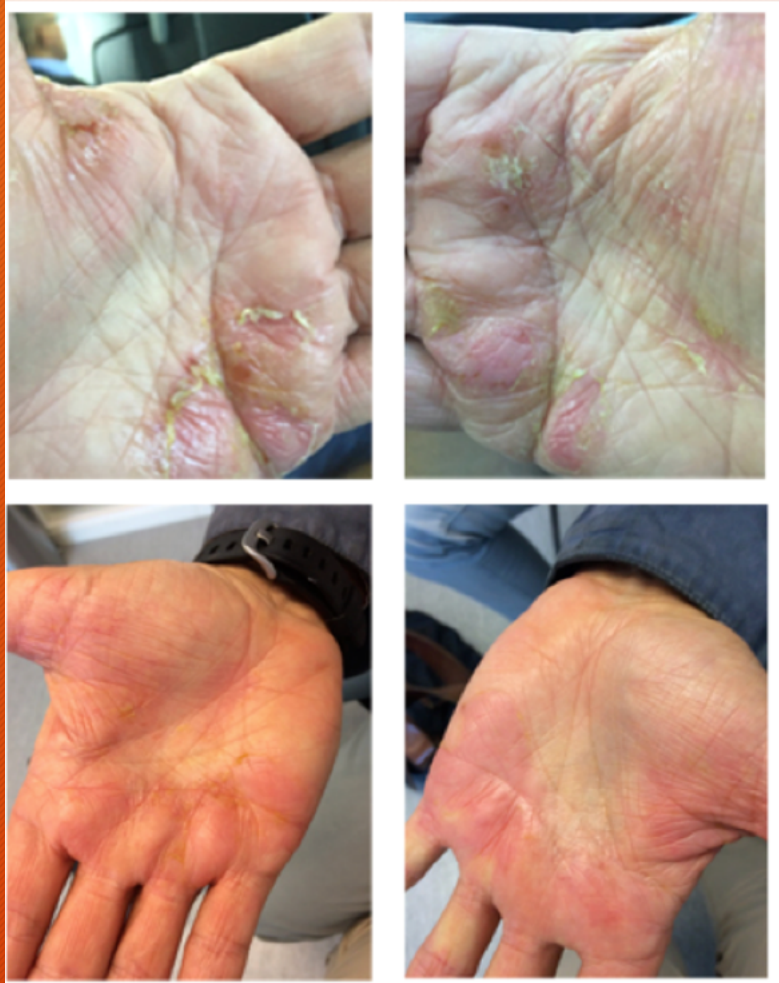
Abstract

[Go to:](#) ▶

In recent years, antibiotics have become widely used in animal breeding. The application of antibiotics in livestock may lead to the presence of antibiotic residues in animal-derived foods, especially meat, that may pose a threat to human health. In this study, 26 common antibiotics (eight sulfonamides, nine fluoroquinolones, four tetracyclines, and five macrolides) were screened in 88 meat samples (cattle muscles



# Don't we have a built in healing system?





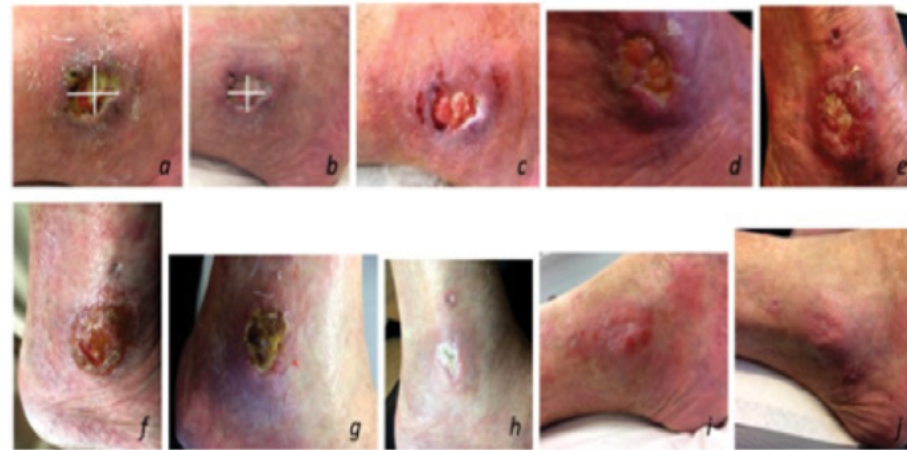
# By a Functional Medicine approach



### A Holistic Approach and Successful Treatment of Chronic Wound in Diabetes Mellitus by Platelet-Rich Plasma (PRP) Combined with Optimized Diet

Bolouri H\* and Hajimirsadeghi A

Hagaklinik Research Institute, Specialist Polyclinic of Primary Health Care, Gothenburg, Sweden



(a) Wound area with (length × width) measurement of 35 × 25 mm<sup>2</sup> prior to the treatment in our clinic.  
(a-j) The patient underwent a total of 13 PRP treatments over 24 weeks starting on 27 February 2017.

**Figure 1:** Step by step successful treatment of chronic wound in diabetes mellitus by platelet-rich plasma (PRP) combined with optimized diet.



# IS DEMENTIA A NATURAL PART OF AGING?

Memory loss is not part of the aging process.

Studies have shown that 20% of individuals over the age of 100 show no signs of memory loss or brain disease.

Ref; Perls, T., "Dementia free centenarians," *Exp Gerontol* 2004; 39:1 587-93



# Alzheimer's pathology can start in your 20s

We think of Alzheimer's as only affecting older people, but that is changing. Our fast-paced lifestyles, the widespread impact from COVID, and the increasing toxicity of our environment may be factors converging to create an astounding increase in early-onset dementia among younger people.

49

The average age of someone living with dementia is 49

373%

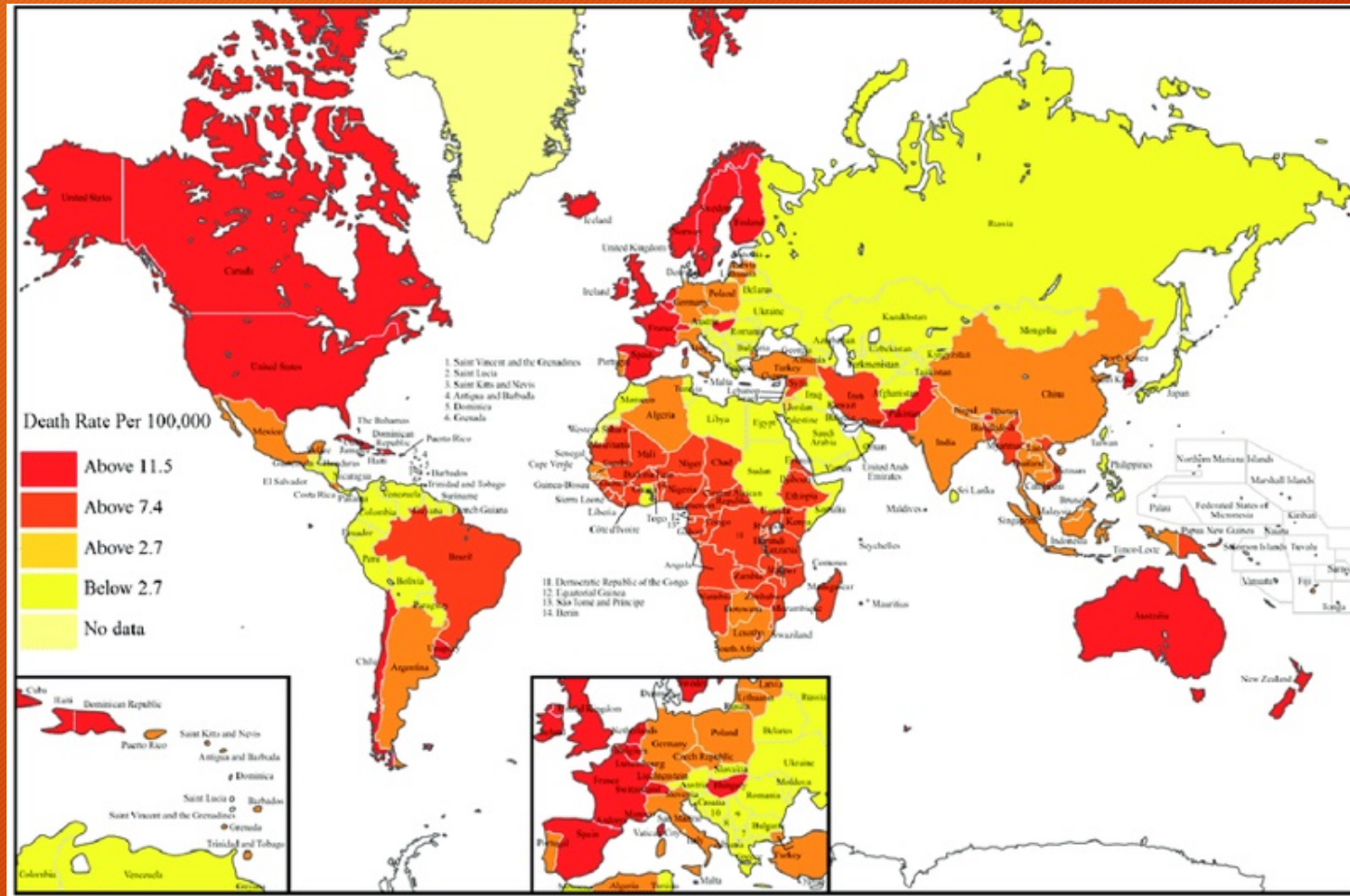
Increase in dementia among people aged 30 to 44 years old

7th

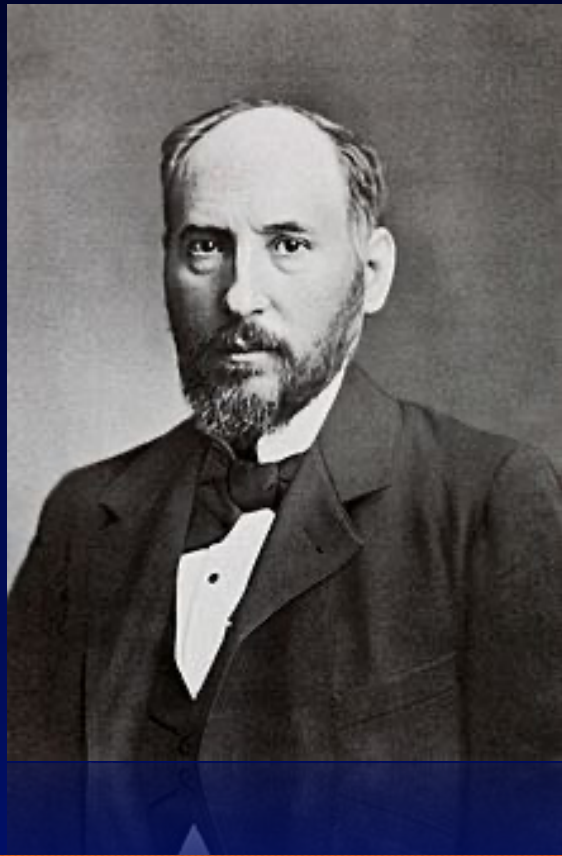
Alzheimer's is the 7th leading cause of death worldwide



# GLOBAL ALZHEIMER'S PREVALENCE







“In the adult centers, the nerve paths are something fixed, and immutable: everything must die, nothing may be regenerated.”

- Santiago Ramón y Cajal, Nobel laureate  
(1852-1934)



# Neuroplasticity

## The brain is plastic



“Our study demonstrates that cell genesis occurs in human brains and that the human brain retains the potential for self-renewal throughout life.”

- Dr. Peter Eriksson, 1998



# Neuroplasticity

- A 44-year-old official missing 90 percent of his brain, lived normally.....





# Statistics according to the Alzheimer's Association

- Over 55 millions diagnosed globally
- Every 3 secs someone develop AD worldwide
- Every 65 secs someone in the United States is diagnosed with AD
- By 2050, the total number diagnosed will grow to 14 millions

**Your most powerful tools you have at your disposal:  
your life choices!**



# What is Alzheimer's?

In 1901, Alzheimer discovered build up amyloid plaque formation & fibrillary tangles in the brain



Alois Alzheimer

Auguste Deter



**One of three AD patients is a woman**

**Higher risk of Alzheimer's  
than breast cancer.**



# Prevent ALZHEIMER'S!

- Avoid?
- Prevent?
- Reverse?



# WHO, March 2023

Dementia; several diseases that affect memory, thinking, and the ability to perform daily activities.

**Things that increase the risk of developing dementia include:**

- age (more common in those 65 or older)
- high blood pressure (hypertension)
- high blood sugar (diabetes)
- being overweight or obese
- smoking
- drinking too much alcohol
- being physically inactive
- being socially isolated
- depression.

**The most common form of dementia is Alzheimer by 60-70% of cases**



# Is it the ApoE4 gene that causes Alzheimer's?

## APOE Status and Alzheimer's risk

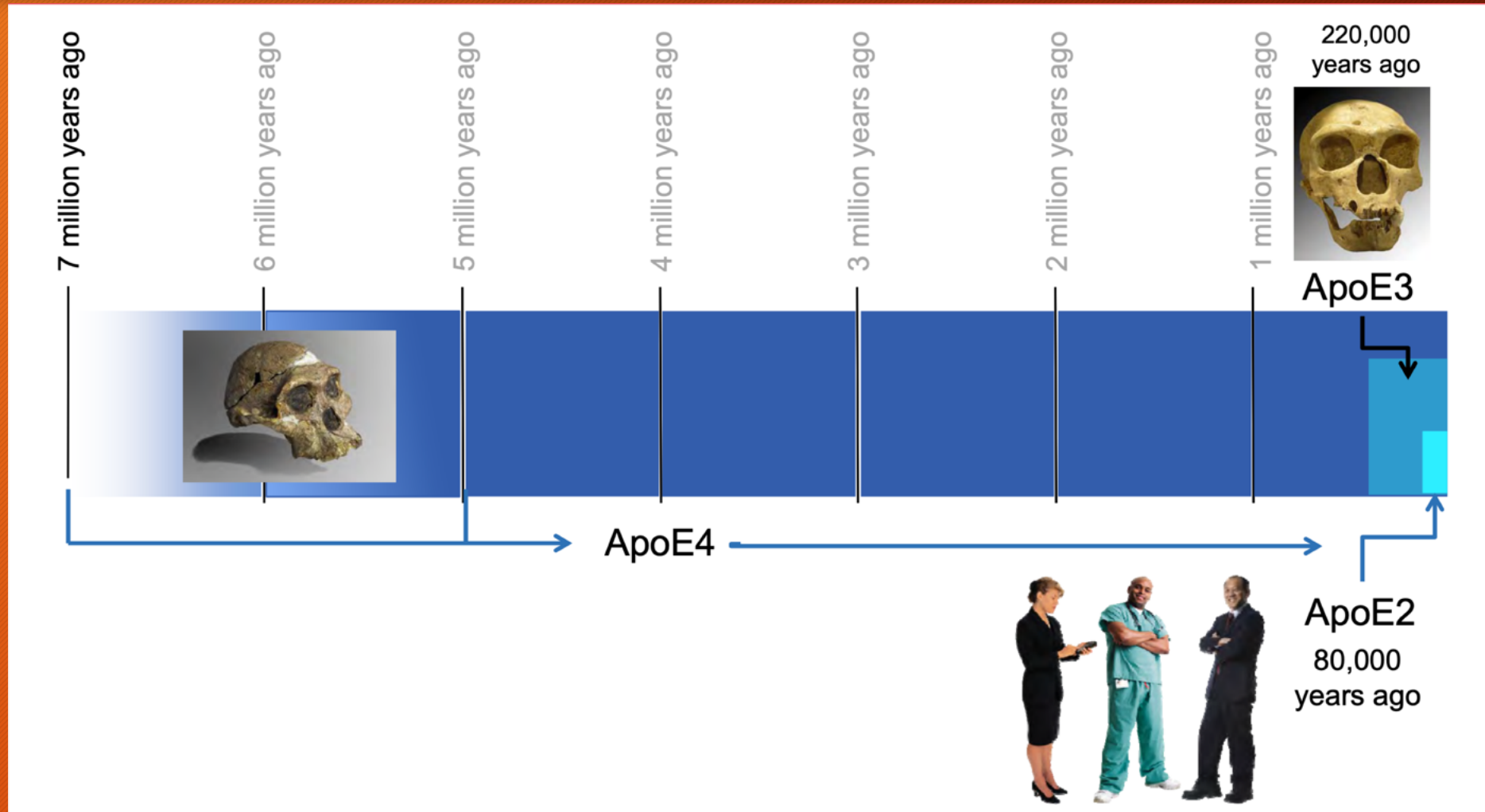


Genotype	<b>E2/ E2</b>	<b>E2/ E3</b>	<b>E2/ E4</b>	<b>E3/ E3</b>	<b>E3/ E4</b>	<b>E4/ E4</b>
Disease risk	40% less likely	40% less likely	2.6 X more likely	Average risk	3.2 times more likely	14.9 times more likely



Research: Apolipoprotein E-ε4 allele (ApoE4) is the major risk factor for AD

# The chimp that killed the rhino Evolution, shortgeivity, Alzheimer's and the God Gene





**Remember,  
Your destiny is not written in your genes!**

- **Your genes**
- **Epigenetik**
- **Microbiome**



# What do we know about ApoE-4 gene?

The Tsimane of Bolivia; the majority have heavy *Ascaris* loads (70%).

- ApoE4-negatives suffer age-related cognitive decline + heavy parasite load.
- ApoE4-positives do not suffer age-related cognitive decline + parasite load.

However, those who are ApoE4+ actually do as well or slightly better cognitively if they have parasites.

This may be related to alterations in **microbiome** (cf. IBS).



# Hypotheses behind Alzheimer's

Three well-known hypotheses so far:

- Beta amyloid plaque,
- Tau-protein tangles,
- Hypoglycemia (type II diabetes)



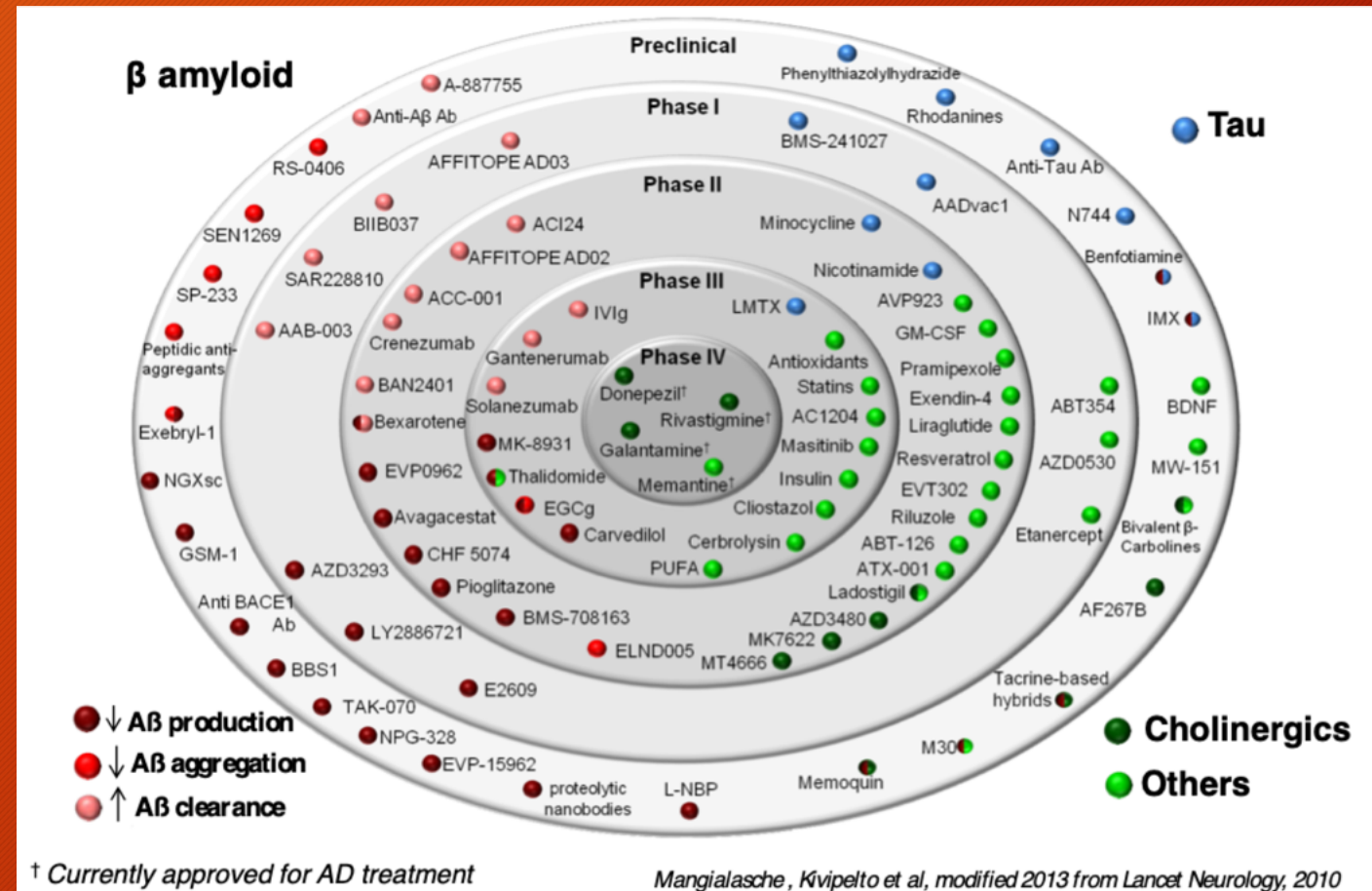
Everyone knows someone who is a cancer survivor,

no one knows an Alzheimer's survivor.



# Alzheimer's Disease Therapeutic Landscape

- Cognitive medicine - a new approach in health care science  
Cognitive medicine - an emerging field, *Wallin et al. BMC Psychiatry (2018)*
- Demensdagen 2019  
Aducanumab, the future drug inhibit beta amyloid?  
Swedish research result showed the clearing of beta amyloid in the brain, presented in 2024.  
*Aducanumab*, monoclonal antibody clears the blood 10-15 years storage of beta amyloid for one year.





[nature](#) > [news](#) > article

NEWS | 04 May 2023

# Alzheimer's drug donanemab: what promising trial means for treatments

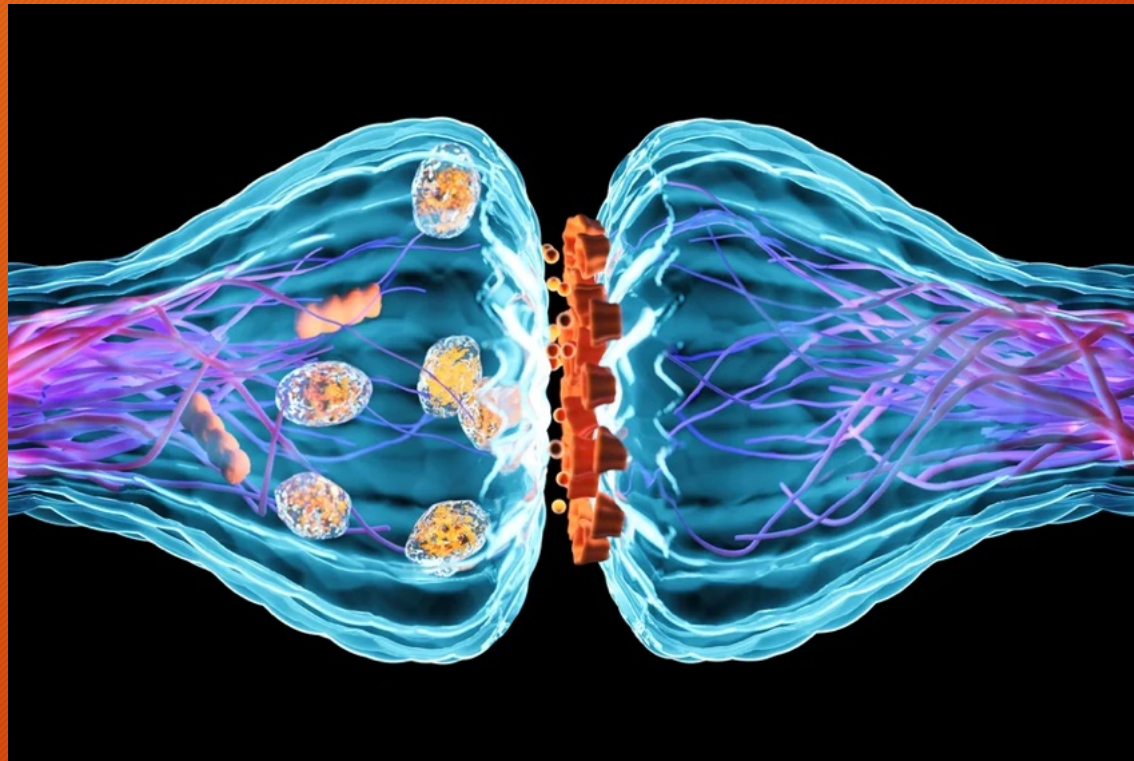
**Results suggest that the amyloid-targeting drug candidate slows cognitive decline in some people, but questions remain over its potential side effects.**

[Sara Reardon](#)





# Persistence of memory by kidney - brain connection at activated synapses



A synapse is a structure enabling a neuron to communicate with another neuron or effector cell by exchanging an electrical or chemical signal



# The perfect Alzheimer's drug would

**Reduce APP  $\beta$ -cleavage, reduce  $\gamma$ -cleavage, increase  $\alpha$ -cleavage, reduce caspase-6 cleavage, reduce caspase-3 cleavage, prevent oligomerization, increase neprilysin, increase IDE, increase microglial clearance of  $A\beta$ , increase autophagy, increase BDNF, increase NGF, increase netrin-1, increase ADNP, reduce homocysteine, increase PP2A activity, reduce phospho-tau, increase phagocytosis index, increase insulin sensitivity, improve axoplasmic transport, enhance mitochondrial function and biogenesis, reduce oxidative damage and optimize ROS production, enhance cholinergic neurotransmission, increase synaptoblastic signaling, reduce synaptoclastic signaling, improve LTP, optimize estradiol, progesterone, E2:P ratio, free T3, free T4, TSH, pregnenolone, testosterone, cortisol, DHEA, and insulin, reduce inflammation, increase resolvins, enhance detoxification, improve vascularization, increase cAMP, increase glutathione, provide synaptic components, optimize all metals, increase GABA, increase vitamin D signaling, increase SirT1, reduce NFkB, increase telomere length, reduce glial scarring, enhance repair, etc.**



# Alzheimer's would be a rare condition

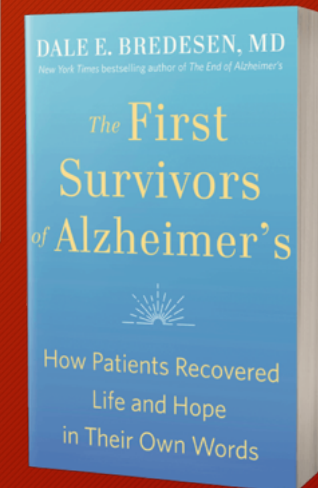
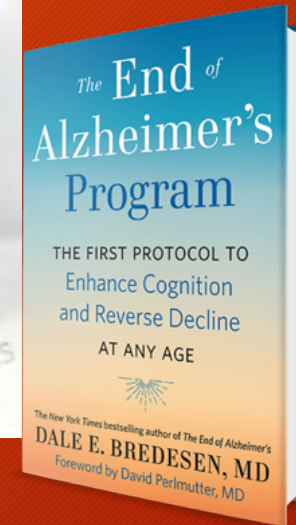
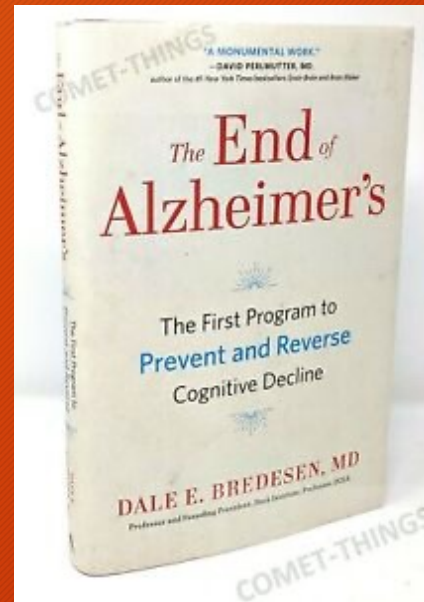
 THE INSTITUTE FOR  
FUNCTIONAL  
MEDICINE®

In collaboration with  
 **MPI**  
COGNITION

## Reversal of Cognitive Decline: Evolution, Pathology, Physiology

 **DALE BREDESEN, MD**

REVERSING COGNITIVE DECLINE:  
Advanced Clinical Training  
December 2017  
Miami, FL





**Treating Alzheimer's is analogous to repairing**

**A roof with 36 holes...**





# RECODE, Bredesen's Cognoscopy

- Type 1: Inflammatory
- Type 2: Atrophic
- Type 1.5: Glycotoxic
- Type 3: Toxic,
- Type 4: Vascular
- Type 5: Traumatic brain injuries



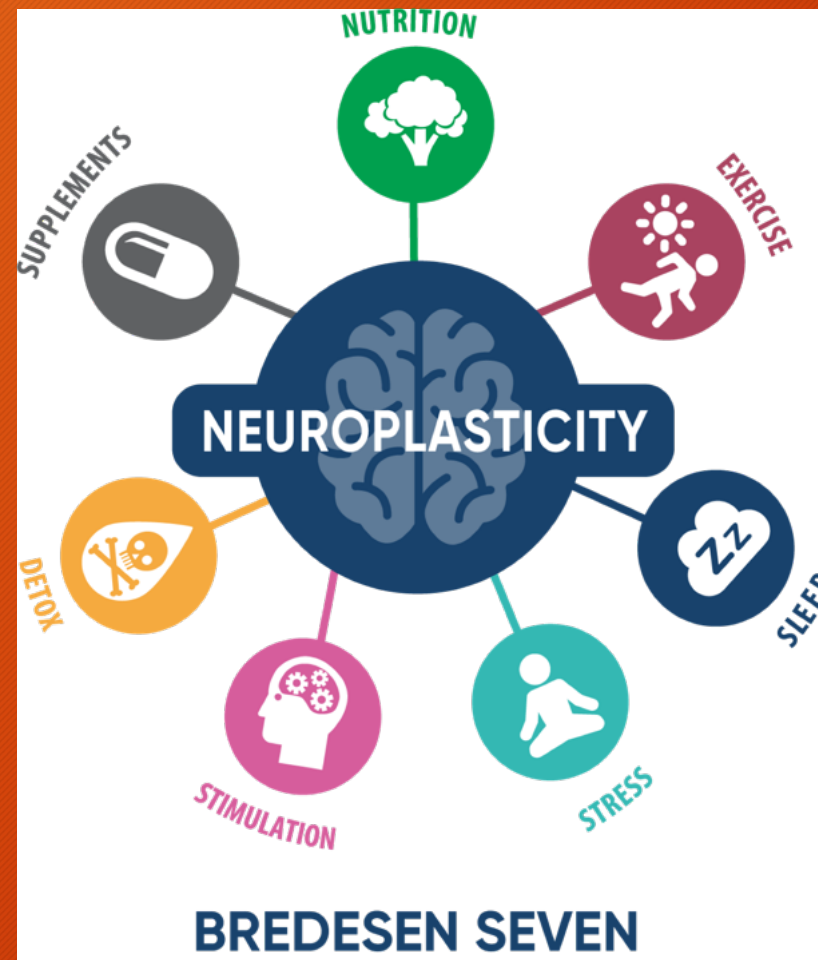
# Improvement of cognitive function up to 74% by RECODE



*Observed Improvement in Cognition During a Personalized Lifestyle Intervention in People with Cognitive Decline. 2023. Heather Sandison et al. Clinical Trial, J Alzheimers Dis. 94(3):993-1004.*



Stop the ongoing neurodegenerative process & reverse cognitive decline by enhancing the neuroplasticity





# Cognitive decline associated with Alzheimer's disease

can now be reversed, and improvement sustained, using a personalized programmatic approach that is targeted to the underlying pathophysiology.



# INSULINRESISTENS

- Root cause of all chronic diseases
- Driving the aging processes faster
- Leads cognitive dysfunctions



# How to fight insulin resistance?

- Healthy gut lining to cure insulin resistance.
- Accelerate the autophagy cellular.
- High diastolic blood pressure insulin resistance.
- An optimized ketogenic diet increases autophagy.
- An excellent marker: triglycerides / HDL <1.5



# **Aging process accelerates with insulin resistance**

**Most people spend every waking moment in  
a state of elevated insulin.**



# Heavy metals & Cognoscopy

Review

> [Trends Pharmacol Sci](#). 2018 Dec;39(12):1049-1063. doi: 10.1016/j.tips.2018.10.001.

Epub 2018 Oct 20.

## Copper and Zinc Dysregulation in Alzheimer's Disease

Review

> [J Alzheimers Dis](#). 2020;76(4):1215-1242. doi: 10.3233/JAD-200282.

## Heavy Metals Exposure and Alzheimer's Disease and Related Dementias



# The breakdown of the blood-brain barrier (BBB) in neurodegenerative disease

- Type 2 diabetes increases the risk of Alzheimer's disease
- Lack of omega-3 fatty acids (EPA and DHA) in the brain
- High blood pressure increases, an important modifiable lifestyle factor
- Alcohol consumption, higher risk of breast cancer and general health conditions
- Lack of protein & muscle mass; strength training and activity
- High stress levels



# Autophagy & intermittent fasting (IF)

- IF Starts autophagy through an optimized ketogenic diet.
- Most often, the proponents follow blindly without knowledge of the 34 fatty acids.
- They write about enormous successes such as weight loss.
- When restoring insulin resistance, Zn, Cr, Se levels need to be adjusted
- (The Journal of Nutritional Biochemistry, October 2021).
- Serious life-threatening deficiencies; low RBC Mg, Ca, Cu, D3 as well as the 34 fatty acids are at the core of healing everything from gut to brain but also Covid.



Low-grade chronic inflammation, silently simmers for years without our knowledge, can affect almost anyone and contribute to CVD, cancer, type 2 diabetes and other conditions.



Harvard Health Publishing  
HARVARD MEDICAL SCHOOL  
*Trusted advice for a healthier life*

**Get started TODAY!**

**Fight Health-Robbing  
Inflammation!**  
**with 7 Simple Steps**


---

Science has proven that chronic, low-grade inflammation can turn into a silent killer that contributes to cardiovascular disease, cancer, type 2 diabetes and other conditions.

The fact that three out of five people around the world die from a



**Fighting  
Inflammation**  
*How to stop the damage before it compromises your health*

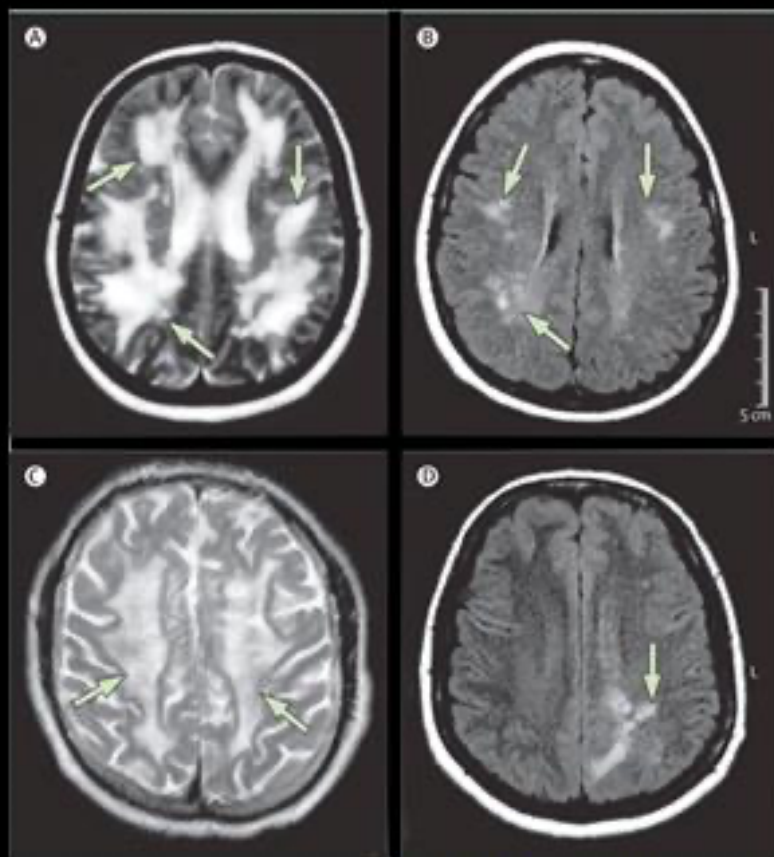


**Act now!**

Shockingly, 3 out of 5 people around the world die from a disease that has been linked to inflammation.



# The significance of diet and nutrition for the brain and genes!



Hadjivassiliou, M., Gluten sensitivity: from gut to brain. *The Lancet Neurology*, Volume 9, Issue 3, Pages 318-330



# Most of us today know more about how our car or iPhone works than our own bodies

- Japanese study; laughing can turn off genes involved in prostate cancer.
- The power of social connections to influence our immune system and gene expression.
- In each other's presence, the ECG and EEG of both are connected.



# Vitamin D, Homocysteine, and Folate in Subcortical Vascular Dementia and Alzheimer Dementia

Moretti R, Caruso P, Dal Ben M, Conti C, Gazzin S, Tiribelli C. *Front Aging Neurosci.* 2017 May

The statistical models confirmed the association between lack of vitamin D & folate and high levels of homocysteine with dementia.



# Can flavonoids help fend off forgetfulness?

September 17, 2021

By **Heidi Godman**, Executive Editor, *Harvard Health Letter*



Harvard Health  
Publishing  
HARVARD MEDICAL SCHOOL



The foundation of a healthy diet is a vibrant rainbow of fruits and vegetables, like rosy red strawberries, dark green spinach leaves, or sunny yellow peppers. Their colors often come from flavonoids, powerful plant chemicals (phytochemicals) that appear to contribute to many aspects of health. And now a large Harvard study published online in *Neurology* in July suggests that [flavonoids may also play a role in protecting](#)



# Green coffee fruit extract is rich in polyphenols!

Decaffeinated coffee also contains about 75% of the antioxidants that increase the BDNF level in the plasma.



<https://foodrevolution.org/blog/food-and-health/coffee-health/>

<https://www.psychologytoday.com/blog/your-brain-food/201105/why-decaf-coffee-is-just-healthy>

<https://foodrevolution.org/blog/coffee-health/>



# What are polyphenols?



**MACRONUTRIENTS** (carbohydrates, proteins and fats)

**MICRONUTRIENTS** (vitamins and minerals).

- Polyphenols naturally found in plant-based food, such as fruits, vegetables, herbs, spices, tea, dark chocolate, and wine.



# How does polyphenols affect the brain?

- Polyphenols are hardly absorbed in gut, but these are food for the microbiome in the intestine
- Their metabolites are transported to the brain through the blood!

**Healthy integrity of the intestinal mucosa means a healthy BBB!**



# Green tea & anti-cancerogena effekt





# Turmeric: More than 5 000 years popular in India

Related to their low prevalence of Alzheimer's in the world.



- <https://foodrevolution.org/blog/food-and-health/prevent-reverse-alzheimers/>
- <https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC2781139/>
- <http://www.worldlifeexpectancy.com/cause-of-death/alzheimers-dementia/by-country/> -
- <https://pubmed.ncbi.nlm.nih.gov/19966973/>
- <http://www.ncbi.nlm.nih.gov/pubmed/24335167>
- <https://nutritionfacts.org/2015/02/05/why-pepper-boosts-turmeric-blood-levels/>
- <https://pubmed.ncbi.nlm.nih.gov/29065496/>



# Antocyaniner



- [https://www.huffingtonpost.com/2012/04/26/cognitive-impairment-study-berries\\_n\\_1453557.html](https://www.huffingtonpost.com/2012/04/26/cognitive-impairment-study-berries_n_1453557.html)
- [https://www.huffingtonpost.com/2012/04/26/cognitive-impairment-study-berries\\_n\\_1453557.html](https://www.huffingtonpost.com/2012/04/26/cognitive-impairment-study-berries_n_1453557.html)
- <http://www.ncbi.nlm.nih.gov/pubmed/20047325>



# Omega 3 fatty acids

Flaxseed and chia seed both contain high omega 3 fatty acids while Flaxseed contains ALA in addition to high polyphenols and fiber.





# Ubiquinol, Co Q10 in case of statin usage

Accumulation of Beta amyloid & Tau protein  
increase in the brain by Statin



# Green & cruciferous vegetables; broccoli, cabbage, kale, and Brussels sprouts

Nutrient dense that benefit brain health.

According to research from Rush University in Chicago in 2015;  
cognitive functions improved in older people when they ate more greens.



<http://www.sciencedaily.com/releases/2015/03/150330112227.htm>



# Resveratrol improves brain function in the elderly According to a study in the British Journal of Nutrition



<https://www.organicfacts.net/health-benefits/fruit/health-benefits-of-grapes.html>

<https://www.canceractive.com/cancer-active-page-link.aspx?n=1906>

[https://www.eurekalert.org/pub\\_releases/2017-02/ral-psho20317.php](https://www.eurekalert.org/pub_releases/2017-02/ral-psho20317.php)



# Your BDNF-stimulating brain food

- Polyphenols and flavonoids: Blueberry, chocolate, green tea, coffee fruit extract, olive oil and black pepper
- Meditation
- Sleep
- Music
- Social relationships and interactions
- Psychedelic like CBD oil (without thc)
- Spend time under the sun



# MEDICINAL MUSHROOMS

Supports the immune system, Anti-inflammatory, Strong antioxidants, Adaptogenic.

- Reishi; "immortality mushroom"
- Lion's mane; protects against anxiety and depression, cognitive impairment, depression, lengthens axons and dendrites, improves synaptic function
- Cordyceps; anti-cancer properties, increases energy levels and improves libido
- Maitake; regulates blood sugar, blood fats and cholesterol, strengthens the immune system
- Germini; high levels of B2, B3 and B5
- Shiitake; fights obesity, protects cardiovascular and immune systems



# Referenser

1. Dhana et al. Impact of the Apolipoprotein E  $\epsilon$ 4 Allele on the Relationship Between Healthy Lifestyle and Cognitive Decline: A Population-Based Study. *Am J Epidemiol*. Julv 2021.
2. Carlsson M. Alzheimer - psykiatern som blev odödlig. Sandared: Recito förlag; 2017.
3. Johansson P, et al. Cerebrospinal fluid biomarkers for Alzheimer's disease: diagnostic performance in a homogeneous mono-center population. *J Alzheimers Dis*. 2011.
4. Clifford RJ Jr, et al. NIA-AA Research Framework: Toward a biological definition of Alzheimer's disease. *Alzheimers Dement*; 2018.
5. American Psychiatric Association. Mini-D 5: diagnostiska kriterier enligt DSM-5. Stockholm: Pilgrim Press; 2015.
6. Palmqvist S, et al. Discriminative accuracy of plasma phospho-tau217 for Alzheimer disease vs other neurodegenerative disorders. *JAMA*. 2020.
7. Pereira J, et al. Untangling the association of amyloid- $\beta$  and tau with synaptic and axonal loss in Alzheimer's disease. Epub 5 dec 2020.
8. Leuzy A, et al. Current advances in plasma and cerebrospinal fluid biomarkers in Alzheimer's disease. *Curr Opin Neurol*. Epub 19 jan 2020. 8.
9. Bjartmar L, Liljeroth AM, Johansson P, et al. Inför specialistutbildning i kognitiv medicin för läkare. *Läkartidningen*. 2019;116:FILL.
10. Viss.nu, Region Stockholm. Kognitiv sjukdom. Oktober 2019. <https://viss.nu/kunskapsstod/vardprogram/kognitiv-sjukdom>
11. Kjällman Alm A, et al. Experiences of long term ongoing structured support in early stage of dementia - a case study. *Int J Older People Nurs*. 2014;9(4):289-97.