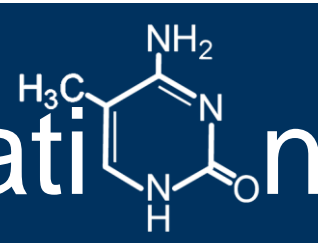


# Differences in DNA Methylation Associated with Area Based Deprivation



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## Introduction

- Multiple deprivation is linked to adverse mental- and physical health.
- This link is only partly due to known environmental exposures (**smoking, alcohol and BMI**).
- DNA methylation (**DNAm**) changes with environmental exposures and differences in DNAm have as been linked to smoking, alcohol and BMI.
- To date there is no epigenome wide study on DNAm differences and socioeconomic status
- We used the single largest DNAm dataset to identify epigenome wide differences in DNAm associated with Scottish Index of Multiple Deprivation (**SIMD**)

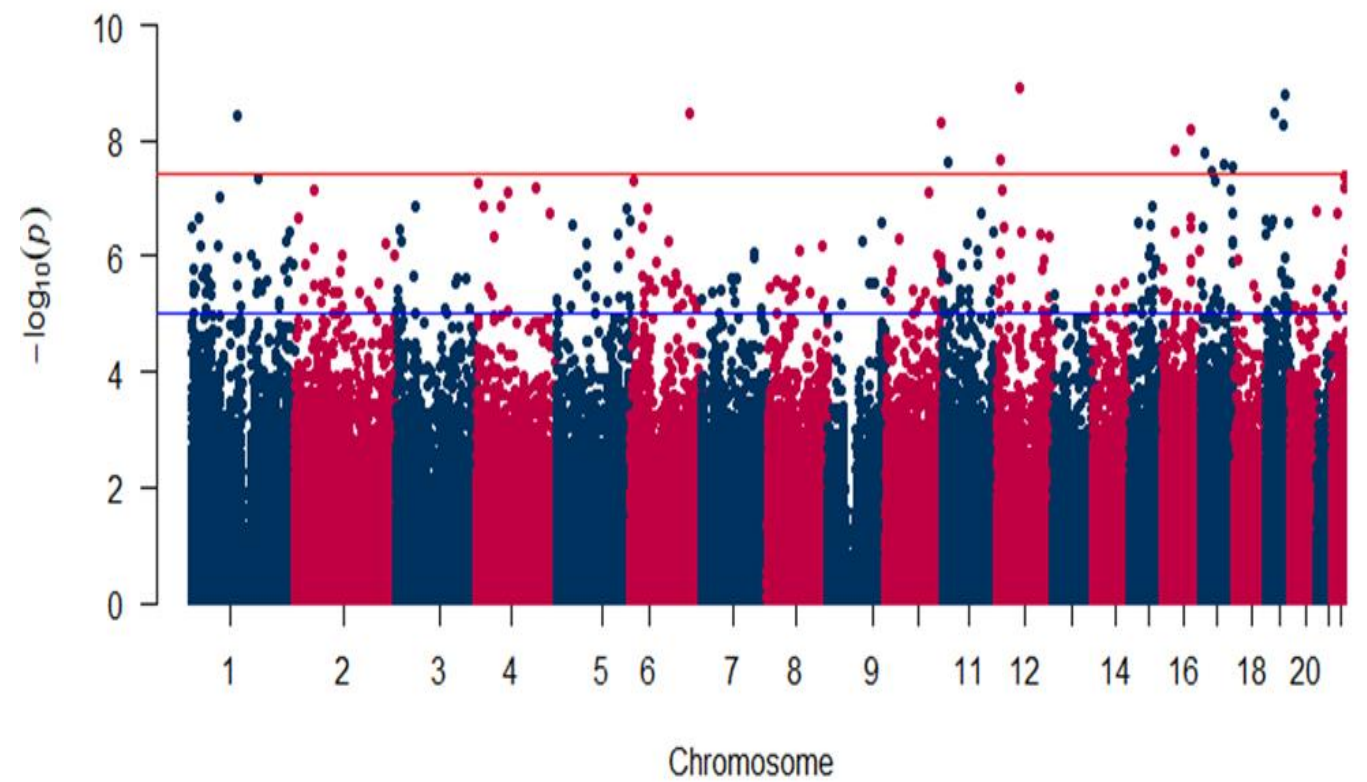
## Methods

- Data from N = 7,373
- DNA obtained from whole blood – DNAm profiled using Illumina EPIC array
- Differentially methylated point (DMP) and Differentially methylated region (DMR) analysis
- EWAS regression model:
 
$$DNAm \sim SIMD + smoking\ status + pack\ years + BMI + alcohol\ consumption + age + sex + white\ blood\ cell\ estimates + 20\ Principal\ Components$$

## Discussion

- DNAm near genes previously linked to bone health, cardiovascular diseases, inflammatory diseases, and major depression
- 4/15 DMPs previously associated with age. SIMD has previously been associated with accelerated epigenetic ageing.
- Pervasive biological consequences of deprivation at the molecular level.
- Current findings congruent with the known mental and physical health burden of low socioeconomic status

## Results



**15 CpGs reach epigenome wide significance.**

Manhattan plot of SIMD rank. Alternating blue and red panels to indicate different chromosomes, blue line = suggestive significance threshold ( $p < 1e-5$ ), red line = epigenome wide significance threshold ( $p < 3.6e-8$ ).



GWAS Catalog

**DMP (N = 15) Phenotypes:**



**Bone health**

(cg03536474, cg20210689, cg16800968, cg12828075)



**Height**

(cg07626482, cg16800968, cg19504123)



**Cardiovascular disease**

(cg03536474, cg20210689)



**Blood protein levels**

(cg13407975, cg10575067, cg19769182, cg05210412)



**Respiratory disease**

(cg21327712, cg11047325)



**Multiple sclerosis**

(cg05210412)



GWAS Catalog

**DMR (N = 399) Phenotypes:**



**Cardiovascular disease**

(28 contributing genes)



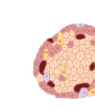
**Blood protein levels**

(37 contributing genes)



**Obesity-related traits**

(30 contributing genes)



**Type 2 diabetes**

(16 contributing genes)



**Depression**

(9 contributing genes)



**Mild cognitive impairment**

(7 contributing genes)