Discriminating Placentas of Increased Risk For Autism With Chorionic Surface Vascular Network Features

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RESEARCH QUESTION

- Are there Placental Chorionic Surface Vascular Network (PCSVN) features that distinguishes placentas of increased risk for ASD from those in the general population?

DATA SET

- 89 EARLI placentas. EARLI is an autism enriched-risk pregnancy cohort that focuses on the prenatal and early life periods of children who have biological siblings already diagnosed with ASD. HIGH RISK for ASD.
- 201 NCS placentas. NCS is a population-based cohort with pregnancies at unknown risk for ASD. LOW-RISK for ASD.

RESULTS

- 8 shape-related, 28 arterial, and 28 venous PCSVN features were computed.
- A major contribution of our work is the creation and validation of a model to discriminate placetas associated with children in a high-risk ASD group against a population of unknown ASD risk based on automatically selected PCSVN features.

METHODS & RESULTS

Step 1: Boruta Algorithm: Select all-relevant PCSVN features

- We anticipate that some PCSVN features will be correlated with outcomes such as diabetes and obesity or other "fetal origins" disorders, including autism and schizophrenia, once reliable and automated vessel extraction methods are established to allow analysis of PCSVNs in large cohorts.

Step 2: Principal Component Analysis (PCA): Identify groups of biological effects of villous growth in different ASD risk categories

- The study presented here should motivate a pursuit of additional PCSVN features which might be correlated with various dichotomous health outcomes as long as information on outcome classification is available.

Step 3: Linear Discriminant Analysis (LDA) with 10-fold cross validation: Produce classification statistics

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