

Is obesity a choice?

Giles Yeo

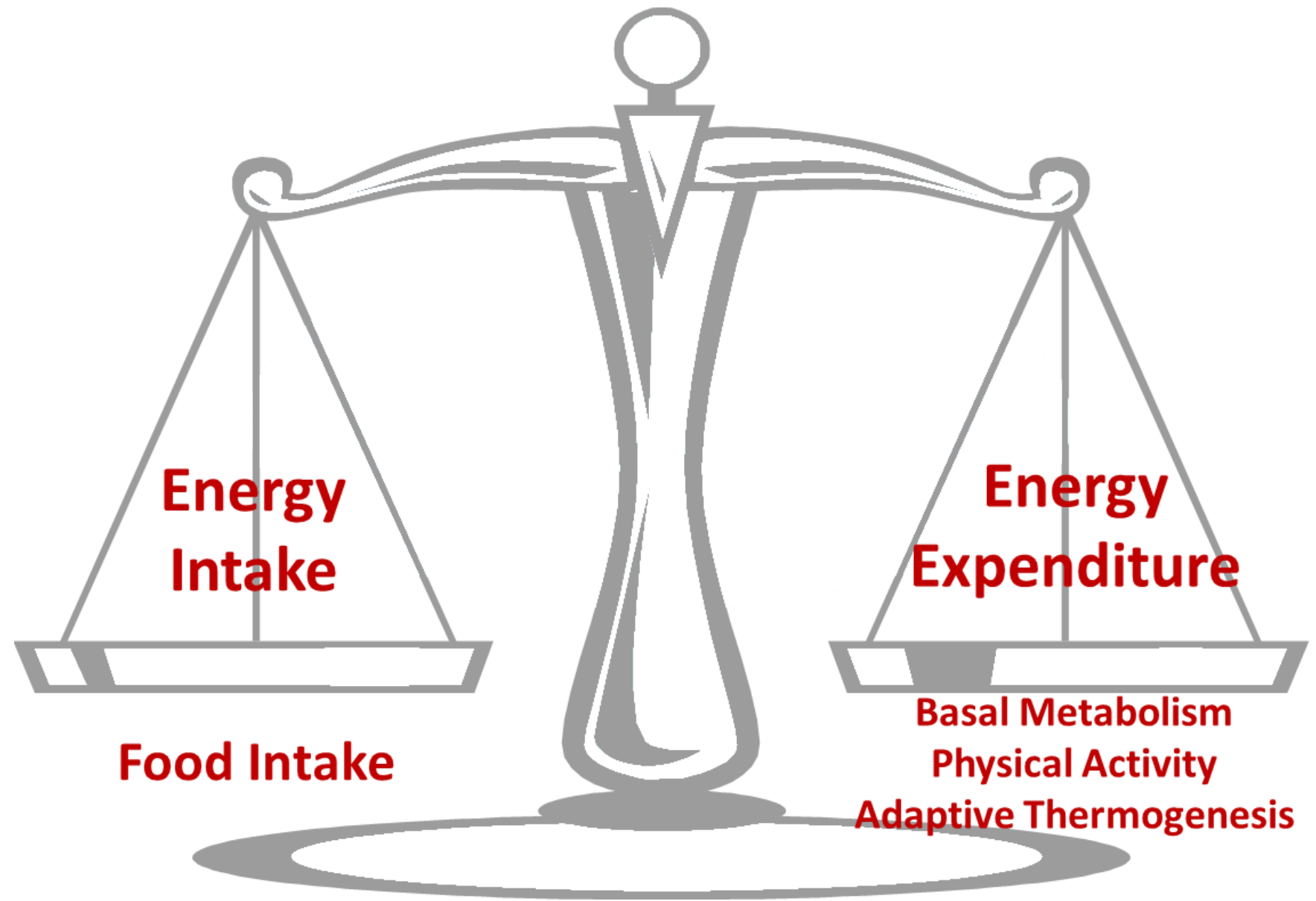
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 @GilesYeo



© World Obesity

Energy balance



**Energy
Intake**

Food Intake

**Energy
Expenditure**

**Basal Metabolism
Physical Activity
Adaptive Thermogenesis**

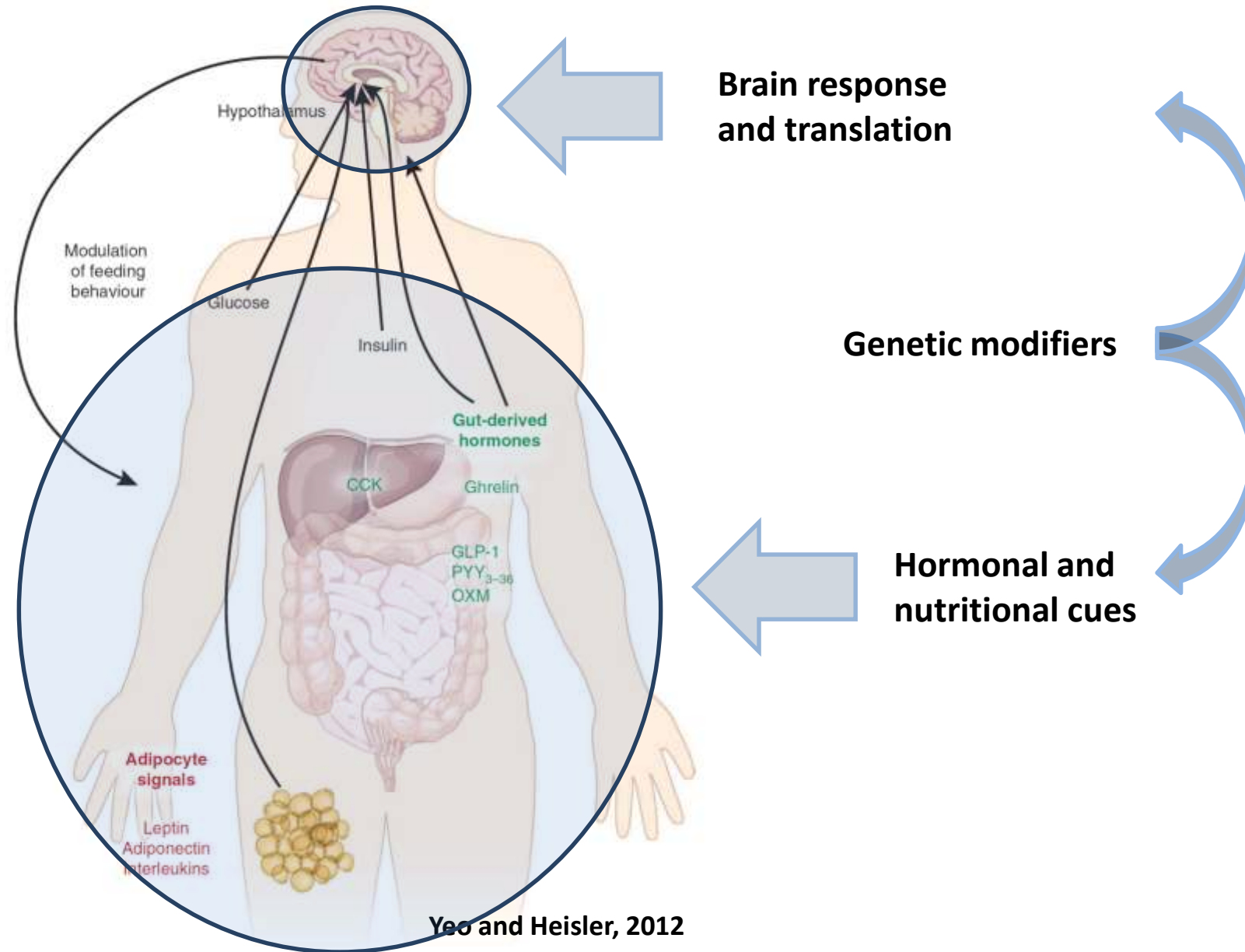
Twin studies



© BBC/Joanna Barwick

Heritability of **BODY WEIGHT** ~ 70%

Brain control of food intake



Yeo and Heisler, 2012

Human congenital leptin deficiency



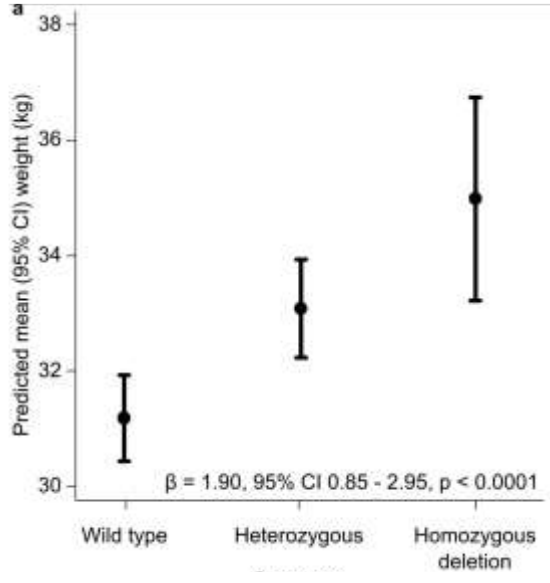
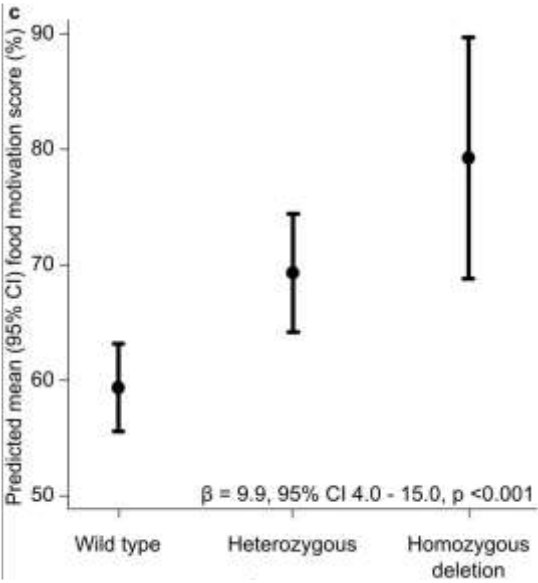
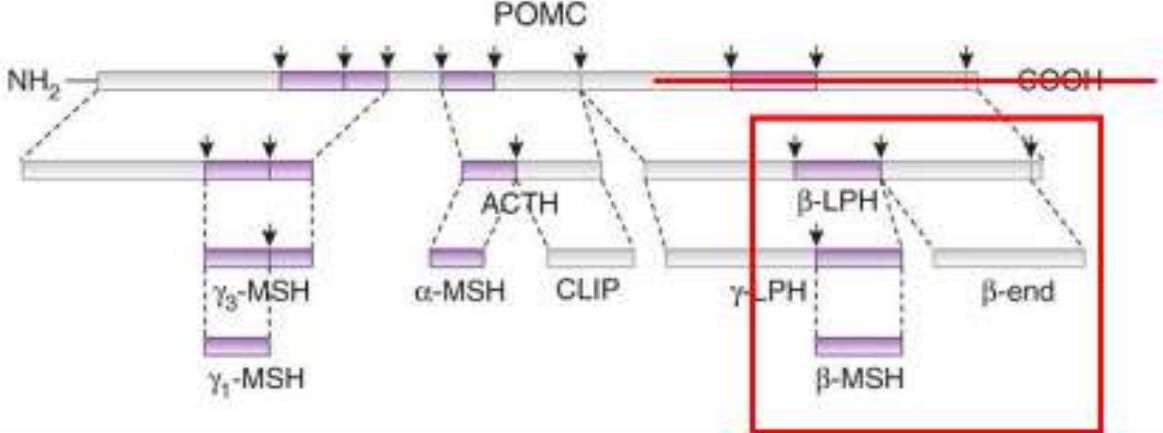
3yr old weighing 42kg

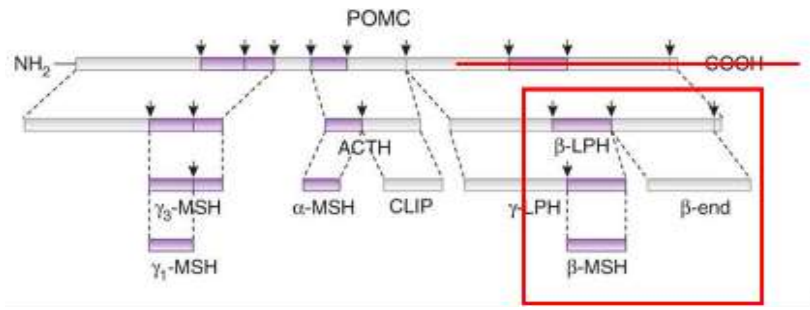
Daily leptin treatment



7yr old weighing 32kg

Labrador retrievers





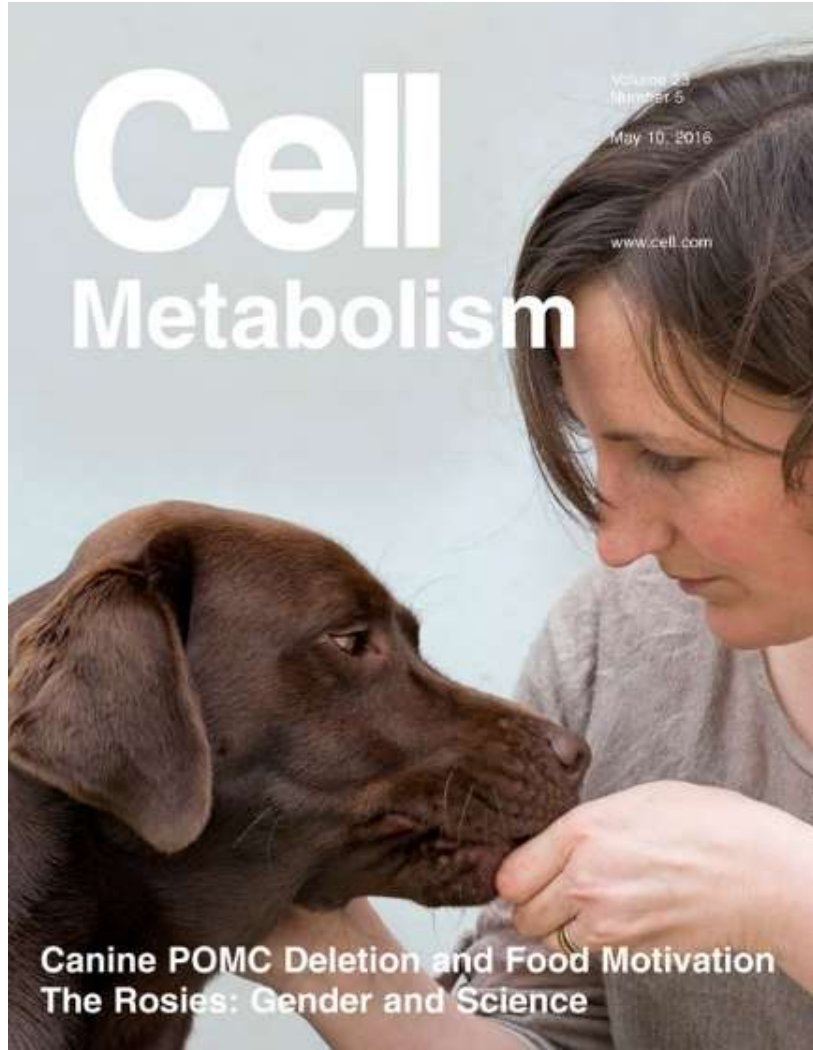
Prevalence

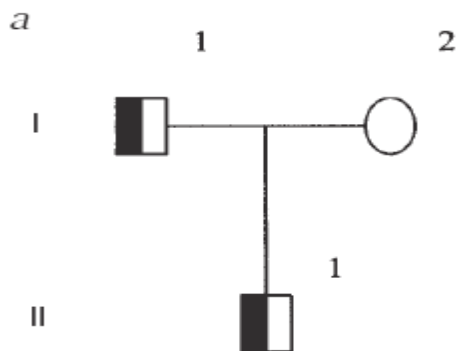
All Labradors

WT 78%
 Hets 20%
 Homs 2%

Labrador guide assistance dogs

WT 23%
 Hets 64%
 Homs 12%



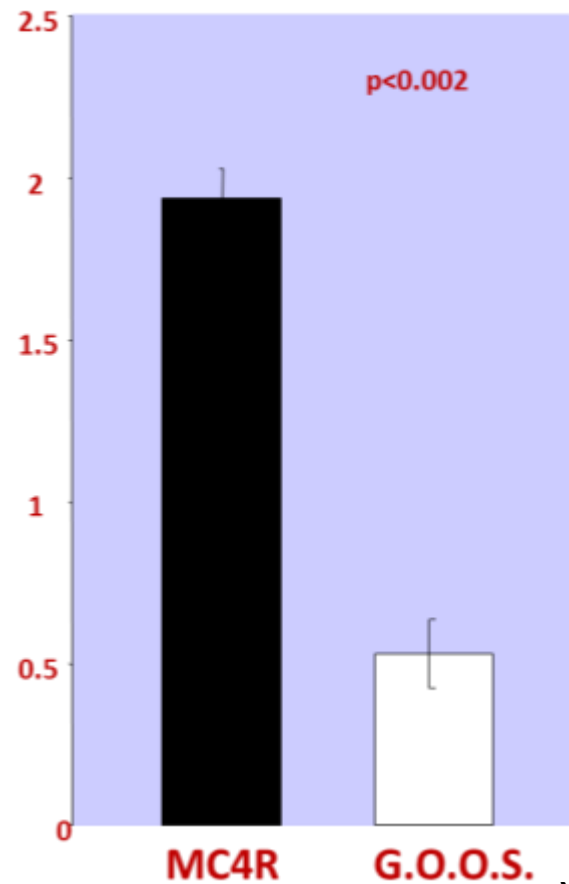


A frameshift mutation in *MC4R* associated with dominantly inherited human obesity

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 Shiva Aminian¹, David J. Halsall¹,
 Richard G. Stanhope²
 & Stephen O'Rahilly¹



Height sds in *MC4R* deficient subjects



A missense variant of the porcine melanocortin-4 receptor (*MC4R*) gene is associated with fatness, growth, and feed intake traits

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PNAS Melanocortin 4 receptor mutations contribute to the adaptation of cavefish to nutrient-poor conditions

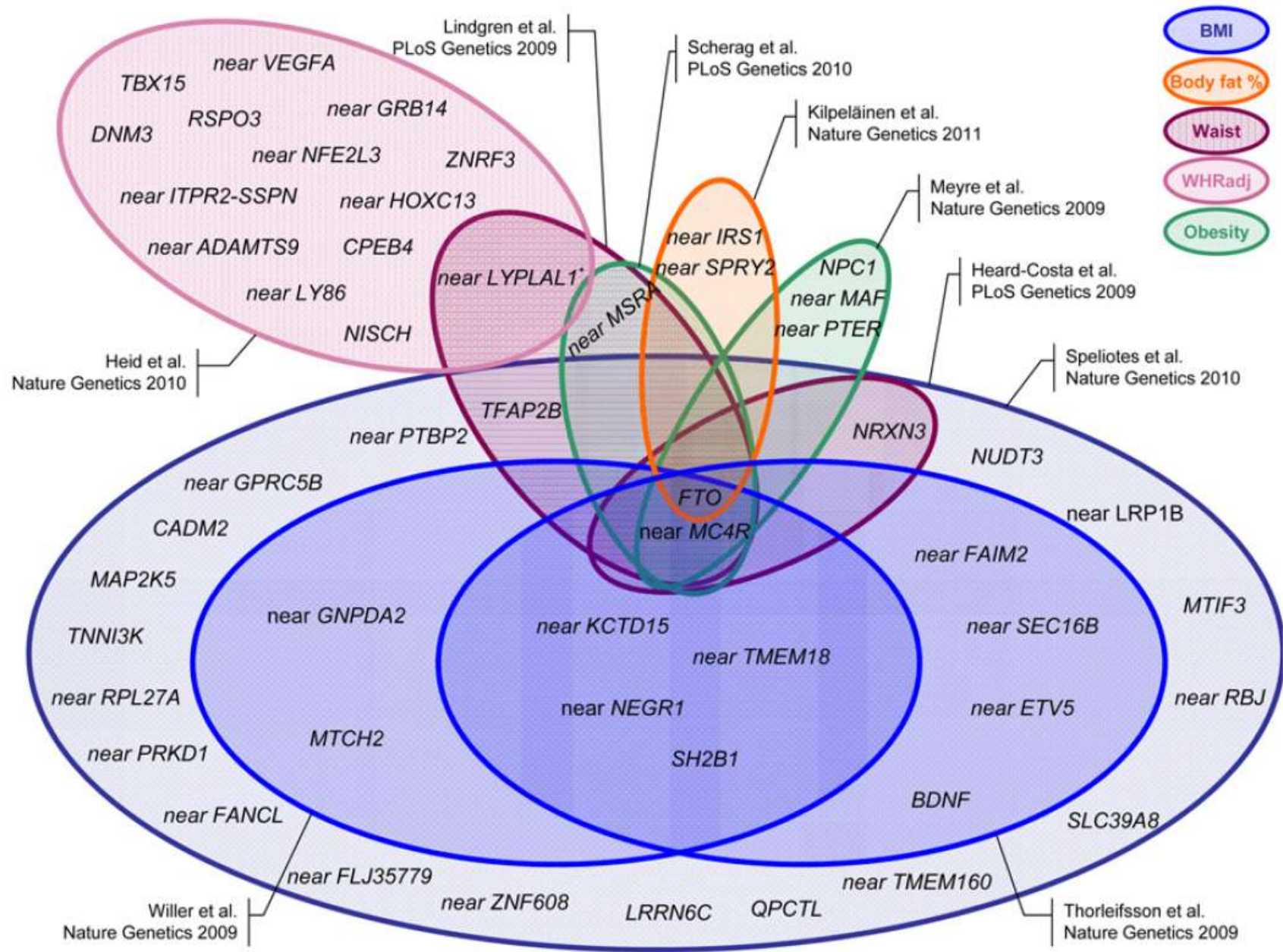
Ariel C. Aspiras^{a,1}, Nicolas Rohner^{a,1}, Brian Martineau^a, Richard L. Borowsky^b, and Clifford J. Tabin^{a,2}

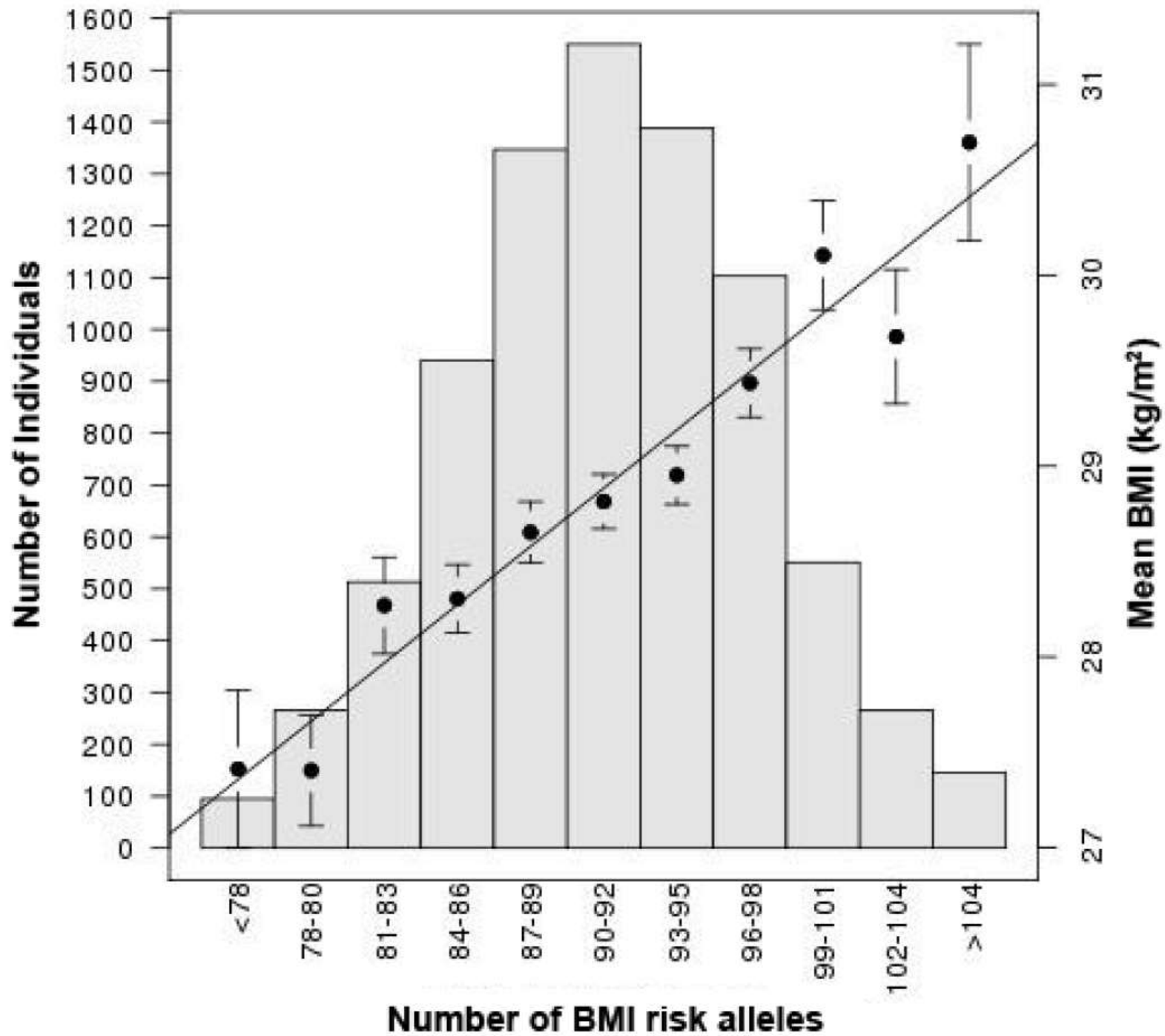
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(a) river (b) Pachón cave (c) Chica cave (d) Subterráneo cave



GWAS and common obesity





Your genes are like a hand of poker



You can't do anything about the cards you have
But you can choose how to play them

Are we all sinners?



With thanks

Sir Stephen O’Rahilly
Tony Coll

Brian Lam
Marcella Ma
Loraine Tung

Eleanor Raffan

John Tadross
Anna Maria Siegert
Georgina Dowsett
Irene Cimino
Marcella Ma
Maria Chukanova
Kara Rainbow
Debra Rimmington
Dave Withers

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