


Prevent brain ageing with personalised nutrigenomics

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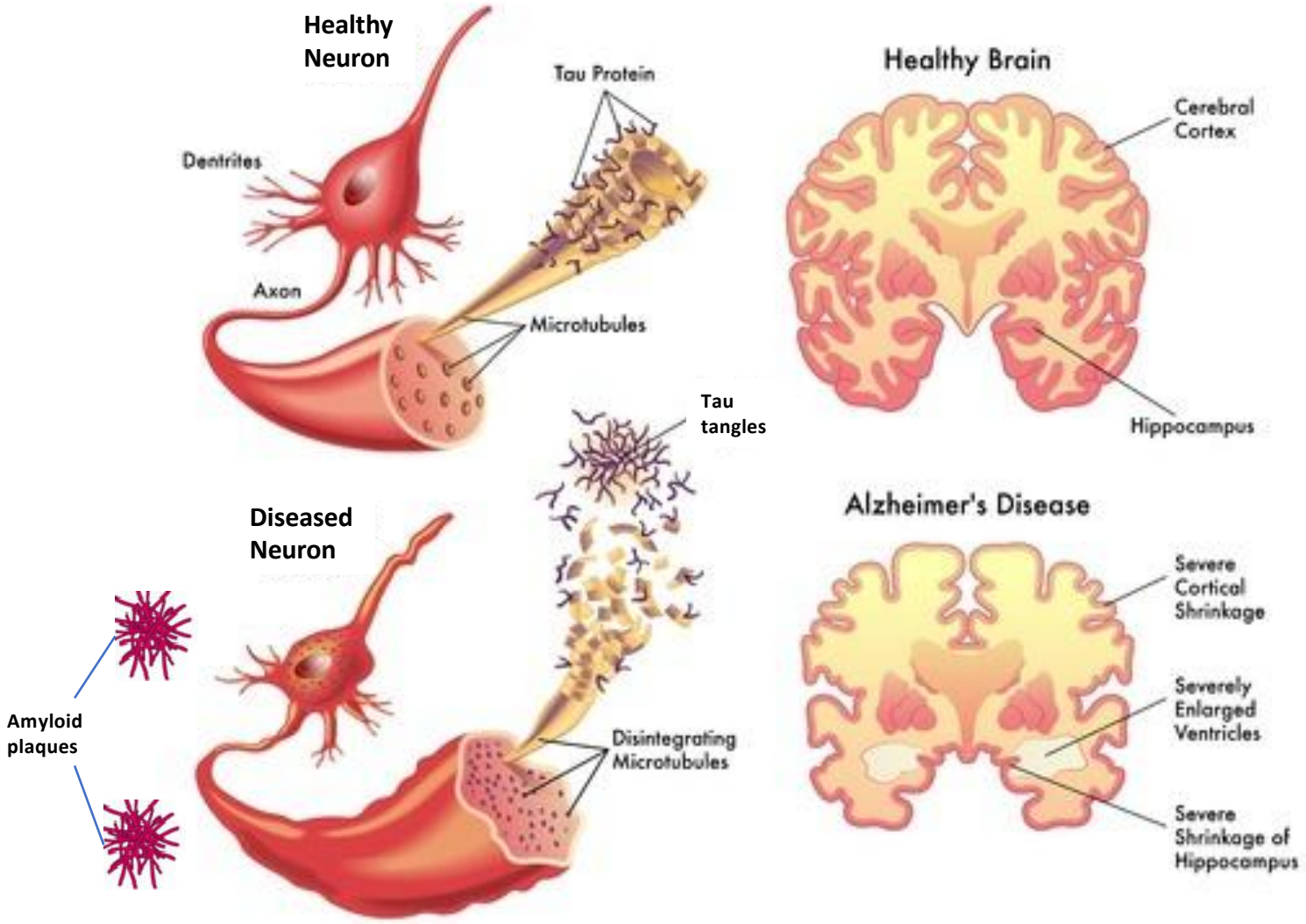
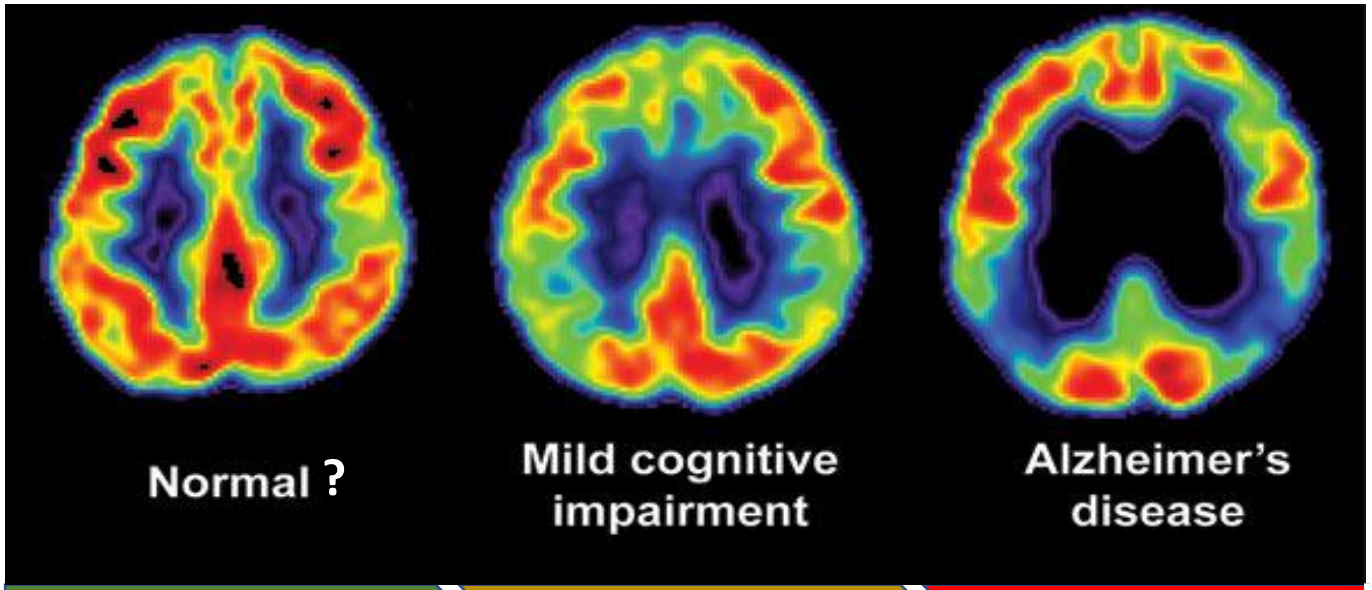
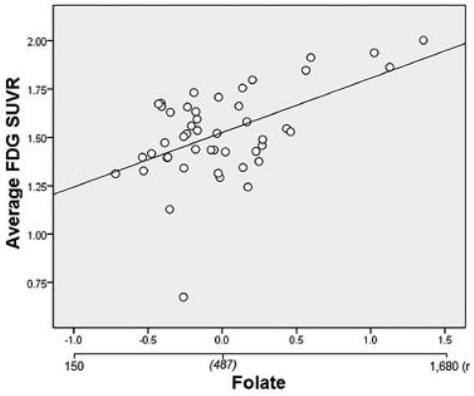


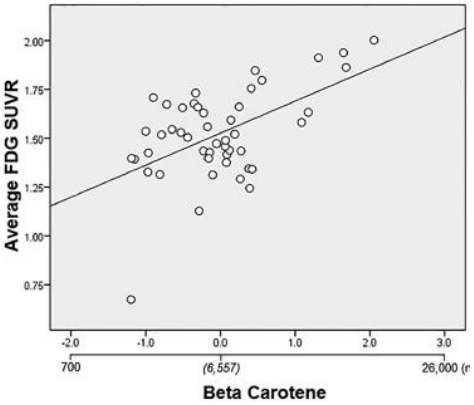
Alzheimer's Disease Progression, Courtesy of American Health Assistance Foundation

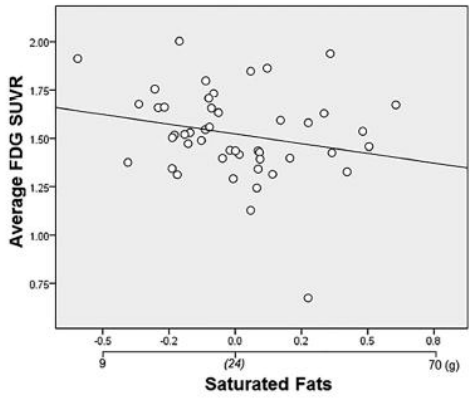


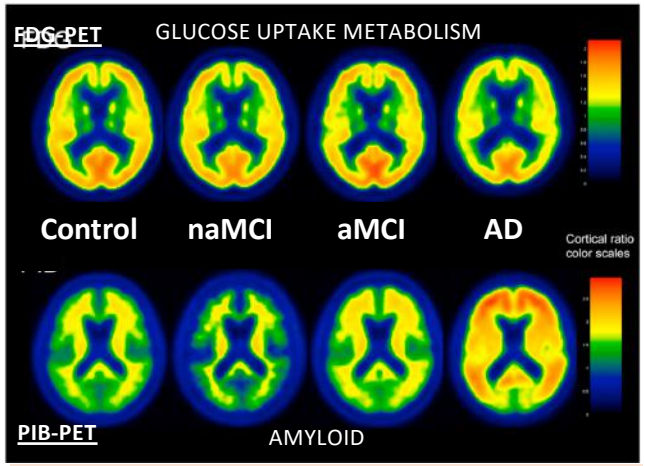
PRECLINICAL APPARENTLY NORMAL	MILD COGNITIVE IMPAIRMENT	ALZHEIMER'S
Silent phase: brain changes without obvious cognitive impairment Individual notices some symptoms but not detectable by tests	Cognitive changes are of concern to individual and family but impairment does not interfere with activities of daily living	Impairment in two or more cognitive functions. Cognitive impairment severe enough to cause inability to perform daily living tasks
OPPORTUNITY TO INTERVENE NUTRITIONALLY TO STALL OR REVERSE COGNITIVE IMPAIRMENT		TOO LATE IRREVERSIBLE

Nutrient intake and brain biomarkers of Alzheimer's disease in at-risk cognitively normal individuals: Cross-sectional neuroimaging pilot study



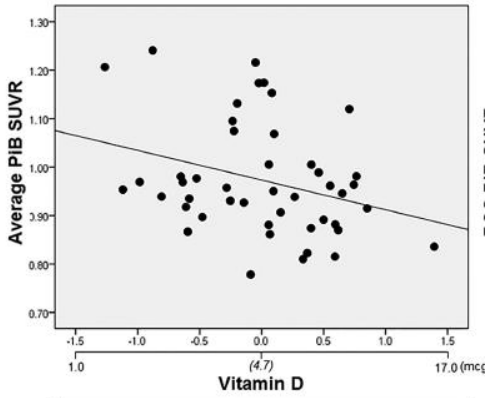


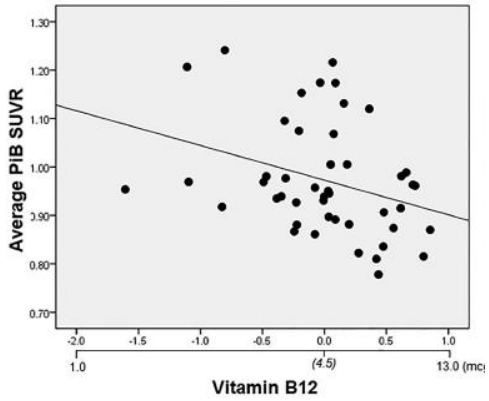


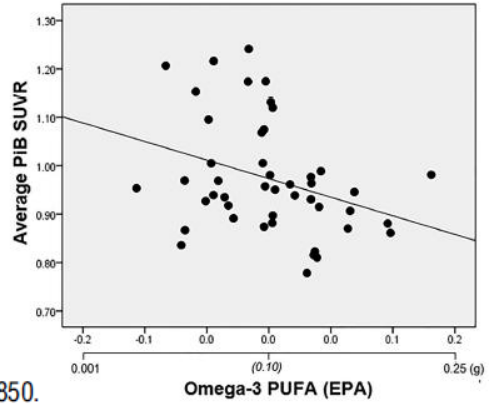


Higher dietary intake of folate and β-carotene associated with more brain glucose use (FDG SUVR)

Higher dietary intake of vit D, vit B12 and EPA associated with less brain amyloid



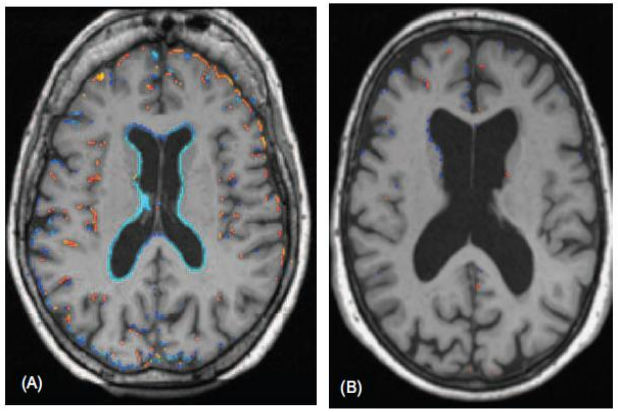




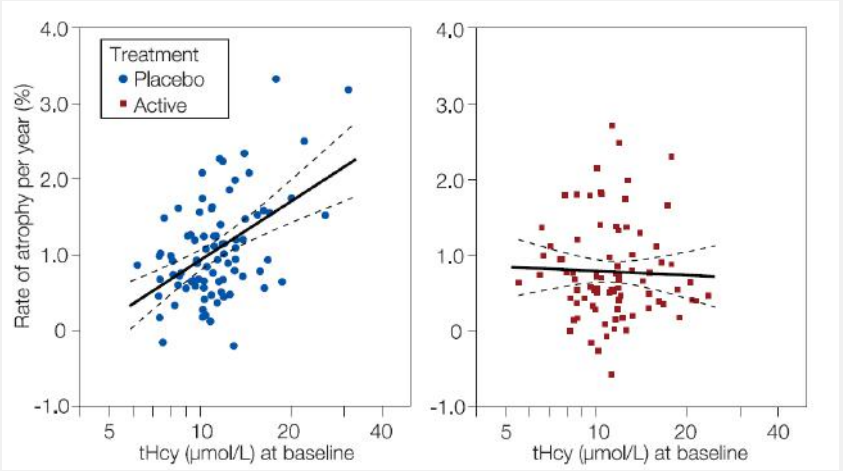
Mosconi L, Murray J, Davies M, *et al. BMJ Open* 2014;4:e004850.

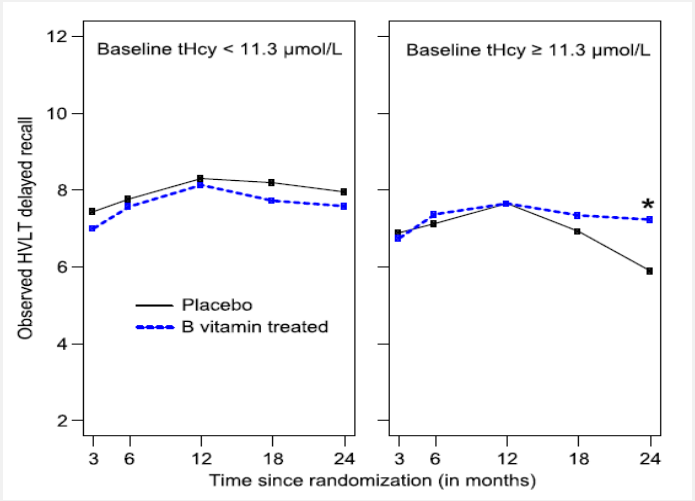
HOMOCYSTEINE LOWERING BY B VITAMINS SLOWS BRAIN ATROPHY AND COGNITIVE DECLINE IN MILD COGNITIVE IMPAIRMENT

VITACOG
PLACEBO-CONTROLLED TRIAL 2y
FOLIC ACID [0.8 mg/d], B12 [0.5 mg/d]
B6 [20mg/d]
Amnestic or non-amnestic MCI, >70y



PLACEBO ACTIVE



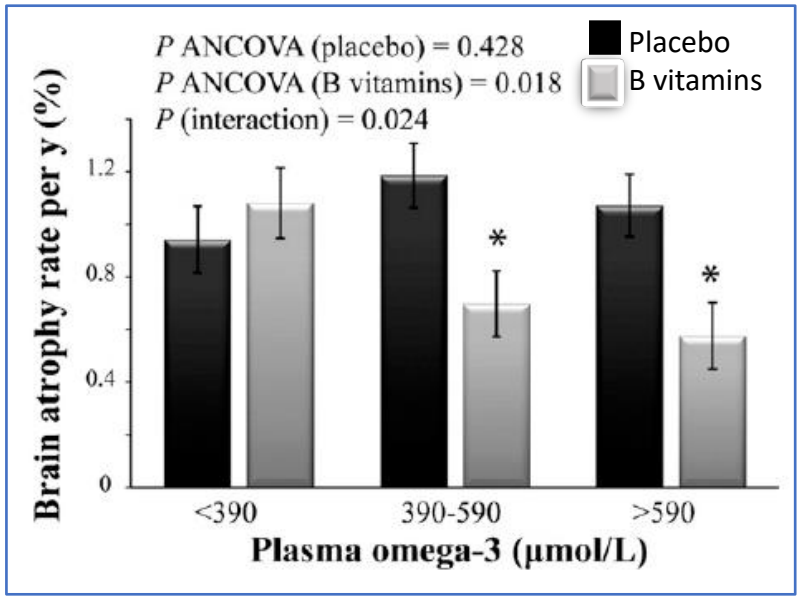


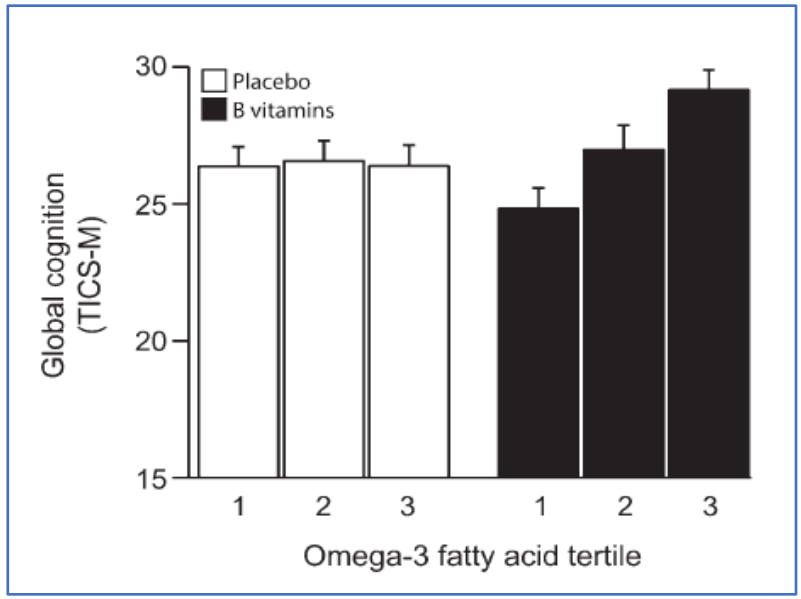
Key points

- B vits for 2 years slows cognitive decline and brain atrophy in MCI
- These benefits are mainly found in those with plasma homocysteine >11umol/L
- Effects mainly attributable to B12

Smith AD et al 2010 Plos One,
deJager CA et al Int J Ger Psych 2012, Douaud et al PNAS 2013

EFFECT OF COMBINED B6, B9, B12 SUPPLEMENTATION ON PREVENTION OF BRAIN ATROPHY AND COGNITIVE FUNCTION IN CASES OF MILD COGNITIVE IMPAIRMENT DEPENDS ON OMEGA-3 STATUS

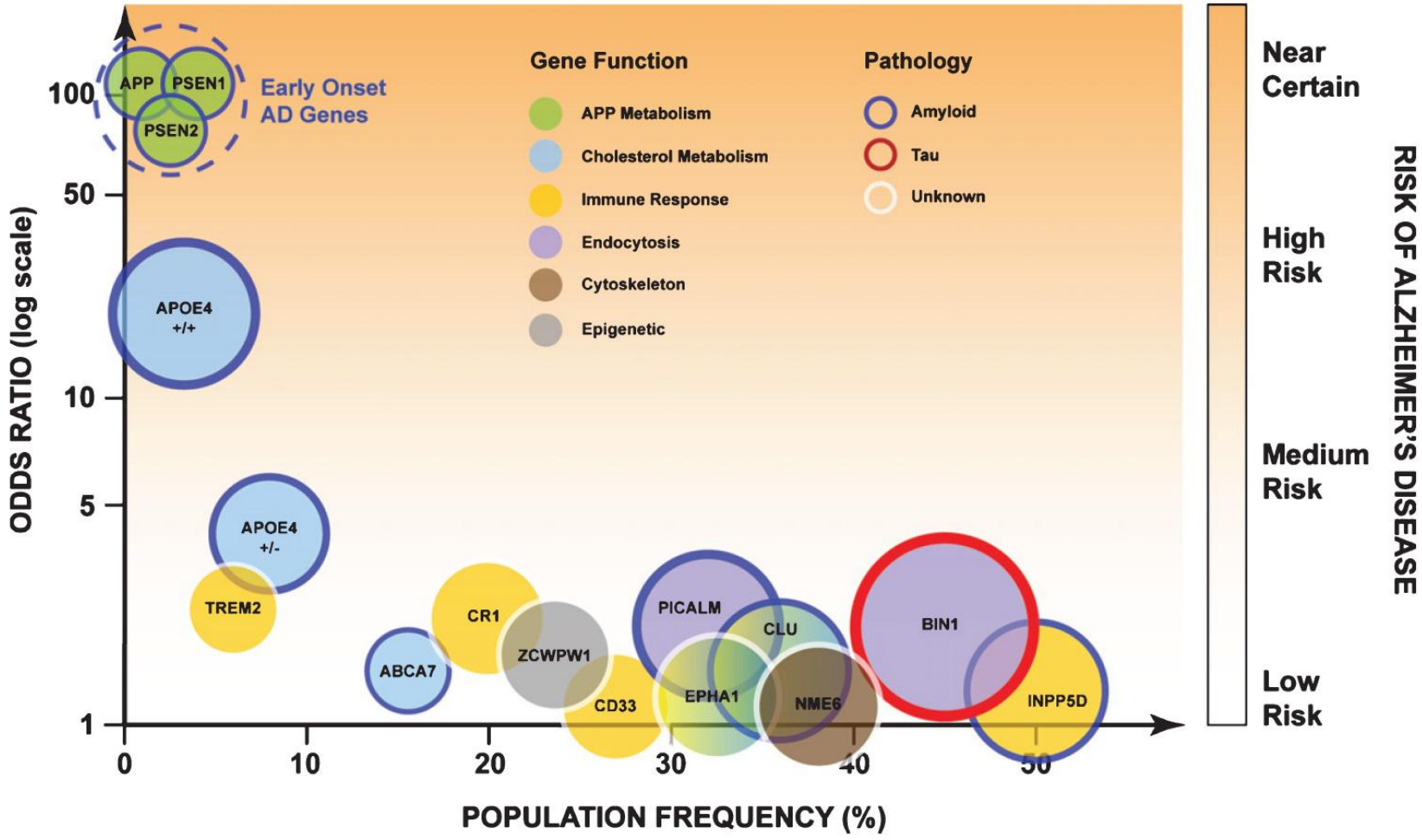




It is important to identify susceptible sub-groups when designing clinical trials. Only those with plasma Homocysteine >11µmol/L and/or plasma Omega-3 fatty acids >390µmol/L benefited from B6+B9+B12 supplementation

Jerneren et al Am J Clin Nutr 2015, 102:215-221 Oulhaj A et al J Alz Dis 2016, 50:547-557

ALZHEIMER'S RISK GENES



M. Robinson et al. / Recent Progress in Alzheimer Disease Research Journal of Alzheimer's Disease 57 (2017) 317–330

Vitamin B-12, apolipoprotein E genotype, and cognitive performance in community-living older adults: evidence of a gene-micronutrient interaction[1–3]

MMSE and B-12 X APOEε4 interaction

Association between natural log-transformed vitamin B-12, *APOE* ε4, interaction between natural log-transformed vitamin B-12 and *APOE* ε4, and Mini-Mental State Examination total scores in linear mixed-effects models

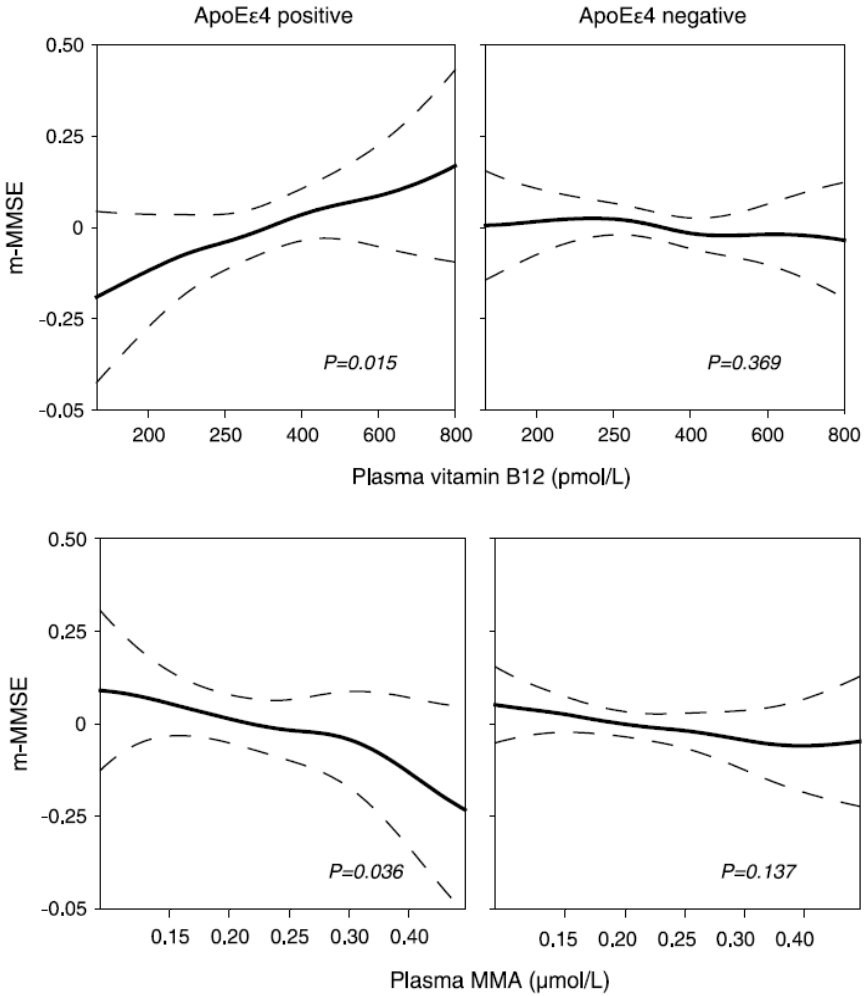
Variable	Coefficient	SE	*P*
Full sample ($n = 539$)			
Vitamin B-12	1.07	0.35	0.003
APOE ε4	−5.37	2.33	0.022
Vitamin B-12 × *APOE* ε4	0.95	0.39	0.016
Subsample ($n = 416$)[1]			
Vitamin B-12	0.67	0.31	0.035
APOE ε4	−3.81	2.08	0.068
Vitamin B-12 × *APOE* ε4	0.66	0.35	0.061

Significant
B-12 X APOε4 interactions
Were also observed for
Digit span and RAVLT
neuropsych tests

Better performance in MMSE, Digit span and RAVLT tests was associated with vitamin B-12 in APOE e4 carriers but not in APOE e4 non-carriers.

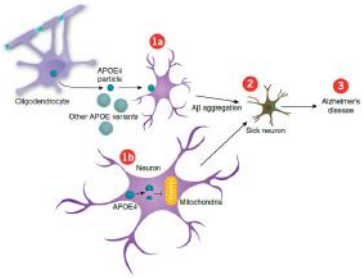
Tze-Pin Ng et al *Am J Clin Nutr* 2009;89:1263–8.

B12 STATUS X APOE GENOTYPE
INTERACTION AND COGNITIVE FUNCTION



Population-based study of 1935 participants, aged 71 to 74 years
Vogiatzoglou et al 2013 Psychosomatic Med Vol 75

Evidence for APOEε4 x Vit B-12 interaction on cognitive function is increasing supporting the hypothesis that intervention with B-12 may prove to more beneficial in APOEε4 carriers



TAKE HOME MESSAGES

- Brain ageing starts to accelerate from age 30 onwards
- Adopt a diet rich in carotenoids, folate, vitamin D, vitamin B12 and omega-3 fatty acids (i.e. fruit, veg, fish)
- Eat oily fish which are rich in vitamin B12, vitamin D and omega-3 fatty acids
- Your risk for Alzheimer's disease is much higher if you are a carrier of the ancestral APOE ε4 mutation
- APOE ε4 mutation carriers may be more susceptible to the brain ageing effects of vitamin B12 deficiency.
- APOE ε4 carriers also benefit more from aerobic exercise with regards to cognitive function.
- In the near future an "avatar" for each person may be available to optimise lifestyle therapy to prevent dementia.
- See your doctor and improve your diet and life-style as soon as you start to experience cognitive impairment