DNA Methylation Signature of Child Abuse

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Technology description

Methods to analyze epigenetic changes, particularly DNA methylation, in children as an indication of traumatic experience.

These methods can be observed via a strand of hair or through saliva samples—simple non invasive tissue collection methods. This technology is useful for the design of tests to detect the biological impact of early life abuse, and to develop and follow prevention and therapeutic interventions.

Background

Childhood maltreatment and abuse is a major risk factor for poor physical outcomes in adulthood including depression, anxiety, and cognitive dysfunction. According to the National Children's Alliance, over 315,000 children were victims of child abuse with 116,940 being six years of age or under. It is necessary to develop biomarkers to indicate neglect at an early age before later-life clinical outcomes become present themselves. This issue has led to a strong foundation for abuse prevention across the country, with Florida's Rapid Safety Feedback using predictive analytics to assign risk levels to various child abuse cases. Organizations such as Prevent Child Abuse America, Child Abuse Prevention, the Blue Ribbon Project, and UNICEF Child Protection are ready to reach out to victims and their families within communities where abuse is a relevant topic of discussion. There has been a long need for resources to identify those victims who sustain biological impact from abuse and to help victims from a young age as an intervention and preventive action. The impact of trauma can result in difficulties with behavior and learning in elementary school. Just as vaccination status is determined when children enter kindergarten, so too can we determine their stress level and the biological profile/signature of early life experience that may interfere with development and education.

Technology Description

Researchers at the University of New Mexico and University of Southern California have developed methods to analyze epigenetic changes, particularly DNA methylation, in children as an indication of traumatic experience. This can be observed via a strand of hair or through saliva samples—simple non invasive tissue collection methods. This technology is useful for the design of tests to detect the biological impact of early life abuse, and to develop and follow prevention and therapeutic interventions.

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Application area

Non-intrusive way to determine whether an individual has experienced abuse
Provides data for caseworkers, families, and others to identify abuse and design interventions
Useful for public health departments to make a determination regarding foster care versus birth family placements
For forensics to determine duration and degree of maltreatment/abuse and for department of justice for legal prosecution of abuse cases
Provides information for kindergarten children entering elementary schools to identify those with methylation or cortisol patterns that predict learning difficulties for educational interventions
Data-driven method of measuring progress of individual's mental and physical health
Can be used to discovery of interventions and effective therapies by serving as an objective measure to follow effectiveness
Can be used to monitor adult health outcomes, such as cardiovascular disease, stroke and cancer risk

Institution

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