Curso Nutrigenomica y Avanzado

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Departamento de Formación Instituto Nutrigenomica

Nutrigenómica y enfermedades neurodegenerativas.

Nutrigenómica y enfermedades neurodegenerativas.

1. Introducción a las enfermedades neurodegenerativas
2. Bases moleculares de las enfermedades neurodegenerativas
3. Nutrigenómica y alzheimer
4. Nutrigenómica y parkinson
5. Nutrigenómica y esclerosis múltiple

1. Introducción a las enfermedades neurodegenerativas

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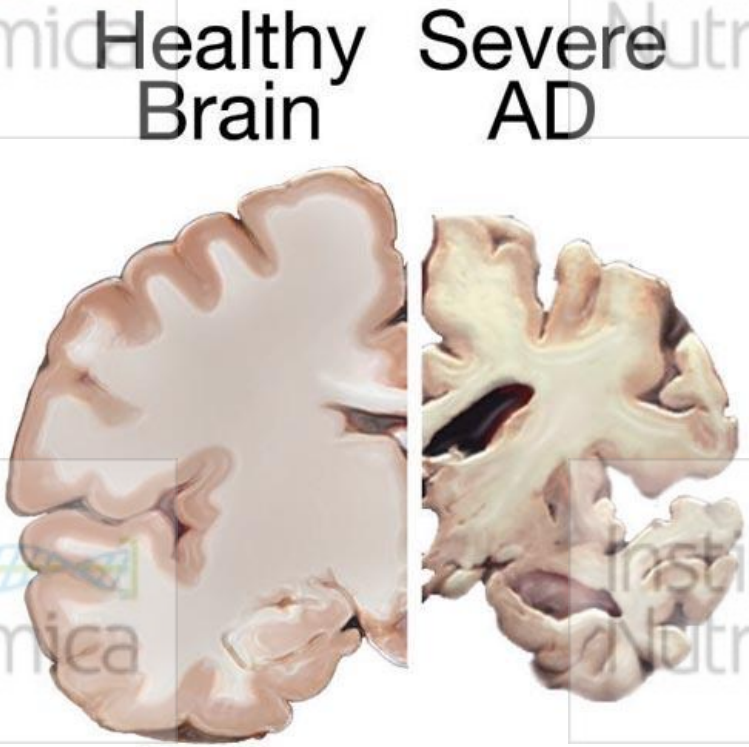

1. Introducción a las enfermedades neurodegenerativas

NEURODEGENERATIVE DISEASES CHARACTERIZED BY FILAMENTOUS-LESIONS FORMED FROM AGGREGATED PEPTIDES/PROTEINS

DISEASE	LESION/COMPONENTS	LOCATION
Alzheimer's Disease (AD)*	Senile Plaques/β-amyloid, NAC Neurofibrillary tangles/PHFτ	Extracellular Intracytoplasmic
Amyotrophic Lateral Sclerosis (ALS)	Spheroids/NF subunits	Intracytoplasmic
Dementia with Lewy Bodies (DLB)#	Lewy Bodies/NF subunits, α-synuclein	Intracytoplasmic
Lewy Body Variant Alzheimers Disease (AD + DLB)#	Senile Plaques/β-amyloid, NAC Neurofibrillary tangles/PHFτ Lewy Bodies/NF subunits, α-synuclein	Extracellular Intracytoplasmic Intracytoplasmic
Multiple System Atrophy (MSA)#	Glial Cell Inclusions/α-synuclein	Intracytoplasmic
Neuronal intranuclear inclusion disease	Inclusions/Expanded polyglutamine tracts	Intranuclear
Parkinson's Disease (PD)#	Lewy Bodies/NF subunits, α-synuclein	Intracytoplasmic
Prion diseases	Amyloid plaques/Prion	Extracellular
Tauopathies*	Neurofibrillary tangles/AD-like PHFτ	Intracytoplasmic
Tri-nucleotide repeat diseases	Inclusions/Expanded polyglutamine tracts	Intranuclear
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This table summarizes neurodegenerative disorders characterized by filamentous brain lesions in the extracellular space or within neurons or glia.
* AD is a heterogeneous dementing disorder, and one of several tauopathies. Other tauopathies are: progressive supranuclear palsy, Pick's Disease, corticobasal degeneration, FTDP-17 and Guam amyotrophic lateral sclerosis/parkinsonism dementia complex.
# Synuclein are implicated in diverse disorders known as synucleinopathies and AD is one as well. (From Trojanowski JQ, Goedert M, Iwatsubo T, Lee VM-Y. (1998) Fatal Attraction: Abnormal protein aggregation and neuron death in Parkinson's disease and Lewy body dementia. *Cell Death Diff.* **5**:832-837.)

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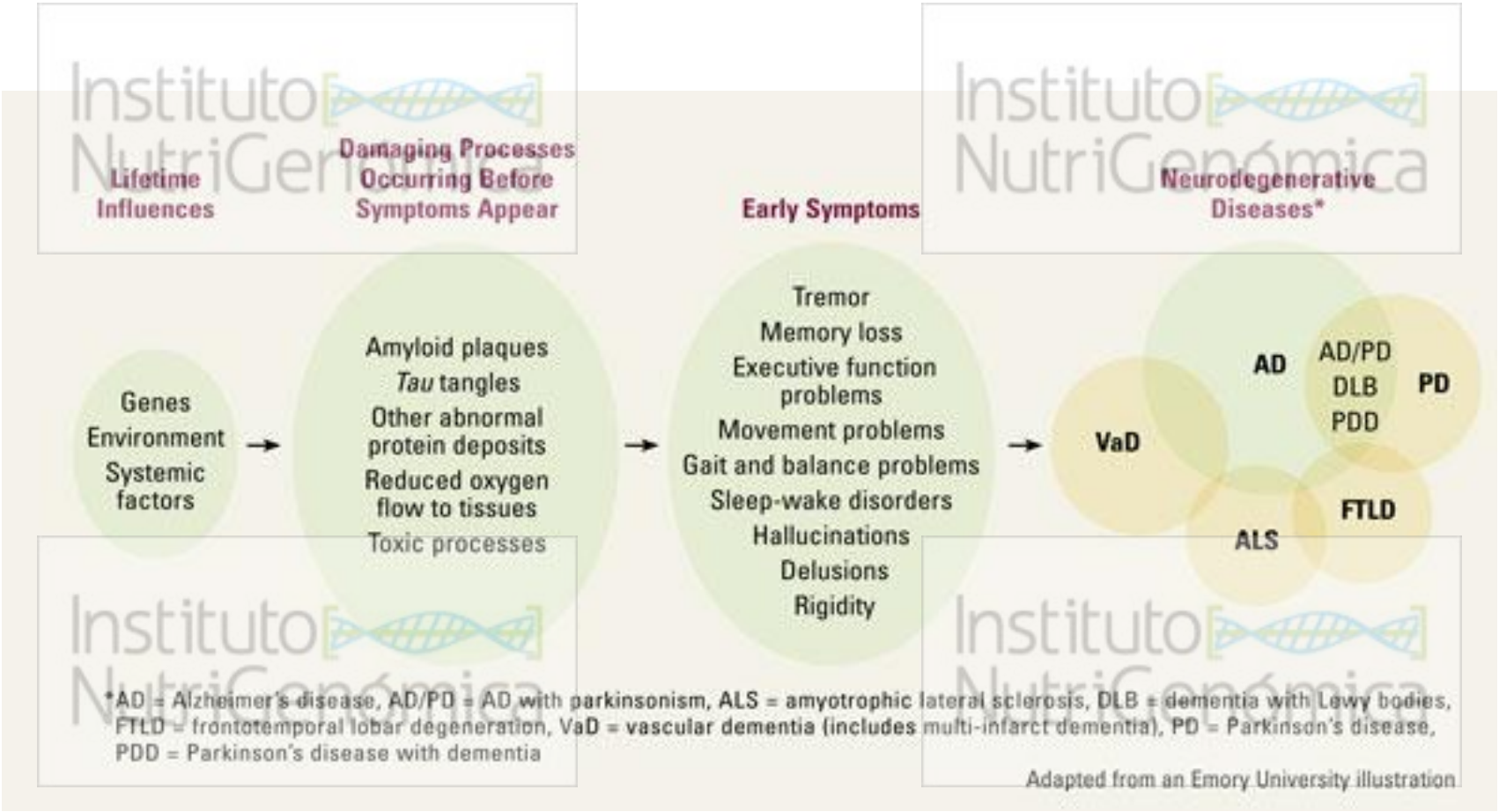

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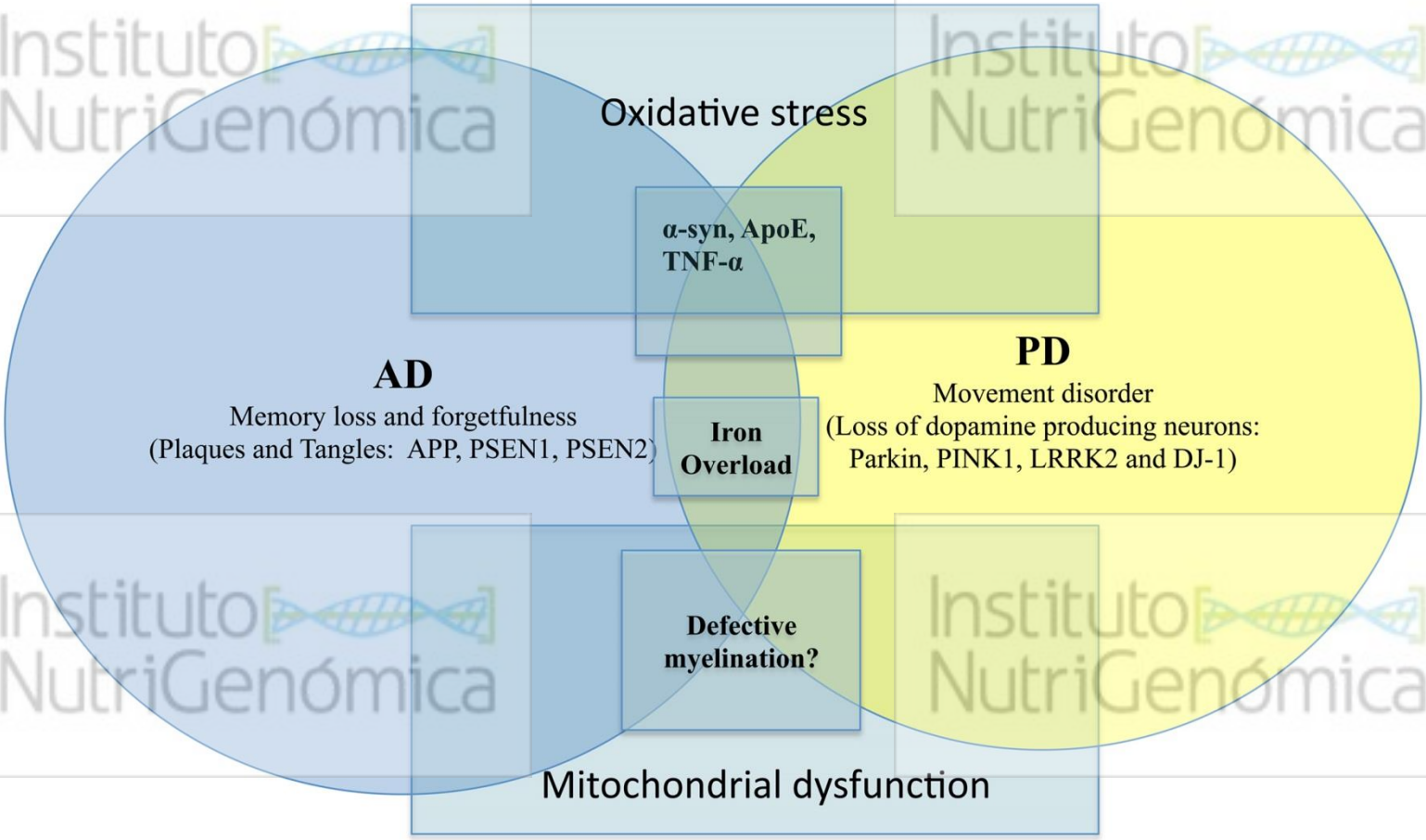


Front. Aging Neurosci., 21 July 2010

1. Introducción a las enfermedades neurodegenerativas

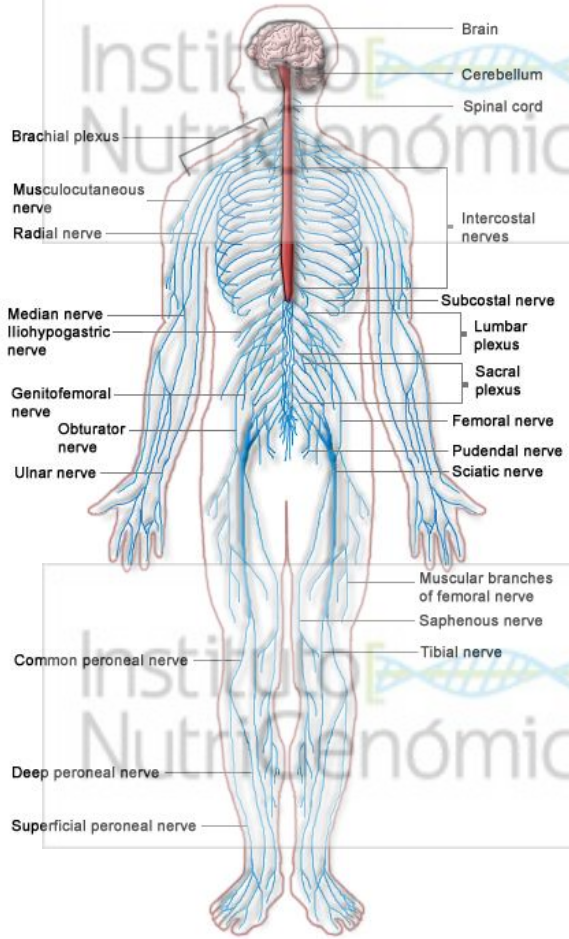
Enfemerdad	Casos / 100000 hab	Prevalencia	Población afectada
Alzheimer y otras demencias	400	0.5 %	35.6 M
Parkinson	315	0.34 %	23.8 M
Esclerosis Múltiple	30	0.03 %	2.28 M

Cause category	2005 (%)	2015 (%)	2030 (%)
Alzheimer and other dementias	0.73	0.81	0.92
Parkinson's disease	0.18	0.20	0.23
Multiple sclerosis	0.03	0.03	0.02

Prince et al., 2013; Pringsheim et al., 2014; Trisolini et al., 2010, WHO, 2006

1. Introducción a las enfermedades neurodegenerativas

- Sistema Nervioso
  - División anatómica
    - **CENTRAL** (encéfalo, cerebelo, cerebro, tallo encefálico y médula)
    - **PERIFÉRICO** (nervios y neuronas)



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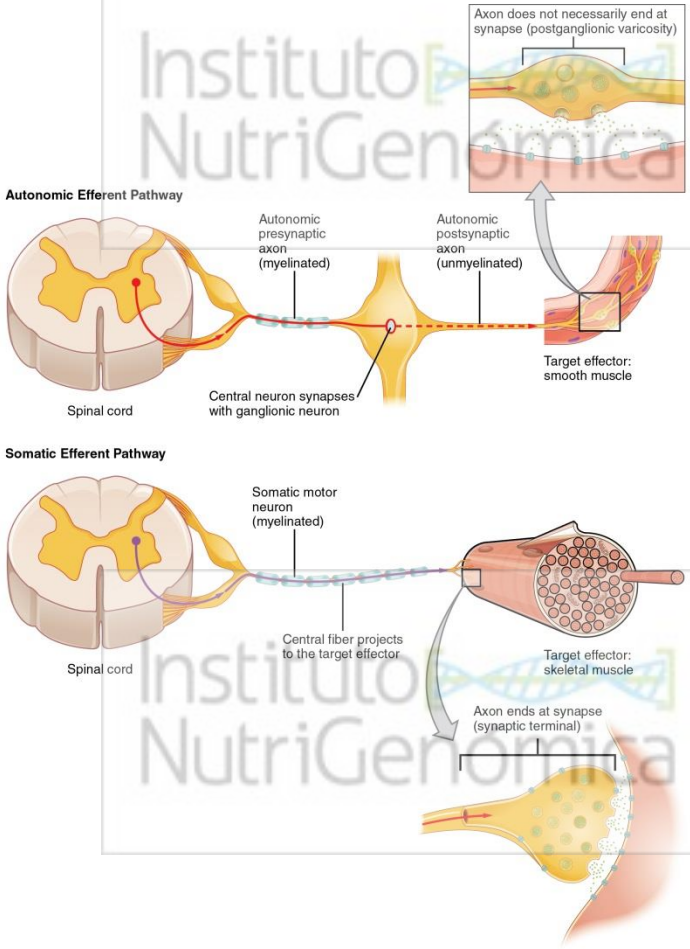
    - **SOMÁTICO** (acciones voluntarias)
    - **AUTÓNOMO** (acciones involuntarias)



2. Bases moleculares de las enfermedades neurodegenerativas

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    - **CENTRAL** (encéfalo, cerebelo, cerebro, tallo encefálico y médula)
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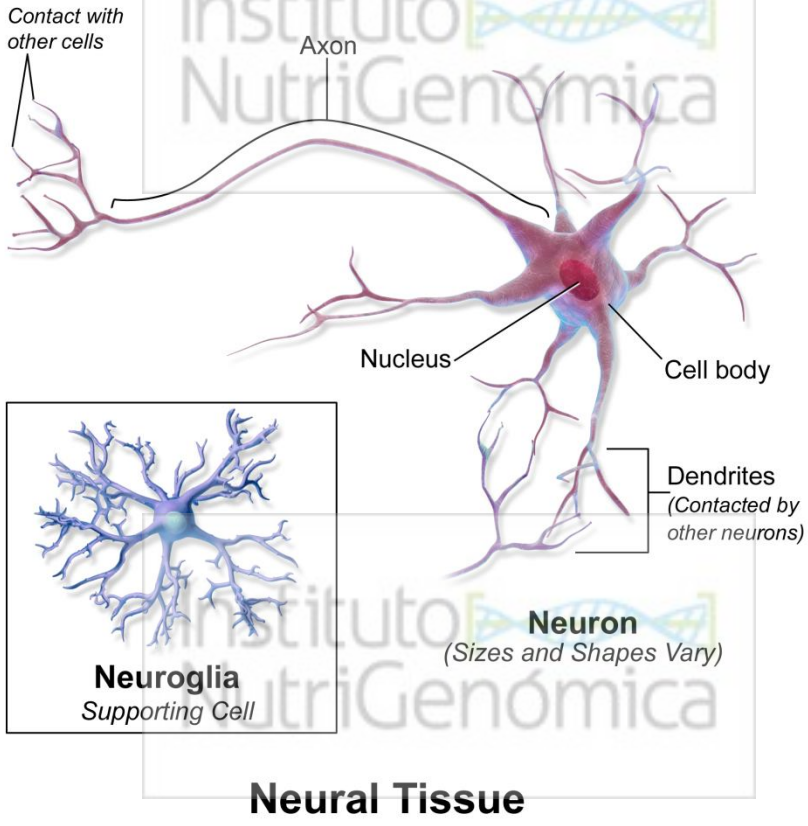
  - División funcional
    - **SOMÁTICO** (acciones voluntarias)
    - **AUTÓNOMO** (acciones involuntarias)
  - Histología
    - **NEURONA** (Recibir estímulos y conducir impulsos nerviosos)
    - **GLIA** (Soporte y protección de las neuronas)



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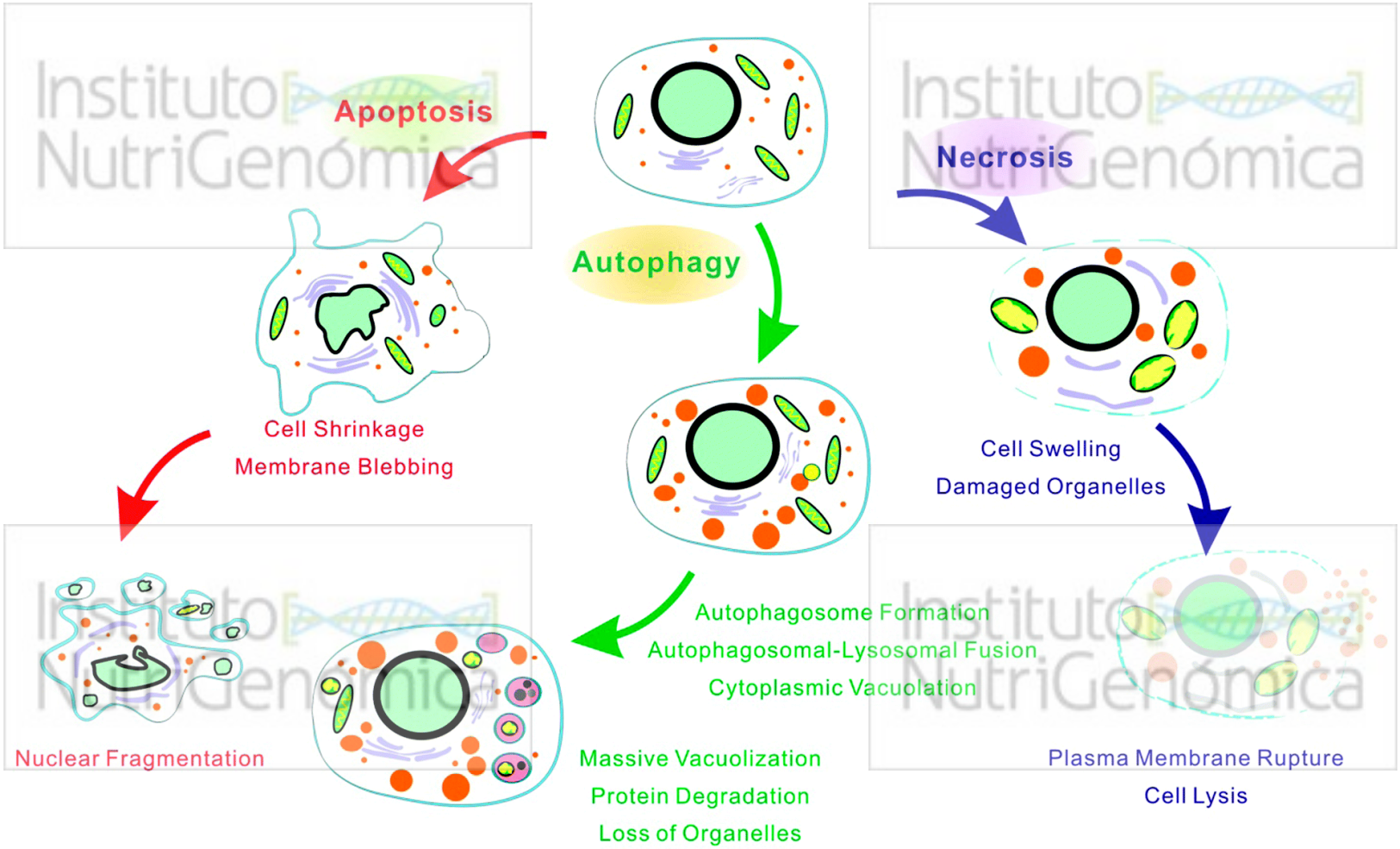

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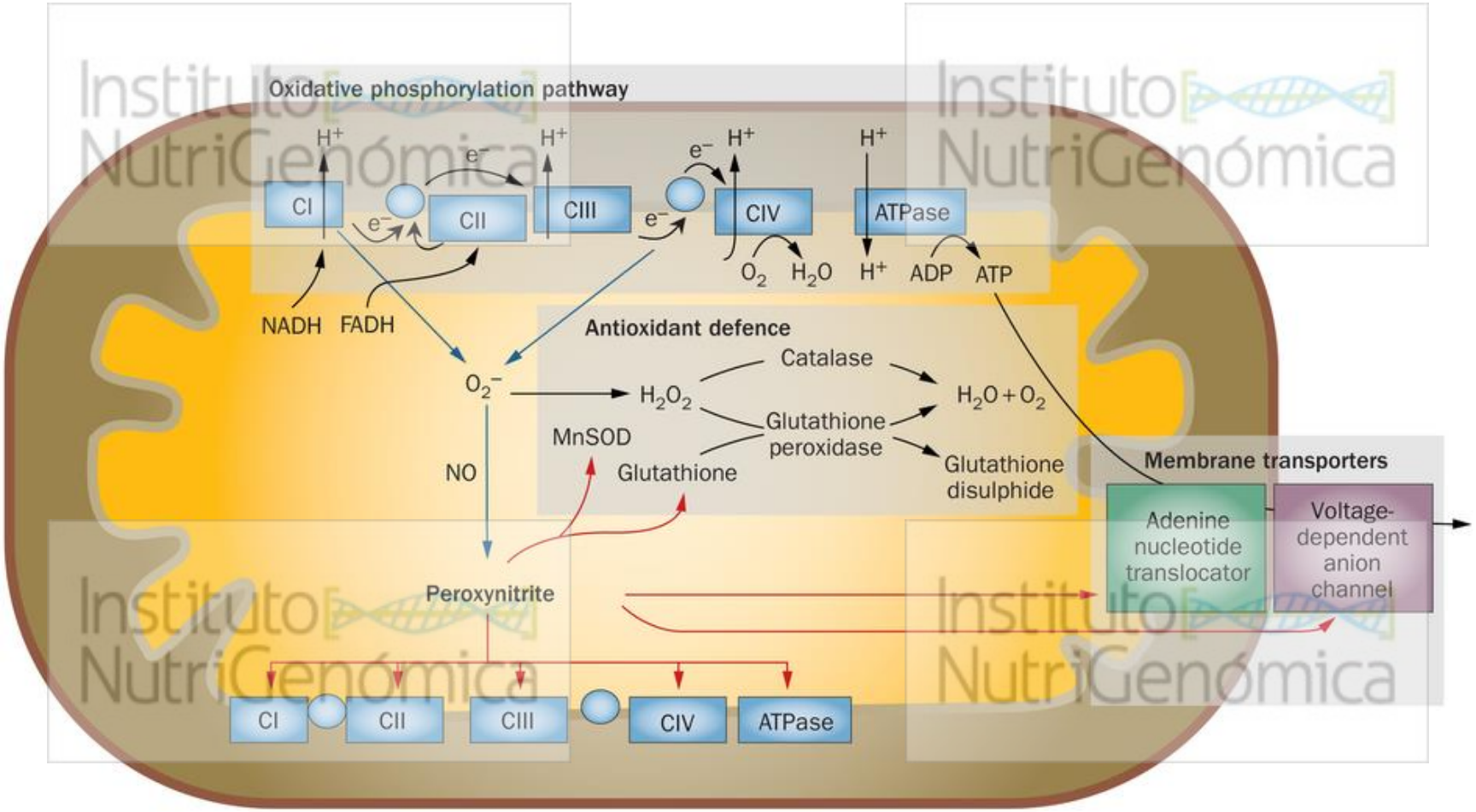

Nature Reviews Neurology 10, 326–336 (2014)

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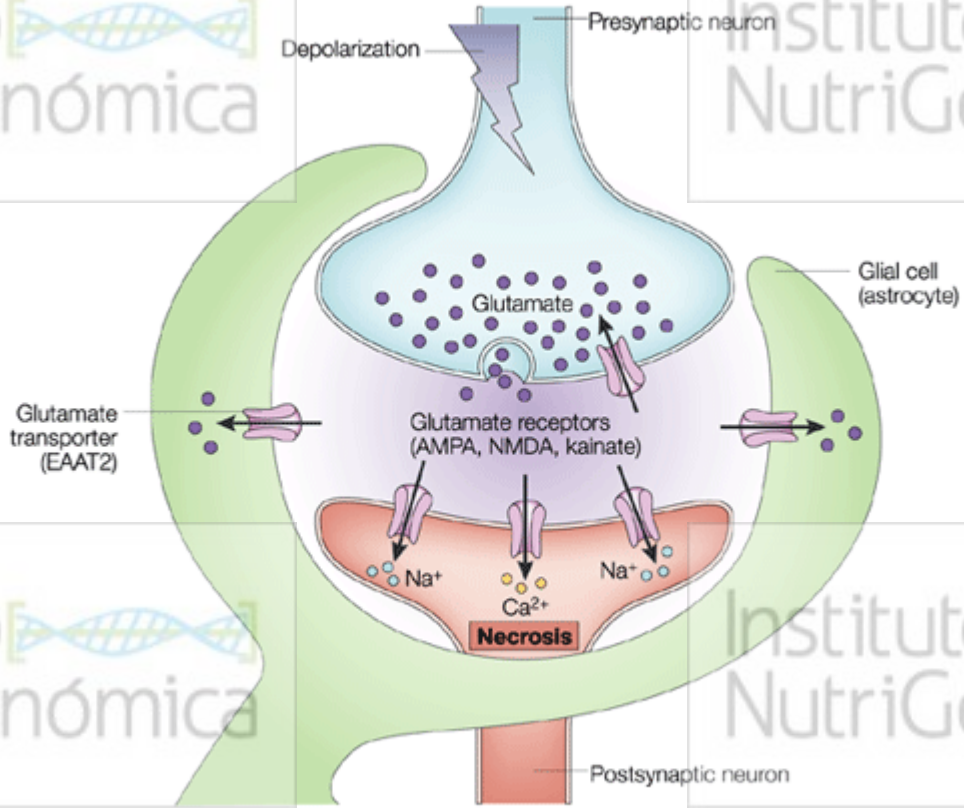

Nature Reviews | Neuroscience

Nature Reviews Neuroscience 4, 672-684 (August 2003)

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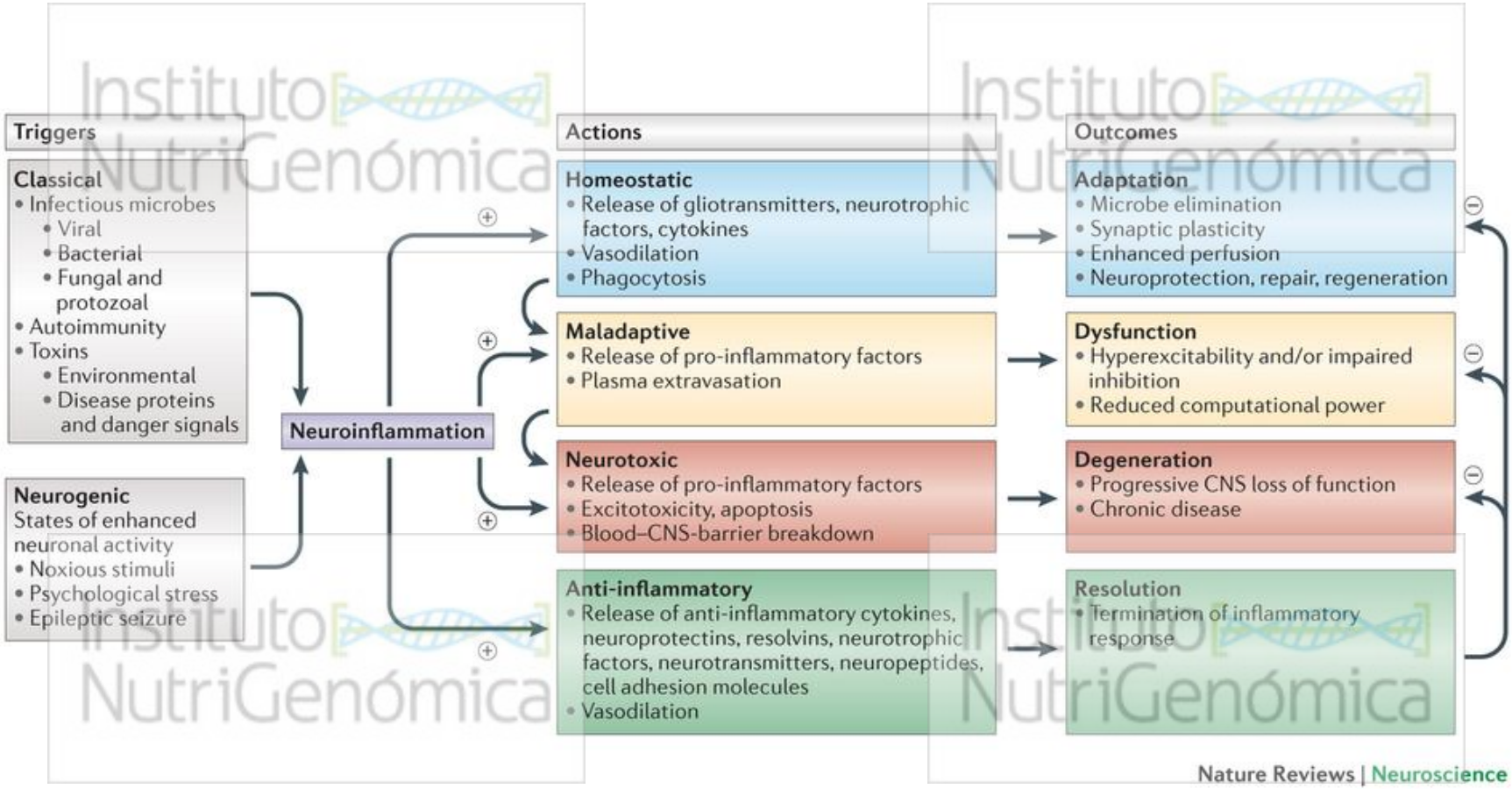

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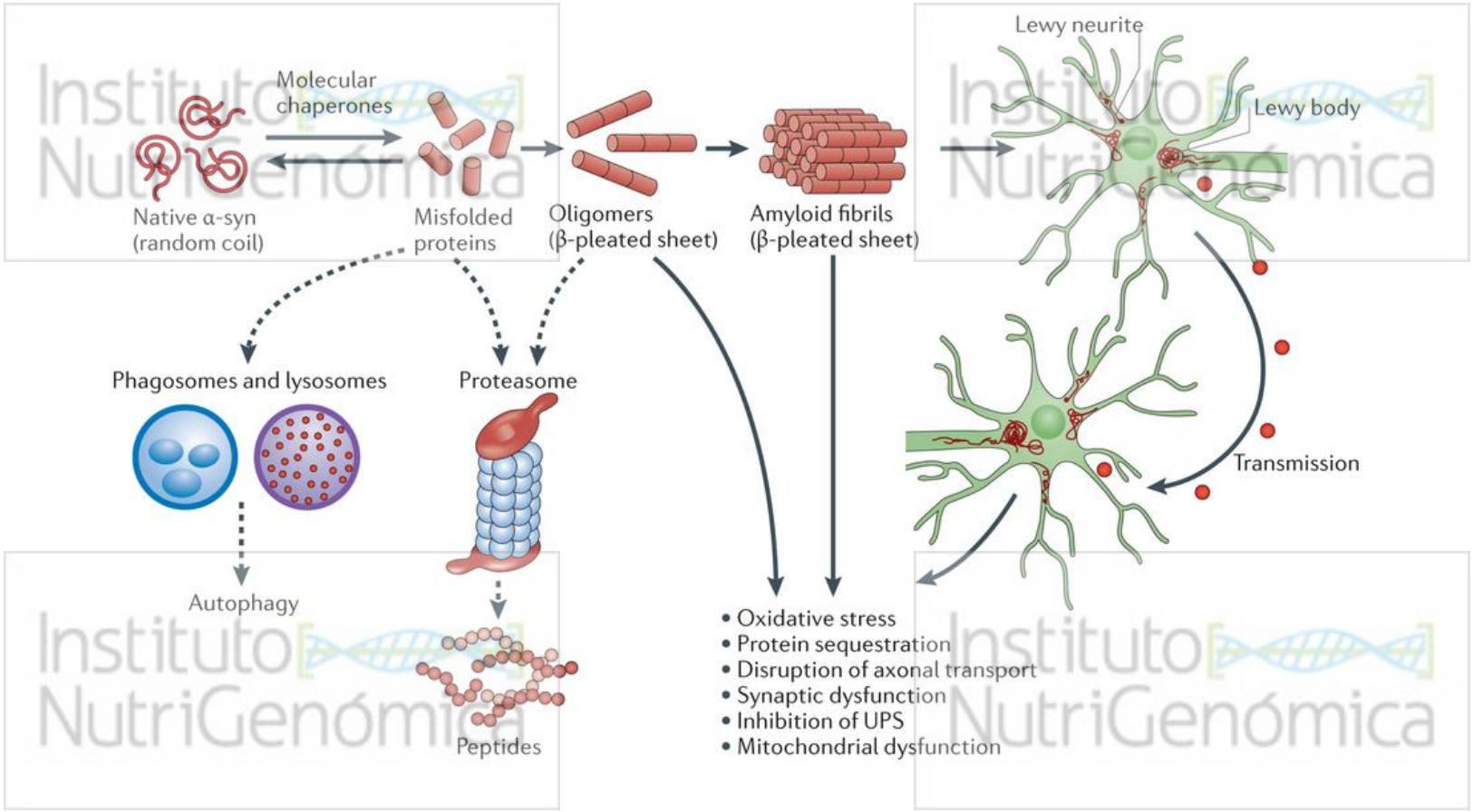

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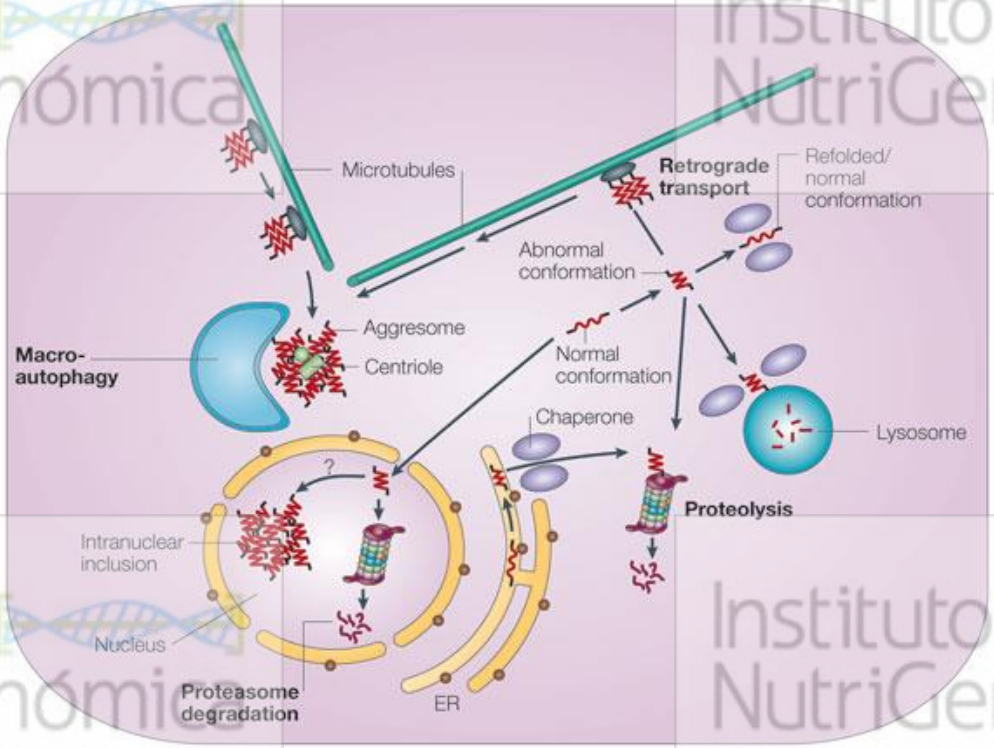

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3. Nutrigenómica y alzheimer

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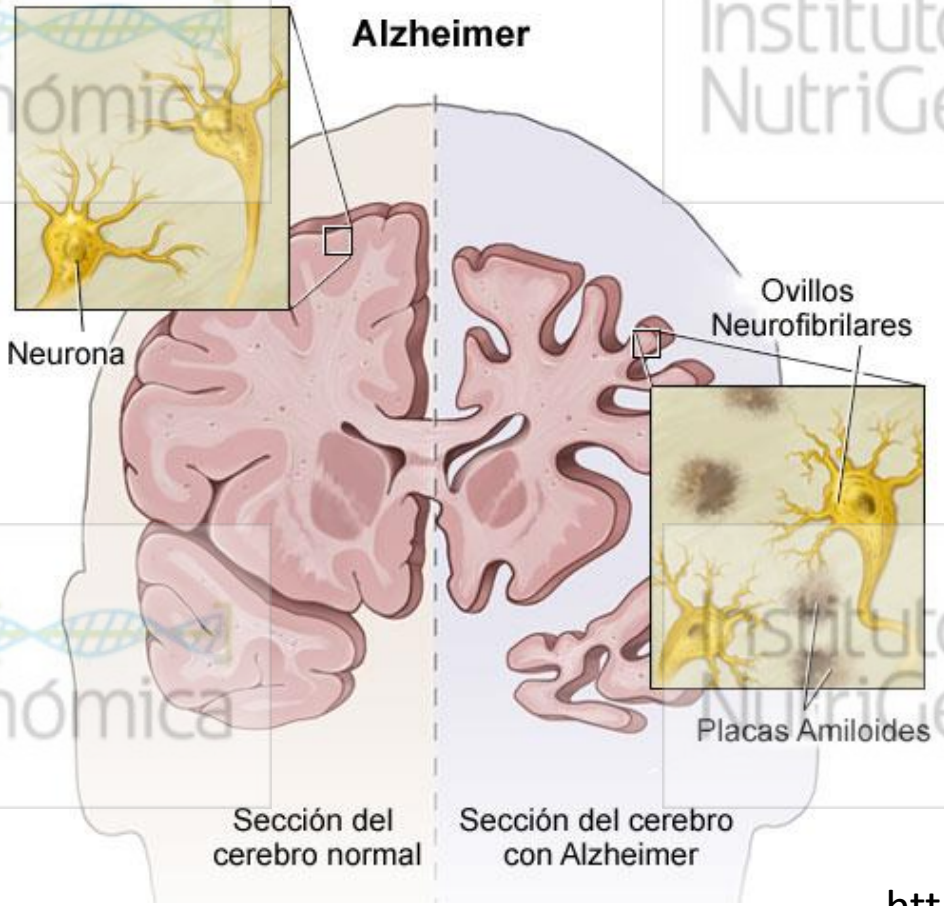

http://healthcare.utah.edu

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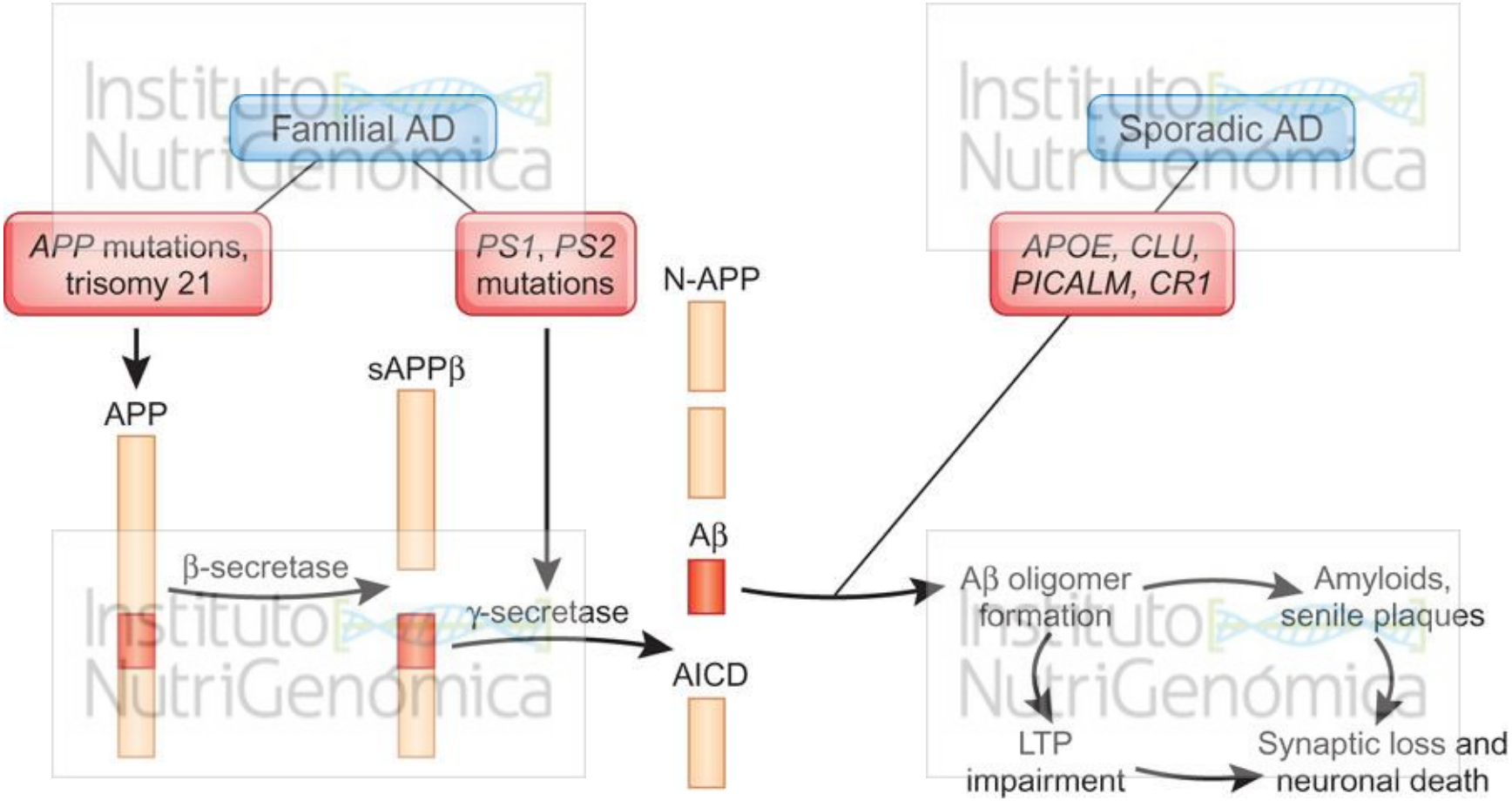


Nature Genetics 41, 1047 - 1048 (2009)

3. Nutrigenómica y alzheimer

Purpose in Life and Alzheimer's

A study suggests that having a greater purpose in life may help limit the harmful effects of changes in the brain associated with Alzheimer's disease.

Protective Plant Chemicals

Eating a rainbow of fruits and vegetables has the potential to keep your brain healthy and protect you from heart disease and cancer.

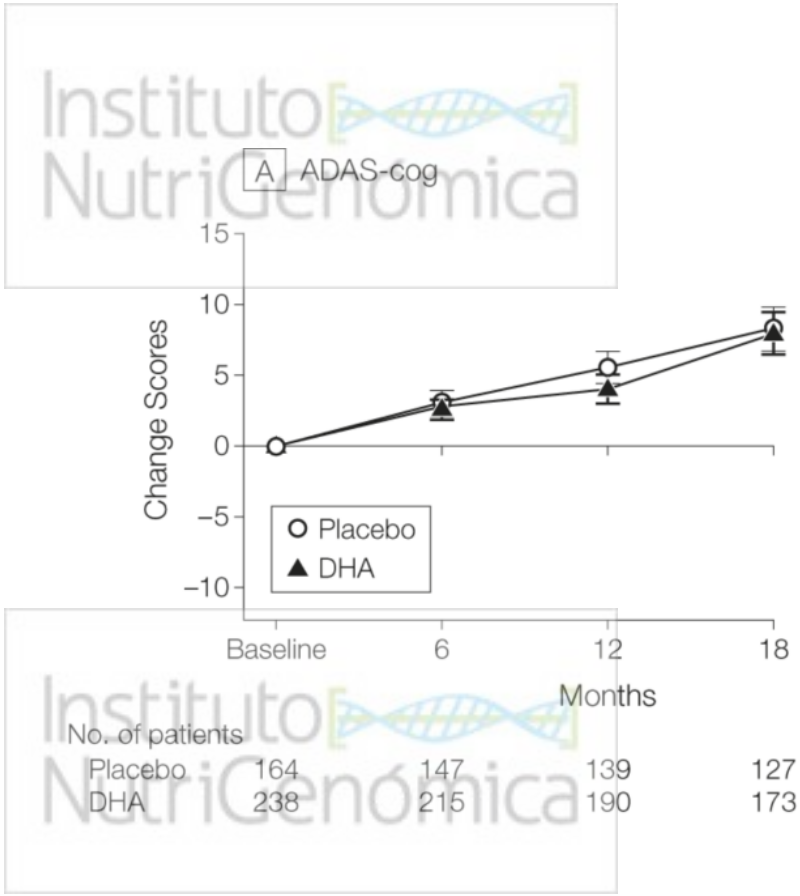
Make Your Diet Greener

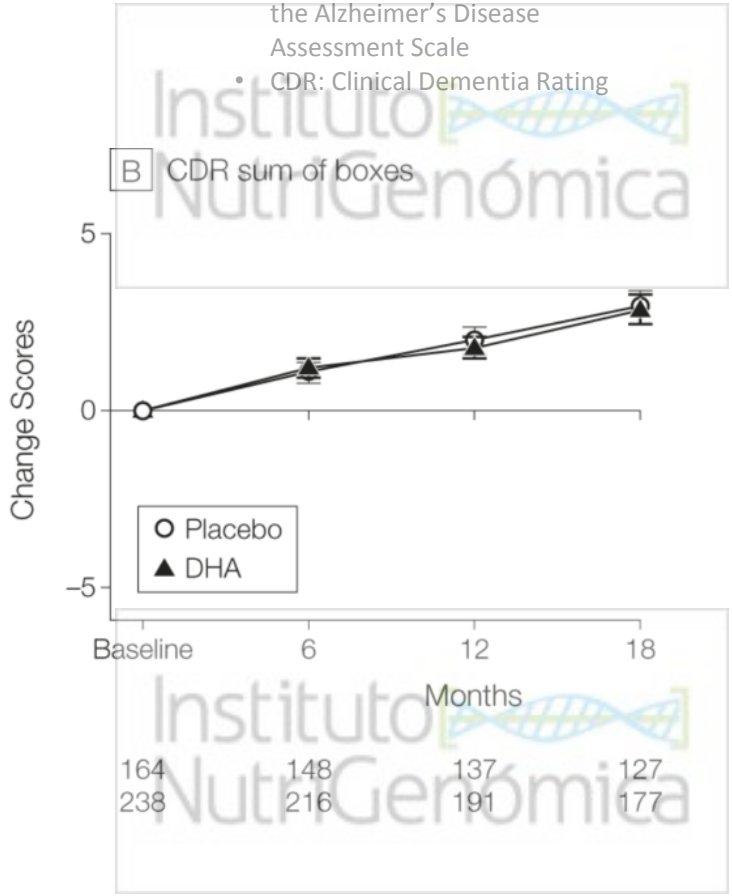
With so many options, it's easy to make leafy greens a more prominent part of your plate — from side dishes to entrees.

https://www.nia.nih.gov

3. Nutrigenómica y alzheimer

- ADAS-cog: cognitive subscale of the Alzheimer's Disease Assessment Scale
- CDR: Clinical Dementia Rating





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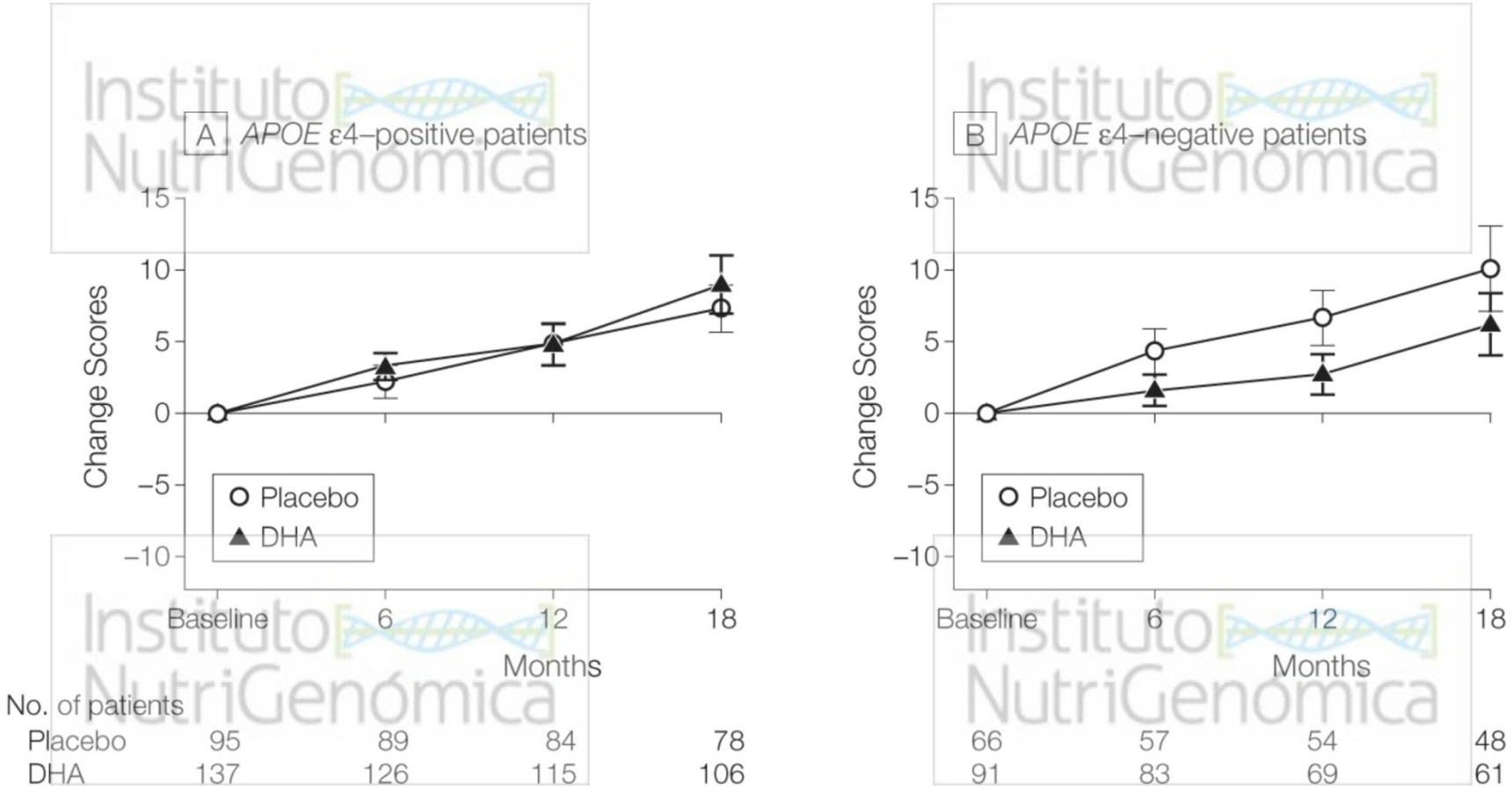
3. Nutrigenómica y alzheimer



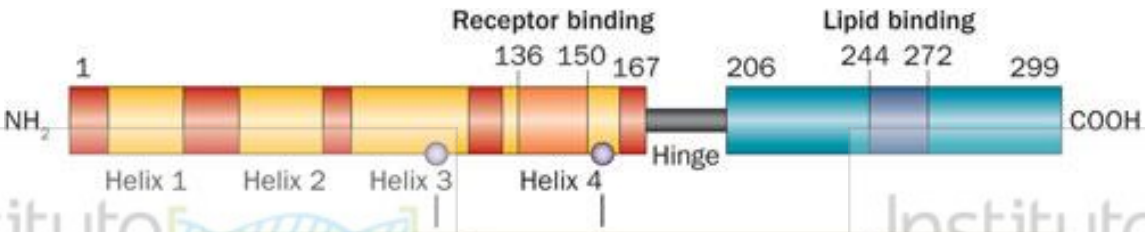
JAMA. 2010;304(17):1903-1911.

3. Nutrigenómica y alzheimer

DHA

caprylic triglyceride

statins



	Isoform-specific amino acid difference		Allele frequency (%)	
	112	158	General	AD
Apo-E2	Cys	Cys	8.4	3.9
Apo-E3	Cys	Arg	77.9	59.4
Apo-E4	Arg	Arg	13.7	36.7

Nature Reviews Neurology 9, 106-118 (February 2013)

4. Nutrigenómica y parkinson

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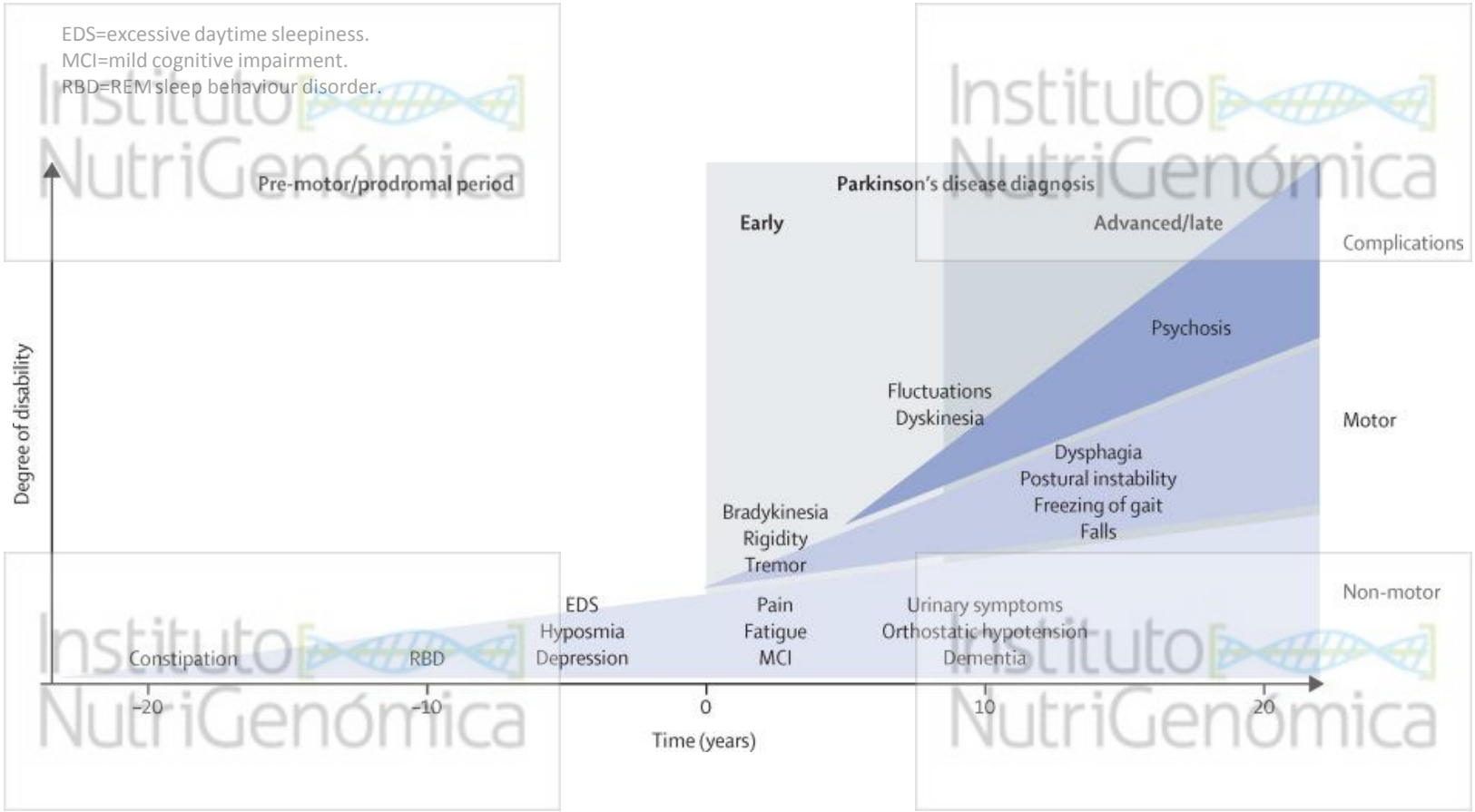

The Lancet, Vol. 386, No. 9996, p896–912, 29 August 2015

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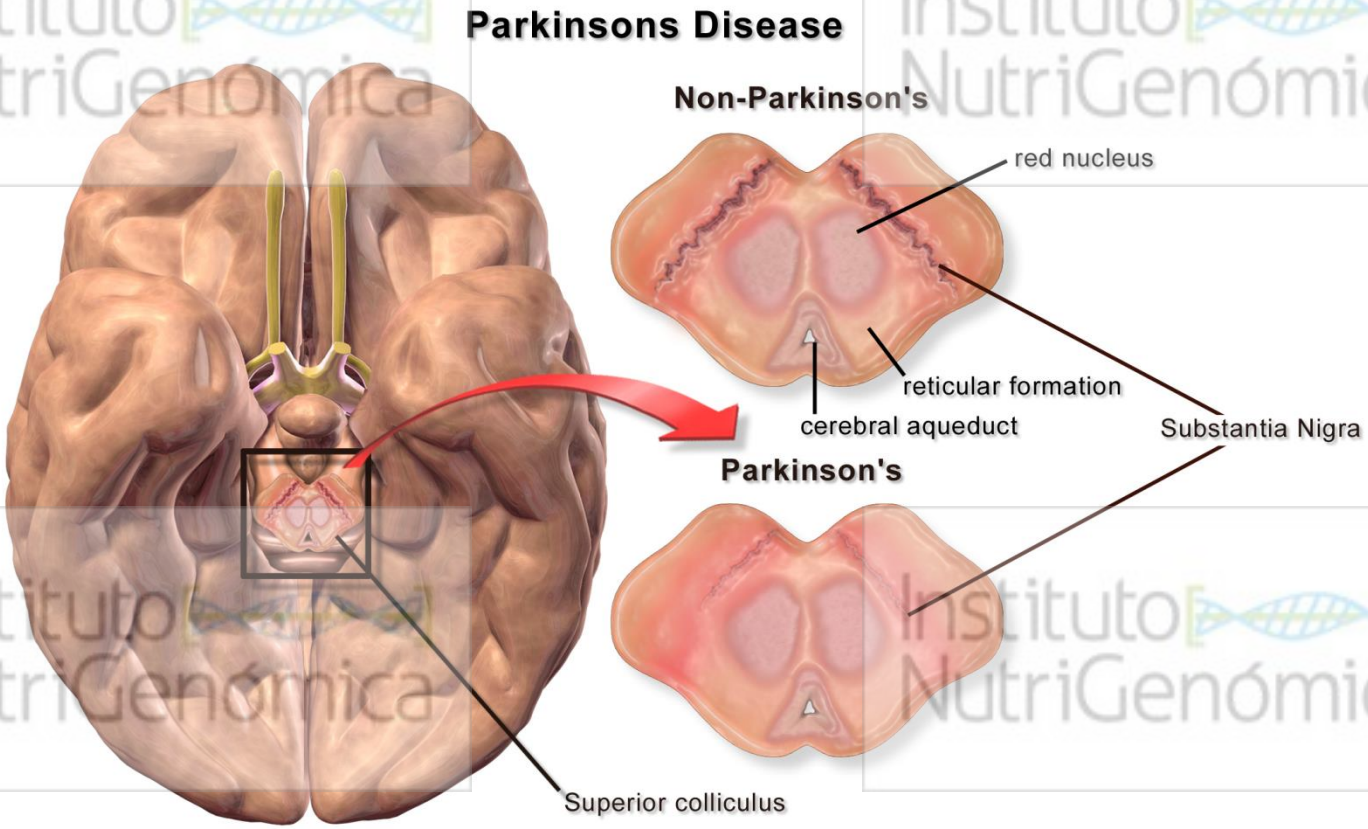

en.wikipedia.org

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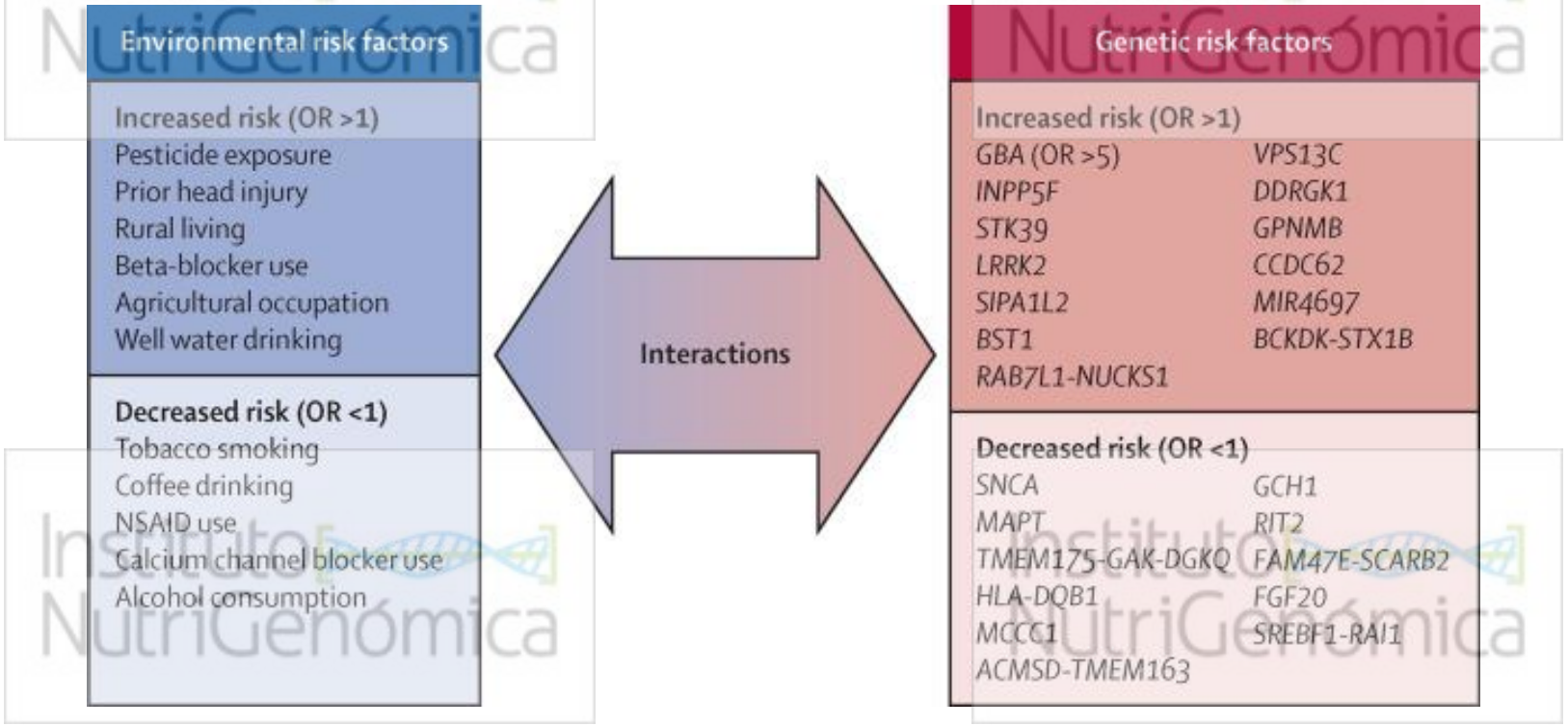

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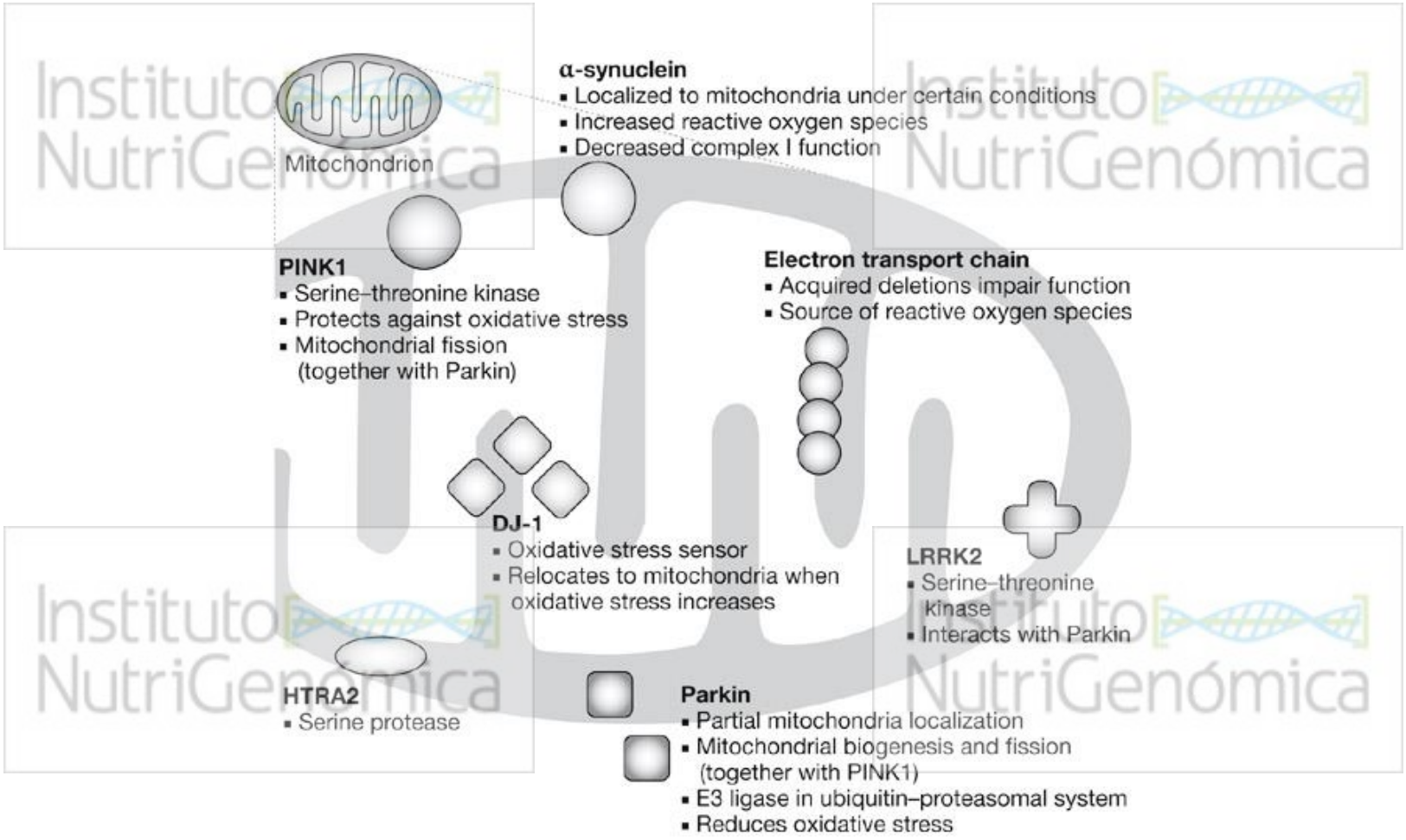

Nature Clinical Practice Neurology (2008) **4**, 600-609

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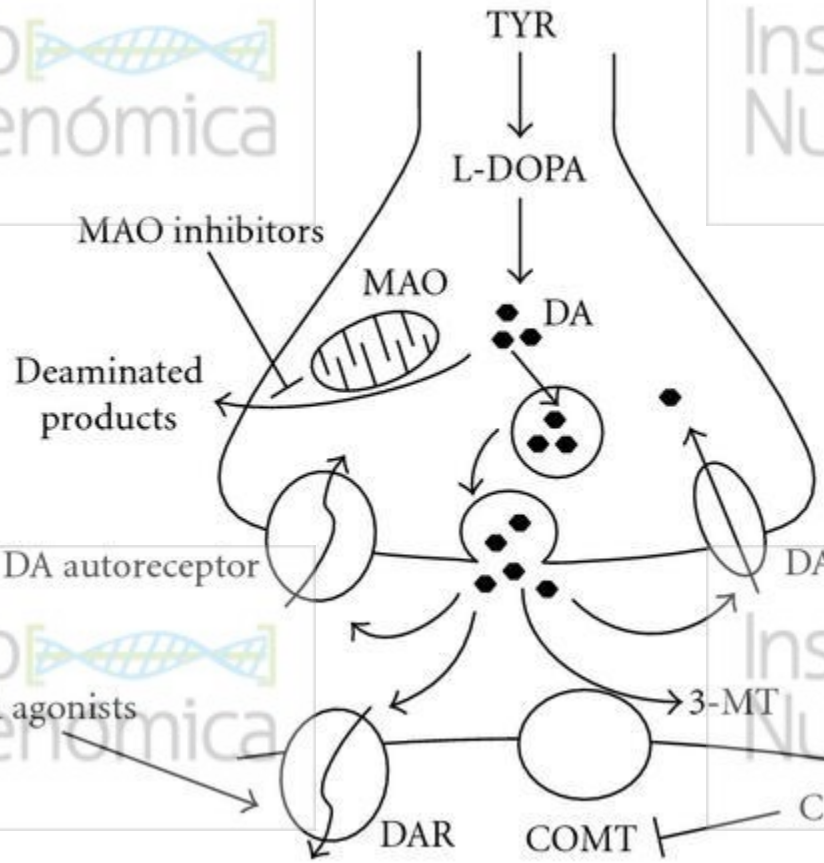

Hindawi, Vol. 2012 (2012)

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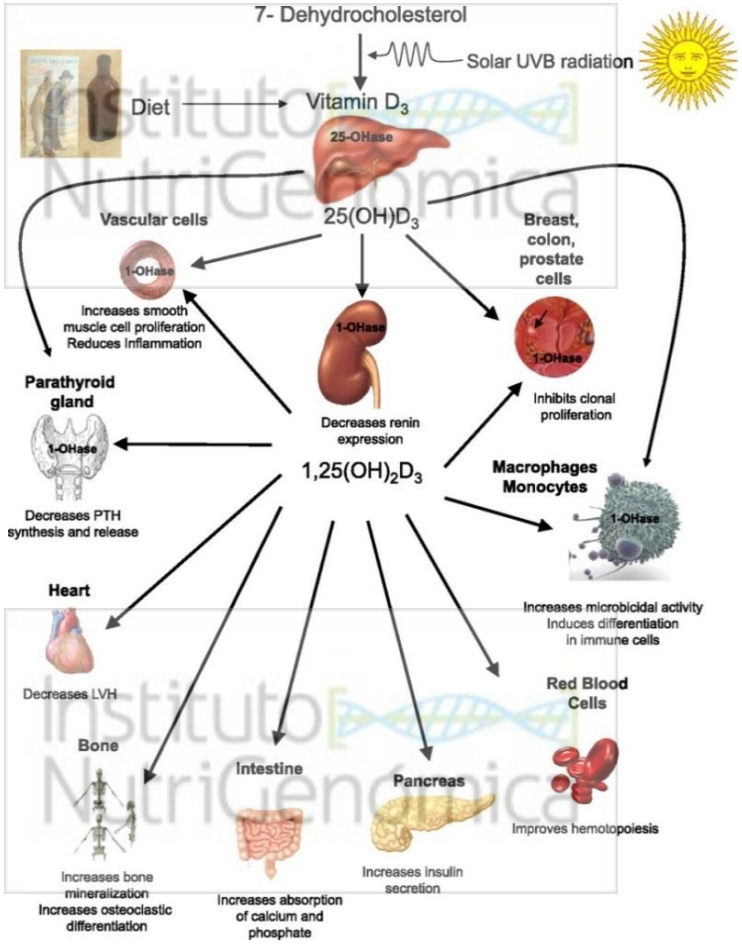

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Serum 25-hydroxyvitamin D concentrations in Mid-adulthood and **Parkinson**'s disease risk.
Shrestha S, Lutsey PL, Alonso A, Huang X, Mosley TH Jr, Chen H.
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DNA variants in CACNA1C modify **Parkinson** disease risk only when **vitamin D** level is deficient.
Wang L, Maldonado L, Beecham GW, Martin ER, Evatt ML, Ritchie JC, Haines JL, Zabetian CP, Payami H, Pericak-Vance MA, Vance JM, Scott WK.
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Nutrients. 2016 Mar 29;8(4):186. doi: 10.3390/nu8040186. Review.
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American Journal of Physiology - Renal Physiology Dec 2009, 297 (6) F1502-F1509

5. Nutrigenómica y esclerosis múltiple

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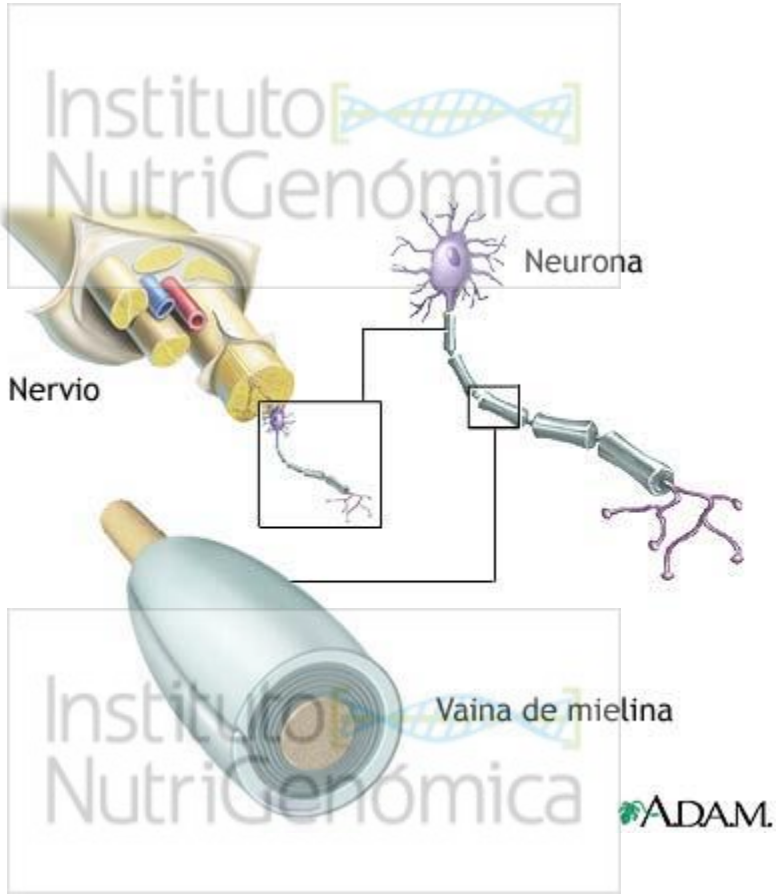

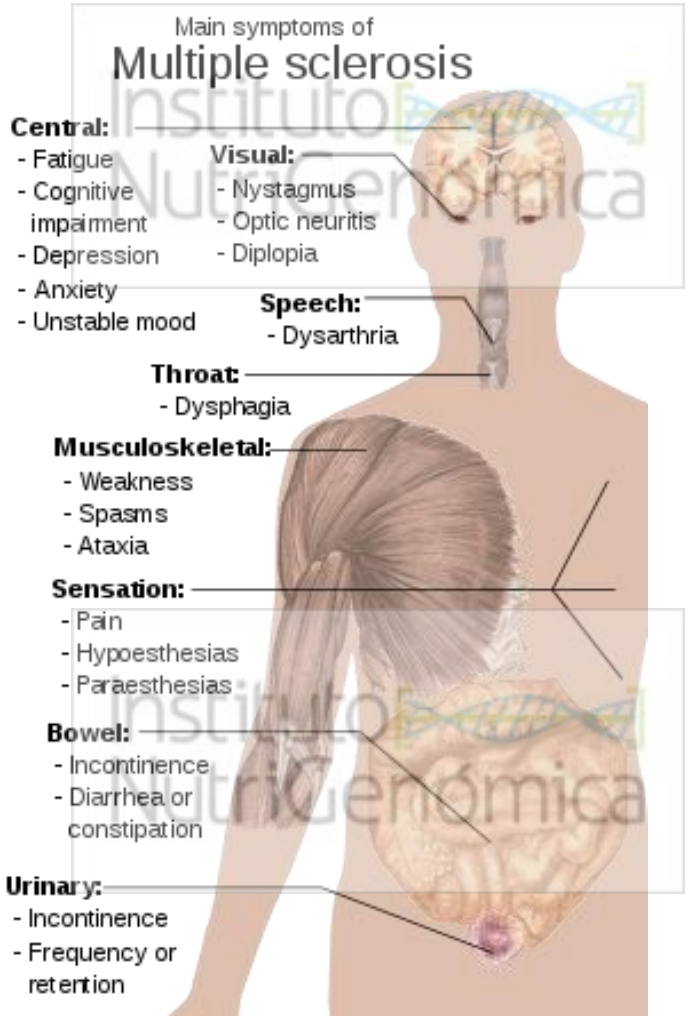

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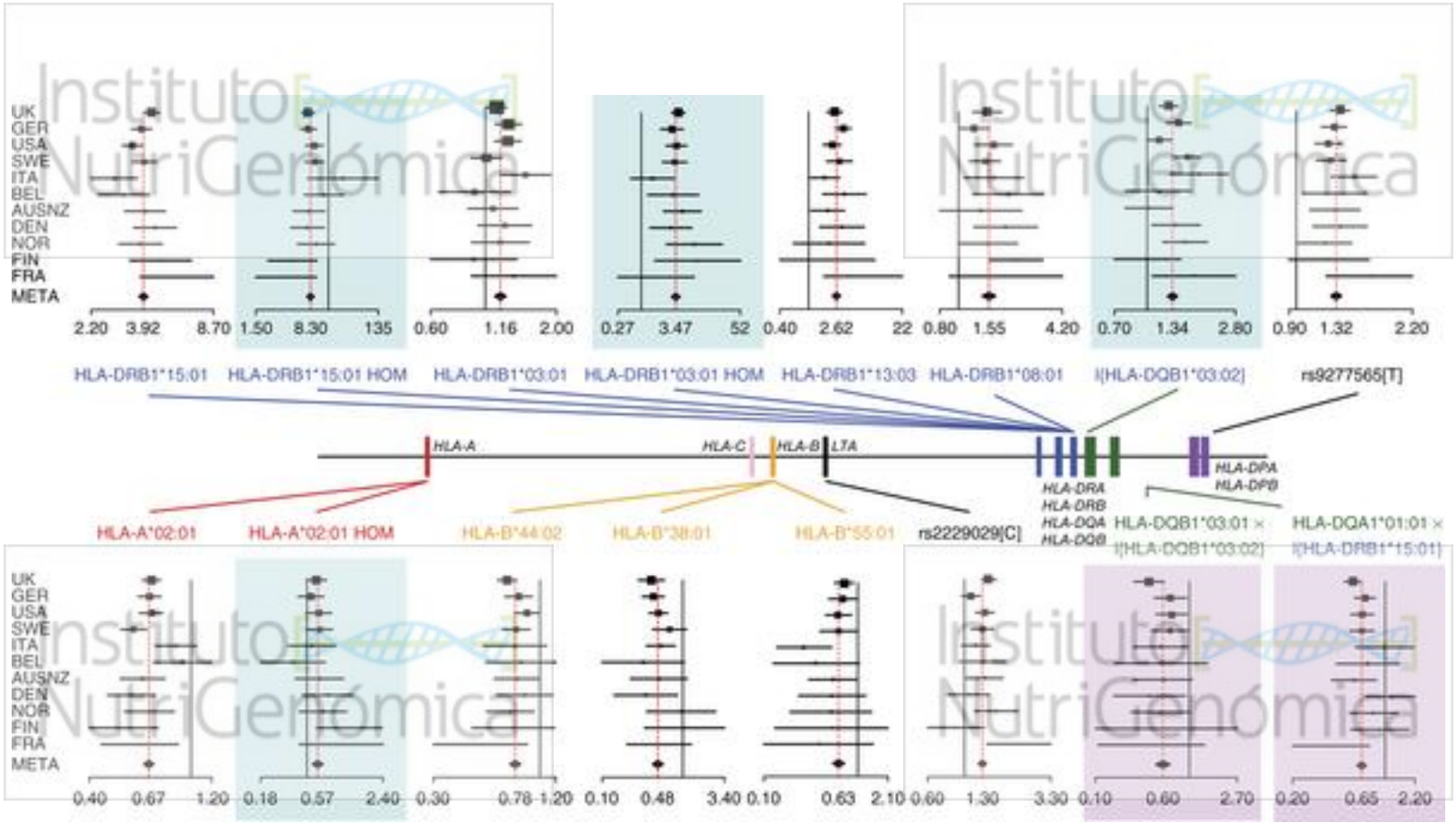

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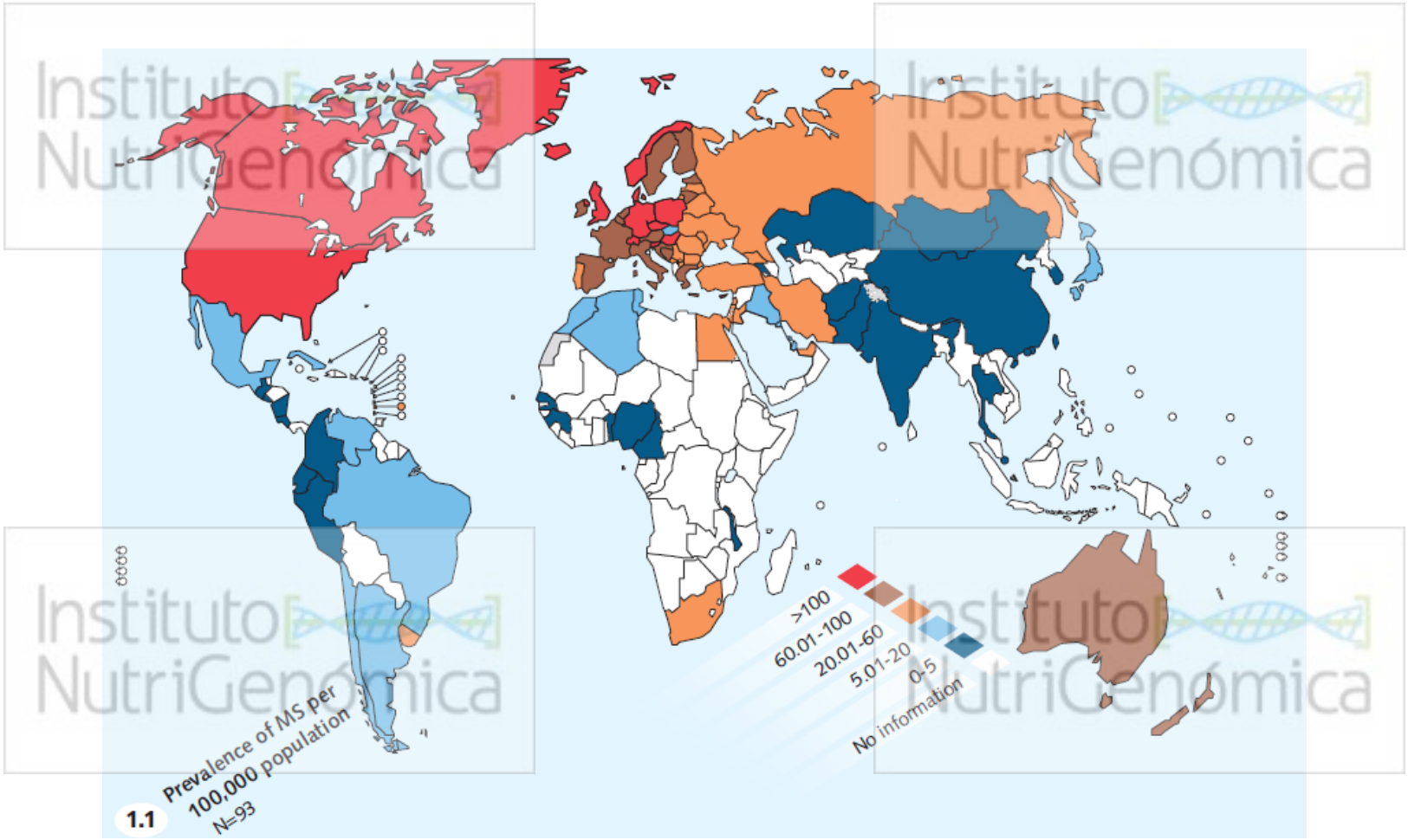

WHO Atlas: Multiple Sclerosis Resources in the World 2008

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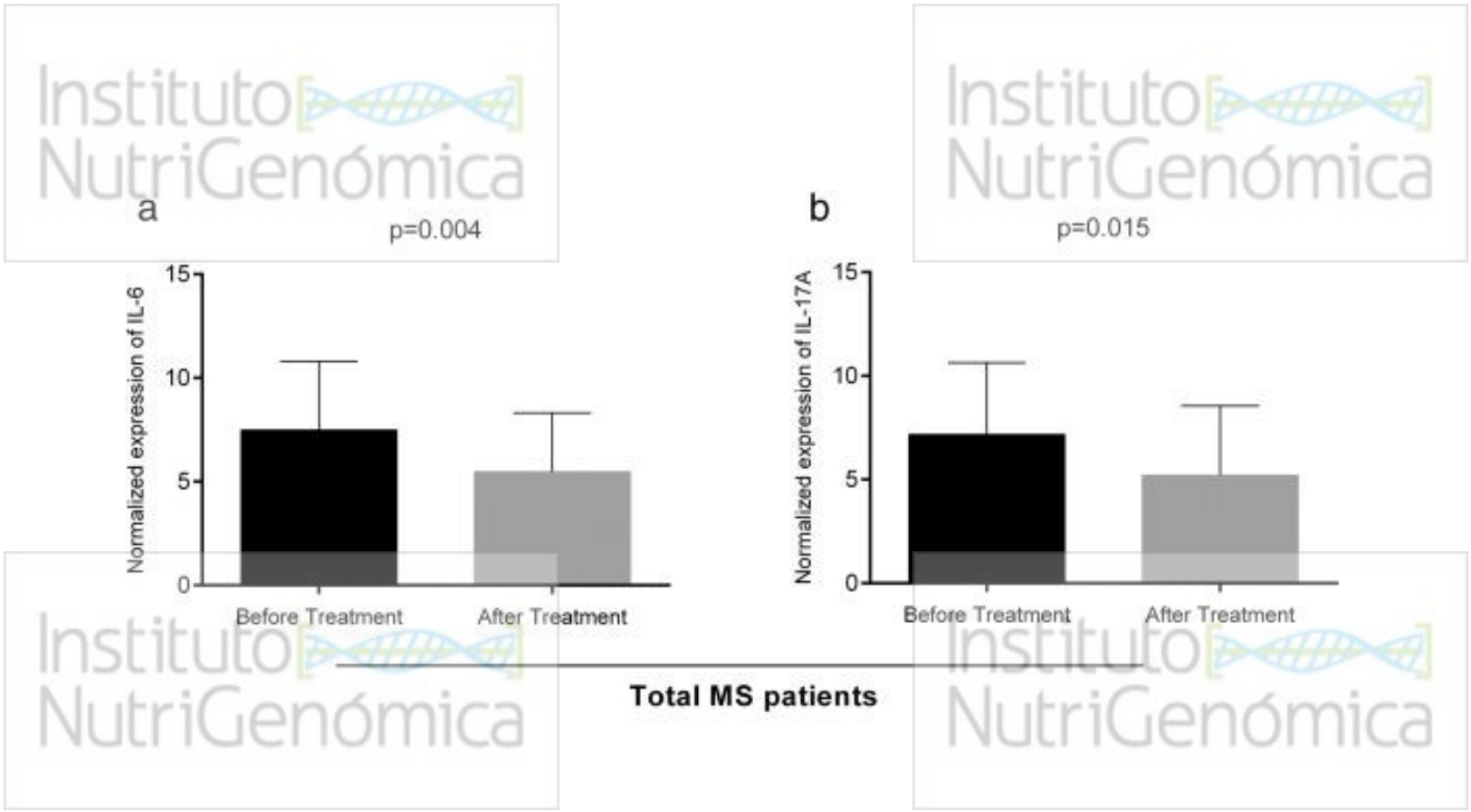

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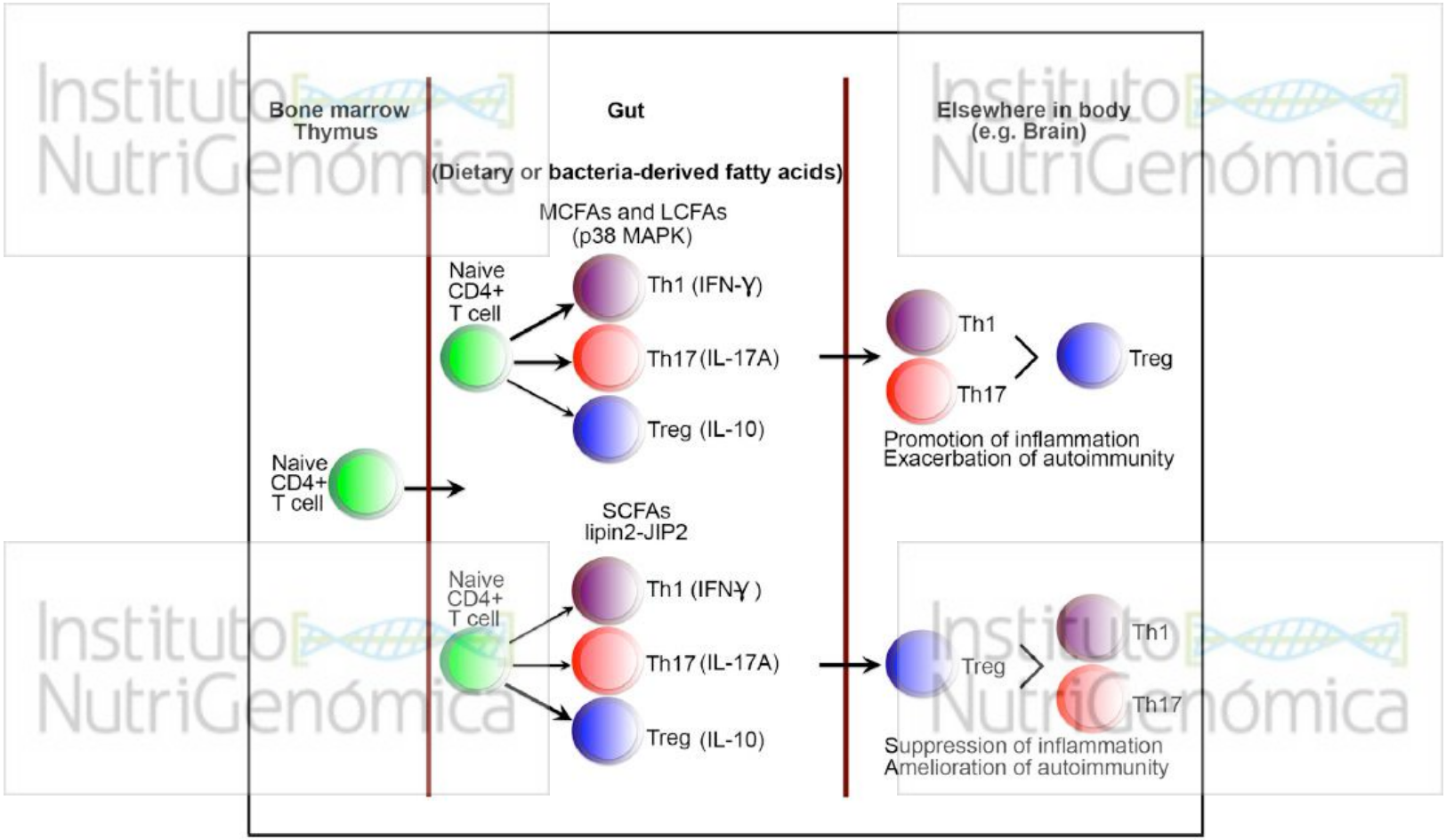

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