

research shows health inequalities imprinted on DNA

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(Medical Xpress) -- New research from the University of Glasgow shows that the health of the city's most deprived residents could be impaired before they are even born.

Experts from the University's College of Medical, Veterinary and Life Sciences and the Glasgow Centre for Population Health examined blood samples of 239 people from Glasgow's most deprived and most affluent areas, and found significant differences in levels of methylation in their [DNA](#).

DNA methylation is a natural process which controls [gene expression](#). The majority of this methylation content is fixed for life in humans from just a few weeks after conception as the structure of the body and organs is formed. Enzymes in the body create chemical 'tags' which are imprinted onto DNA to switch on or off the expression of genes at the right time and in the right place. Most of these tags stay in place for the rest of an individual's life.

The tags are 'read' by cells, similar to the way software's binary code is processed by computers, and ensure that each cell expresses only the genes it is supposed to in order to ensure the body works correctly and remains healthy. Lower levels of methylation can impair this process, increasing the chances of developing diabetes and cardiovascular disease later in life.

Research leader Dr Paul Shiels, Senior Lecturer in Epigenetics at the

University of Glasgow, said: “The scale of health inequalities in Greater Glasgow has been widely reported and in this study we wanted to examine whether there is an epigenetic contribution to the inequality, which would help explain why people on the lower end of the socio-economic spectrum are more likely to be predisposed to a number of common health issues.

“We found that levels of DNA methylation were significantly lower in the samples from the most deprived areas than they were in those from the least deprived, and those samples also showed signs of an elevated risk of cardiovascular disease.

“Methylation levels decline throughout everyone’s life as part of the natural process of ageing, and can be slightly affected in adulthood by external factors such as diet, stress and lifestyle. Those external factors have a much greater effect on babies developing in the womb, affecting the enzymes which allow DNA methylation to occur, so it’s very likely that the significantly lower levels of methylation we’re seeing in the most deprived areas of the city are set before birth.

“It’s a significant finding and may provide part of the explanation as to why many Glaswegians suffer such poor health in comparison to people in other cities in the UK and across Europe.

“Further study is required, and we are undertaking other work in this field at the moment, but practical outcomes from this research could include much quicker feedback on the effectiveness of public health interventions or the development of tests to identify individuals whose levels of [DNA methylation](#) suggest they are more at risk of developing health problems.”

The study, published in the *International Journal of Epidemiology*, was funded by the Glasgow Centre for Population [Health](#) and is part of an

ongoing project, called pSoBid, which is investigating the psychological, behavioural and biological determinants of ill-health in the city.

More information: The research report, titled ‘Socio-economic status is associated with epigenetic differences in the pSoBid cohort’, is available online at gla.ac/yzYmA4

Provided by University of Glasgow

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