Genes and immune system shaped by childhood poverty, stress

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(Medical Xpress)—A University of British Columbia and Centre for Molecular Medicine and Therapeutics (CMMT) study has revealed that childhood poverty, stress as an adult, and demographics such as age, sex and ethnicity, all leave an imprint on a person's genes. And, that this imprint could play a role in our immune response.

The study was published last week in a special volume of the Proceedings of the National Academy of Sciences that looks at how experiences beginning before birth and in the years after can affect the course of a person's life.

Known as epigenetics, or the study of changes in gene expression, this research examined a process called DNA methylation where a chemical molecule is added to DNA and acts like a dimmer on a light bulb switch, turning genes on or off or setting them somewhere in between. Research has shown that a person's life experiences play a role in shaping DNA methylation patterns.

The research team discovered that childhood poverty, but not socioeconomic status as an adult, was correlated with the marks or methylation patterns left on genes.

"We found biological residue of early life poverty," said Michael Kobor, an associate professor of medical genetics at UBC, whose CMMT lab at the Child & Family Research Institute (CFRI) led the research. "This was based on clear evidence that environmental influences correlate with epigenetic patterns."

The amount of stress hormones produced by adults was also linked with variations in DNA methylation. Like the chicken and the egg, Kobor says it is unknown whether increased stress as an adult could leave marks on DNA or whether the marks may play a role in the amount of stress hormones released.

Kobor, who is a Mowafaghian Scholar at the Human Early Learning Partnership (HELP), and his colleagues also found that methylation patterns were predictive of future immune responses, suggesting that early life experiences could play a role in our response to illness later in life.

Provided by University of British Columbia