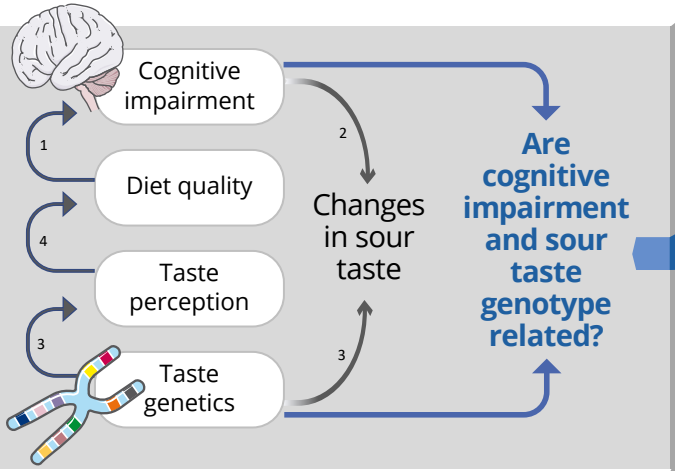
Sour Taste SNP *KCNJ2*-rs236514, Diet Quality and Mild Cognitive Impairment

Celeste Ferraris, Alexandria Turner, Christopher Scarlett, Martin Veysey, Mark Lucock, Tamara Bucher, Emma L. Beckett – The University of Newcastle, Australia

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

Introduction



Method

Design: Secondary analysis of data from the cross-sectional Retirement Health & Lifestyle Study 2010-2012

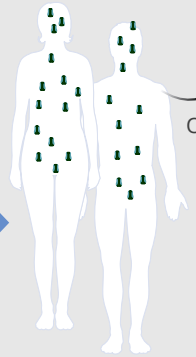
Genotyping: qPCR and TaqMan assays for *KCNJ2*-rs236514

Cognition Test: Mini Mental Sate Examination (MMSE) (≤26 = mild cognitive impairment)

Diet Quality: Dietary Guideline Index, Australian Recommended Food Score & Australian Healthy Eating Index

Analyses: Contingency analysis, logistic fit and nominal logistic regression with *KCNJ2* variant (A) allele as primary predictor. P-value threshold was <0.05

Results



Oral and extraoral *KCNJ2* genes on Kir1.2 channels[5]

In males and the total cohort, the **A allele** of the **sour taste** SNP ***KCNJ2*-rs236514** is associated with...

Population Description

- 524 participants
- ≥ 65 years (m = 77.6y)
- 46% male, 54% female
- 81.1% with *KCNJ2*-A allele

...increased likelihood of **mild to severe cognitive impairment** scores on MMSE

Independent of diet quality & age

No association in females perhaps due to **higher diet quality**

Conclusions/Hypotheses

- More fixed genetic link between sour taste and cognitive impairment
- Sour taste receptor signaling may be reduced by the SNP impacting neurotransmitters altered in cognitive diseases (5-HT, NE & GABA)
- Sour taste receptors have extra-oral functions - *KCNJ2* is in the same areas of the brain[5]where changes occur in cognitive decline[6]

References

Images: https://smart.servier.com/
1. Chen, et al. Dietary patterns and cognitive health in older adults: A systematic review. *J. Alzheimer's Dis*, 2019:67:583-619
2. Sakai, et al. Gustatory dysfunction as an early symptom of semantic dementia. *Dement. Geriatr. Cognit. Dis*, 2017:7:395–405.
3. Chamoun E, et al. The relationship between single nucleotide polymorphisms in taste receptor genes, taste function and dietary intake in preschool-aged children and adults in the Guelph family health study. *Nutrients*. 2018;10(8):990.
4. Törnwall, et al. Genetic contribution to sour taste preference. *Appetite* 2012:58: 687–694.
5. GTExPortal. Gene Expression for KCNJ2. Available: https://gtexportal.org/home/gene/KCNJ2
6. Ledig, et al. Structural brain imaging in Alzheimer's disease and mild cognitive impairment. *Sci. Rep.* 2018:8,:1–16.