Study shows changes in histone methylation patterns in nutritionally stunted children

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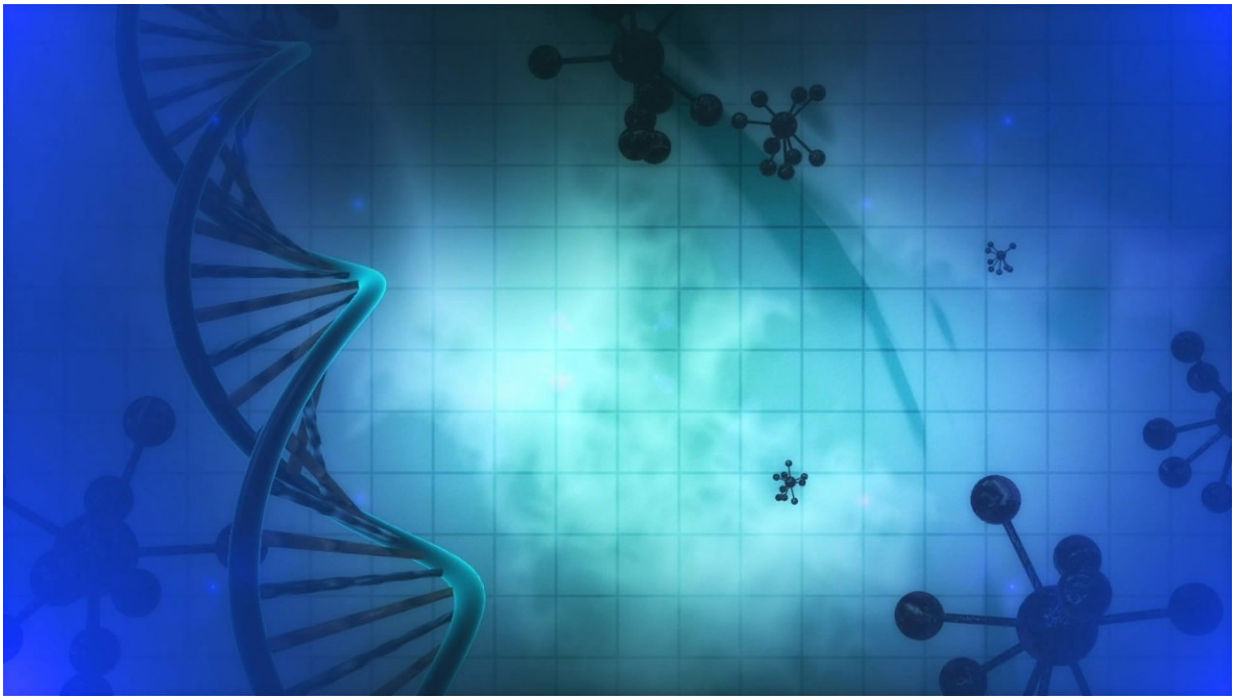

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An international team of researchers has found changes in histone methylation patterns in nutritionally stunted children. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes their study of nutritionally deprived children living in a slum in Bangladesh and what they found.

Most everyone knows that not getting enough to eat, or eating food with little or no nutritional value is bad for you. Worse is when it happens to children who are dependent on certain levels of nutrients to develop properly. Prior studies have shown that when children do not get enough nutrients over an extended period of time, they wind up stunted—shorter than they would have grown otherwise. Many studies have been conducted on the impact of malnutrition on children, but until now, none of them have looked at epigenetic signatures specifically associated with growth impairment.

In this new effort, the researchers sought to change that by taking advantage of an ongoing program in Bangladesh called the Performance of Rotavirus and Oral Polio Vaccines in Developing Countries. As part of the study, health officials have been collecting blood samples from people living in extreme poverty over many years. Included in the program are approximately 700 children living in an urban slum in Dhaka, Bangladesh. By gaining access to such blood samples, the researchers were able to perform chromatin immunoprecipitation and DNA sequencing on samples taken from long-term nutritionally challenged children. More specifically, it allowed them to monitor histone H3 lysine 4 trimethylation (H3K4me3) levels across the children's genomes.

The researchers found H3K4me3 was better than average close to transcription start sites when the children were still very young. But as they grew older, the pattern changed as the children began to experience stunting. It was at this point that a shift occurred—methylation moved from near the transcription start sites to other regions in the body. They also found that there was no such change to histone H3 K27 acetylation levels. And not surprisingly, they found that genes associated with nutritional health in children were expressed differently in children experiencing stunting.

More information: Robin Uchiyama et al. Histone H3 lysine 4 methylation signature associated with human undernutrition, *Proceedings of the National Academy of Sciences* (2018). DOI: 10.1073/pnas.1722125115