ABSTRACT SUBMISSION FORM

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SEX + GENDER

Exploring the role of sex and gender on health research

CHILD HEALTH RESEARCH DAYS

CHRD 2020: Abstract Submission Form

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Title
Identifying the DNAm Signature of Childhood Onset Type II Diabetes in the iCARE cohort

Background
Type 2 diabetes (T2DM) is increasingly prevalent in children as young as 10 years old. Researchers are unsure why T2DM incidence in younger children is increasing but believe early environmental exposures play a role by altering epigenetic patterns. However, the epigenetic changes associated with childhood onset T2DM remains unknown.

Objective
Here, we identify epigenetic signatures unique to childhood onset T2DM (diagnosed before 18 years of age) by comparing DNA methylation profiles (an epigenetic signature) of youth with and without T2DM.

Methods
DNA methylation of whole blood samples from 284 youths (Ages 9 – 26; 74 Controls, 210 Cases) from the Improving renal Complications in Adolescents with type 2 diabetes through REsearch (iCARE) cohort was measured using the Illumina EPIC Human Methylation array. Linear regression was used to identify the DNAm signature of youth with T2DM using the following regression formula: DNA Methylation ~ Diabetes status + Age + Sex + Genetic Ancestry + Cell type composition.

Results
Linear regression analysis identified 17022 differentially methylated sites (adjusted p-value < 0.05) between youths with and without T2DM. T2DM status had effect sizes (ES) ranging from -0.11 to 0.12, indicating sites with up to 11% hypomethylation or up to 12% hypermethylation. Four sites have absolute ES larger than 0.10 (cg12655260; ES = -0.1112, cg16814680; ES = -0.1095, cg19693031; ES = -0.1054, cg11424828; ES = 0.1224). These CpGs play roles in actin-cytoskeleton organization, muscle structure, and hyperglycemia.

Conclusion

We have identified an epigenetic signature associated with childhood onset T2DM in the iCare study population. Our findings build the basis for future studies to assess the utility of these signatures as biomarkers for early detection of T2DM, and identify pathways involved in childhood onset T2DM progression. We would like to acknowledge the important contributions and guidance of the iCARE Participant Advisory Group and Data Access Committee in this work's interpretation.

Theme:
Basic Science

Do you have a table/figure to upload?
No

Are you willing to participate in Goodbear's Den?
Yes

Presenter Status:
Non-Trainee

What was your role in the project?
Analyze Data

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