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Abstract title: Increased Maternal Age Associated with Altered Placental Expression of MAO-A and the SERT Transporter in Healthy Term Pregnancies: Implications for Hyperserotonemia and Autism Spectrum Pathology

Background: Epidemiological studies suggest that advanced parental age is a risk factor for autism spectrum disorders (ASDs). Other lines of research have found that placental-fetal serotonin metabolism plays a key role in brain development on the one hand, and ASD pathology on the other.

Objective: We are interested in whether the link between advanced maternal age and ASD pathology is mediated by ageing effects on placental-fetal serotonergic metabolism. The current project focuses on five placental proteins that regulate the transfer of serotonin into the fetal circulation from the placenta.

Study Design/Methods: Placental samples were obtained at birth from N=22 normal women participating in the Ontario Birth Study (OBS) at Mount Sinai Hospital, Toronto, Ontario, Canada. Pearson correlation was used to explore the relationship between the expression of five placental proteins contributing to serotonin metabolism and maternal age.

Results: A significant negative correlation was found between maternal age and term placental MAOA protein expression (n=22; r= -0.630; p = 0.001), while a significant positive correlation was found between maternal age and term placental SERT protein expression (n=22; r= 0.45; p = 0.033). No effect of maternal age on TPH1, LAT1 or IDO1 was found. Immunohistochemistry confirmed that MAOA and SERT were both localized to the syncytiotrophoblast.

Conclusions: These preliminary data suggest that advancing maternal age is associated with altered expression of two proteins that help to regulate the amount of serotonin crossing into

the fetal circulation from the placenta. Future OBS work will assess the implications of these findings for fetal brain development and ASD pathology in the corresponding OBS children.