

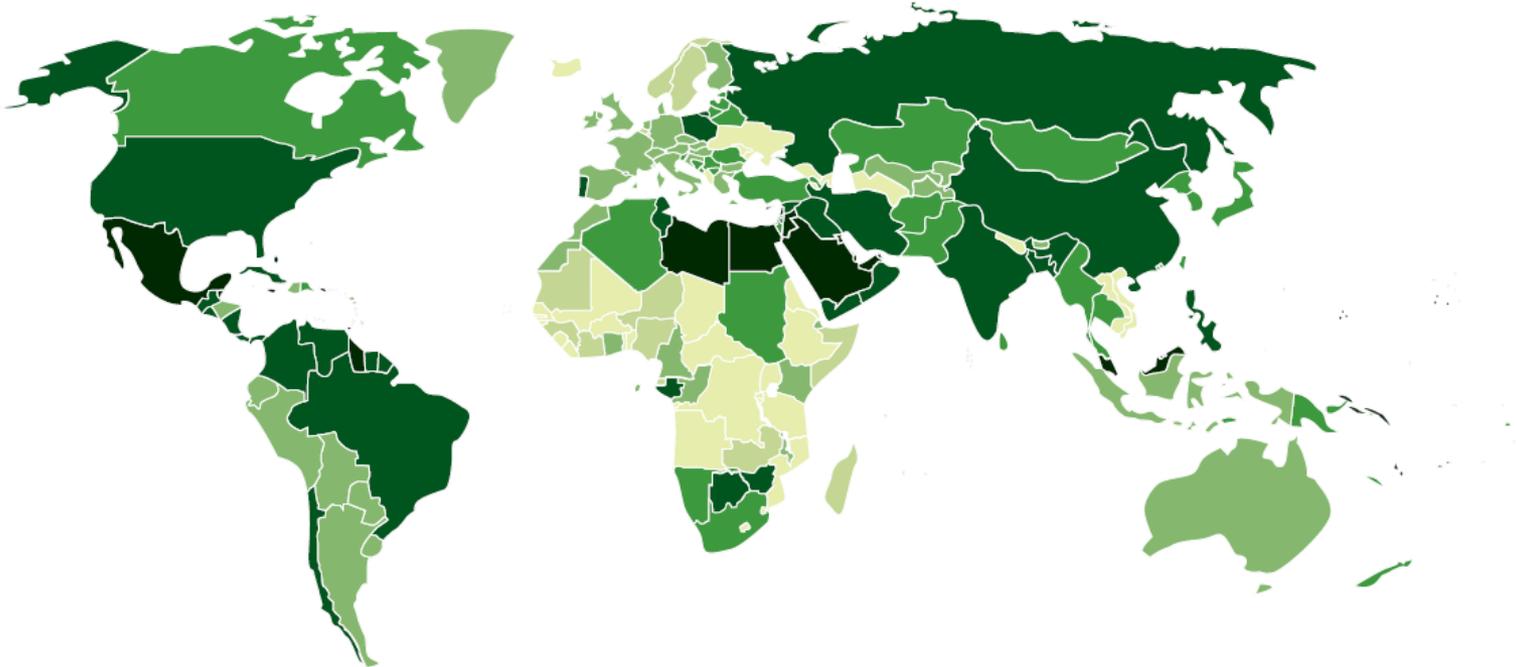


The influence of genes, lifestyles and the environment on the health of people in Fenland

Nick Wareham

Medical Research Council Epidemiology Unit
Cambridge, UK

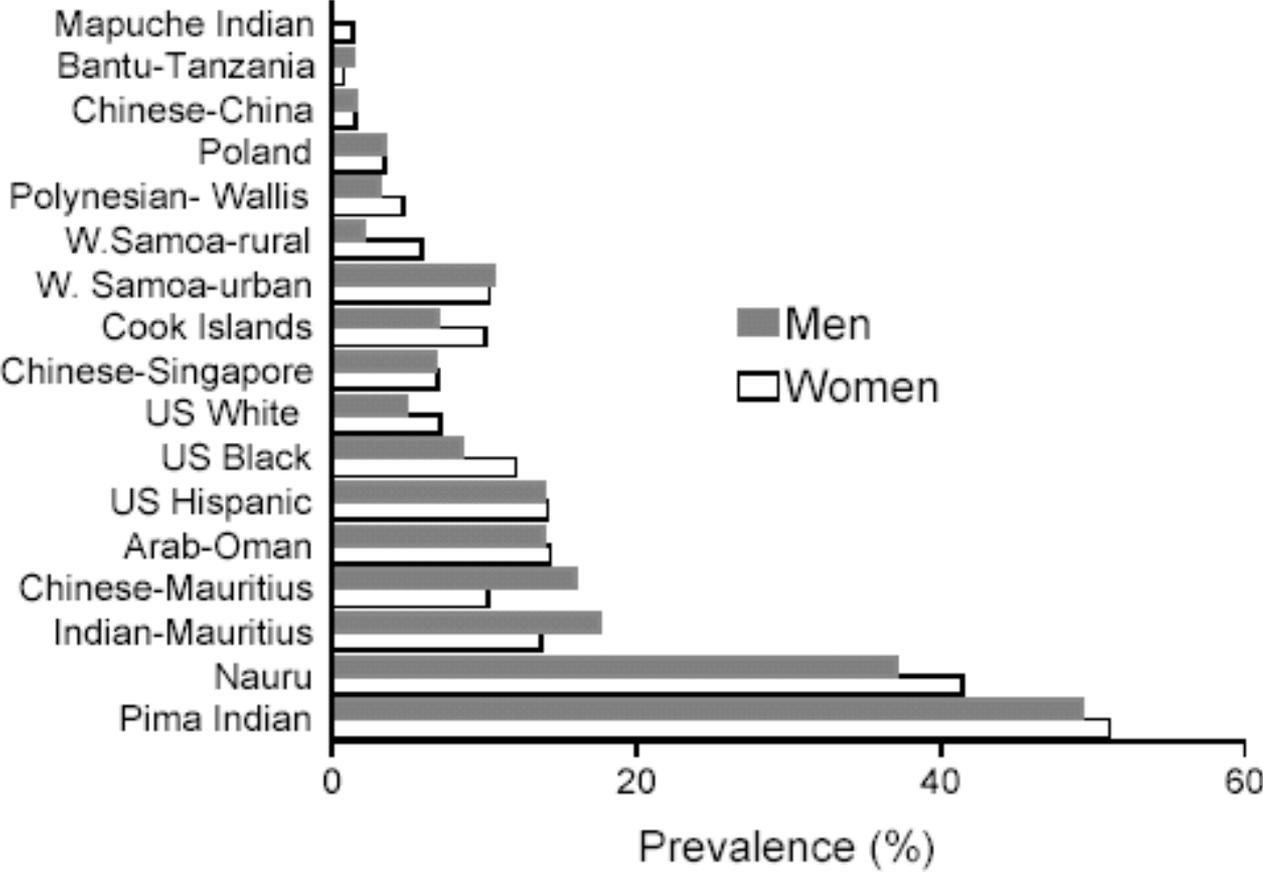
Prevalence of diabetes, 2011



*comparative prevalence

- <4
- 4-5
- 5-7
- 7-9
- 9-12
- >12

Variation in prevalence of diabetes



Theories explaining variation in prevalence of diabetes

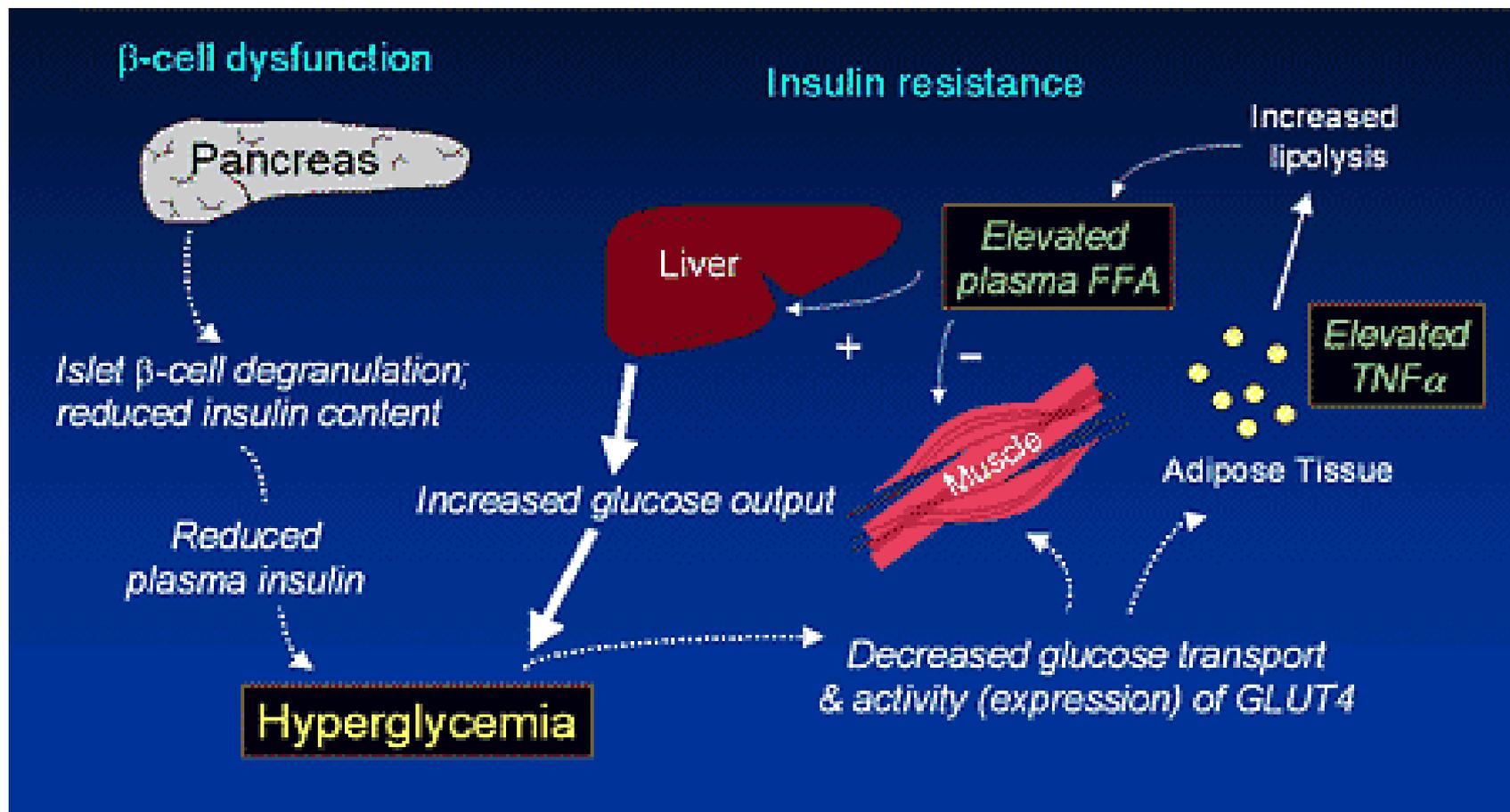
THE AMERICAN JOURNAL
of
HUMAN
GENETICS

Diabetes Mellitus: A “Thrifty” Genotype Rendered Detrimental by “Progress”?

JAMES V. NEEL
*Department of Human Genetics,
University of Michigan Medical School,
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Type 2 diabetes results from defects in insulin resistance and secretion



Precise measurement is critical to finding gene-lifestyle interactions

Number of participants required in study

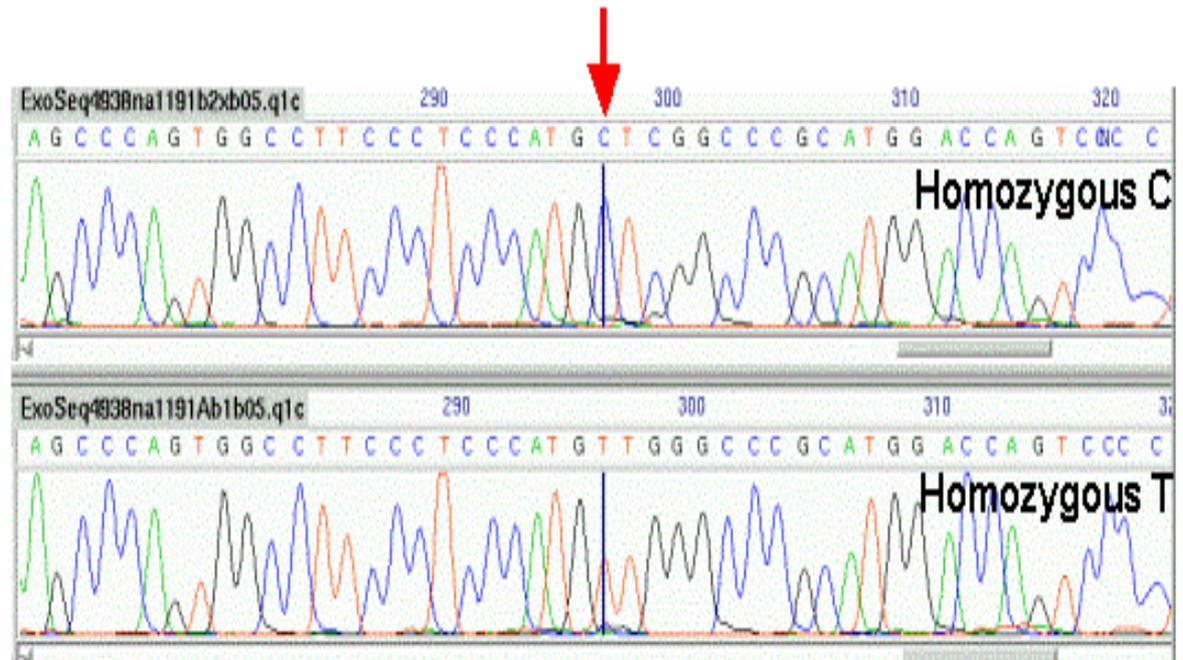
Precision of measurement of lifestyle

Precision of measurement of outcome

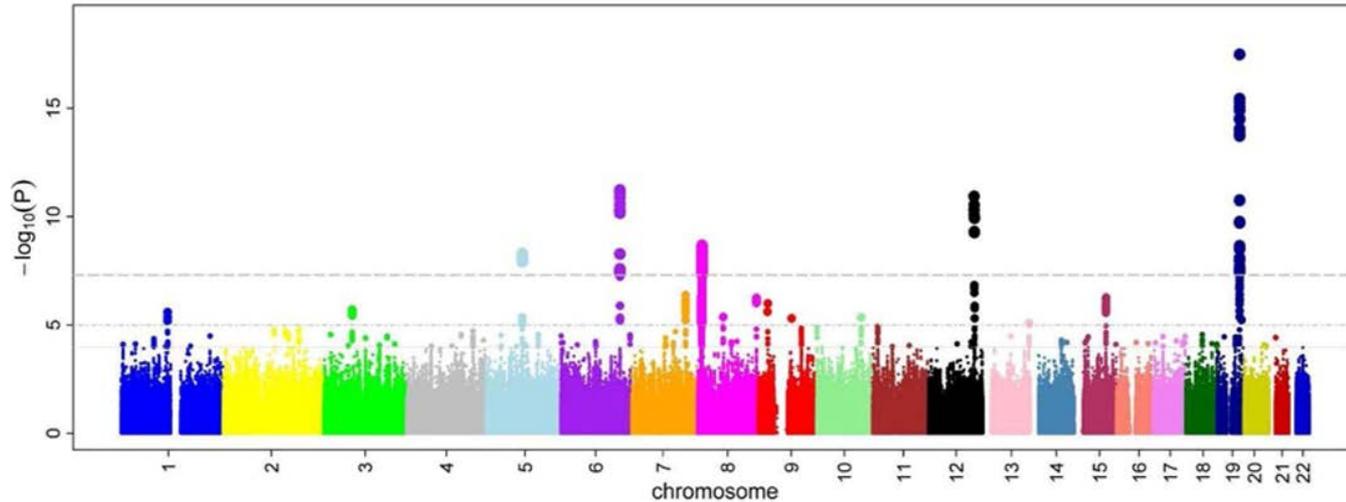


150,989	54,146	27,464
53,329	18,988	9,527

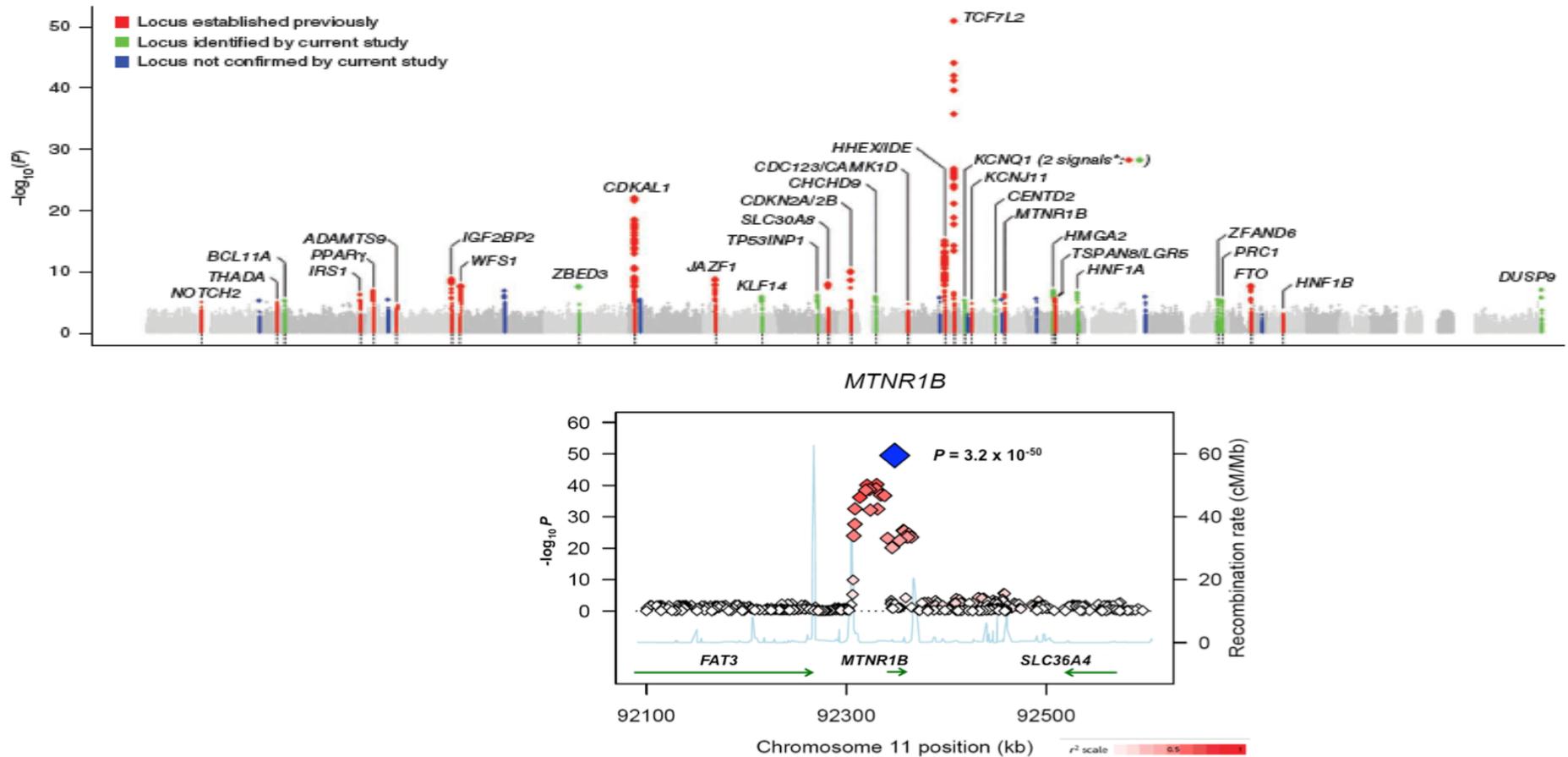
Studying genetic variation between people



Studying association between genomic variation and disease

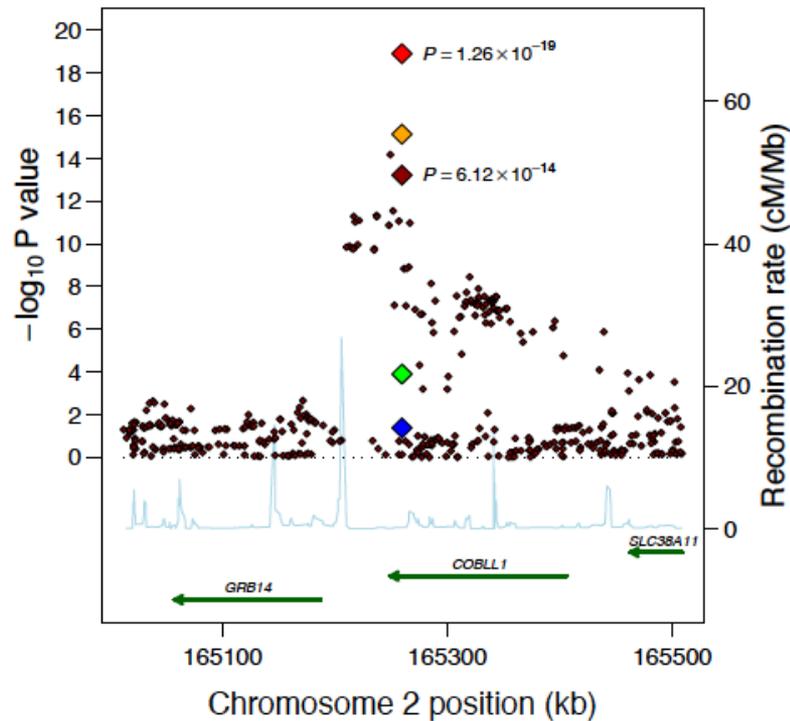


Progress in identifying susceptibility loci for type 2 diabetes and related metabolic traits

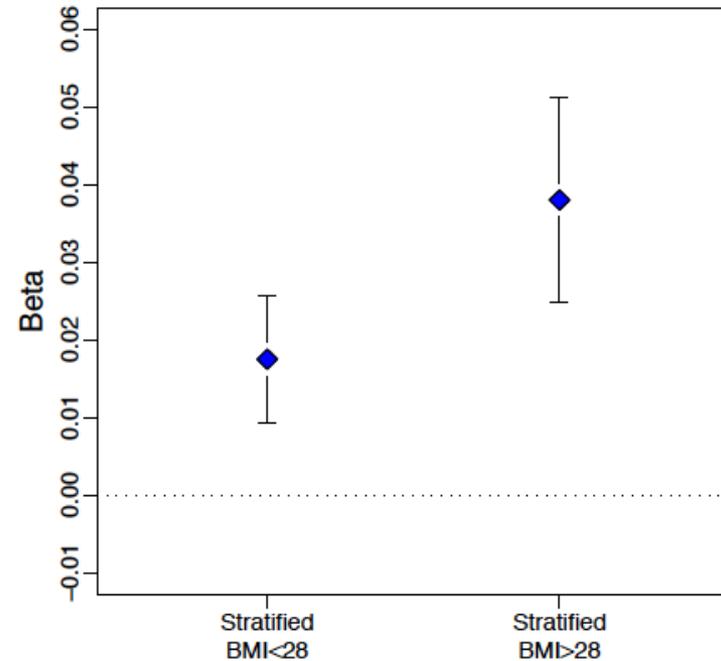


Gene-obesity interaction on glucose levels GRB14

GRB14 region



Increase in fasting insulin per risk allele



- ◆ JMA discovery
- ◆ JMA
- ◆ Main Effect BMI adjusted
- ◆ BMI Interaction
- ◆ BMI Interaction, dichotomous

Conclusions

- Type 2 diabetes originates from a complex interaction between genetic susceptibility and lifestyle behavioural factors
- Understanding these interactions may help to inform therapeutic and preventive efforts
- Studying the interplay between genes and lifestyles requires large and detailed studies like Fenland
- Technological advances in genotyping have made discovery of interactions possible