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OMEGA-6 FATTY ACID NUTRITIONAL STATUS DURING PREGNANCY IS ASSOCIATED WITH INFANT INFLAMMATORY MARKER CONCENTRATIONS

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Inflammation plays a key role in healthy fetal development during pregnancy. However, excessive systemic inflammation is associated with severe infant morbidities such as cerebral palsy, preterm birth, or poor infant growth trajectories. Systemic inflammatory status can be measure through plasma cytokines, with IL-10 promoting an anti-inflammatory environment and IL-8 or TNFα promoting an inflammatory environment. Diet has been shown to impact systemic inflammation. Omega-6 fatty acids, such as arachidonic acid, linoleic acid, and their metabolites generally promote a pro-inflammatory environment in adults, but less is known about how maternal dietary intake of omega-6 fatty acids during pregnancy may affect infant inflammatory status. Unregulated inflammation during pregnancy is associated with severe pregnancy complications. Maternal diet is a modifiable factor that may influence perinatal inflammation status and subsequent infant health outcomes. We hypothesize that cord anti-inflammatory cytokine plasma concentrations (IL-10) will be inversely correlated, and cord inflammatory cytokine plasma concentrations (IL-8 and TNFα) will be positively correlated with omega-6 fatty acid metabolites. Maternal-infant dyads were enrolled at time of delivery. Maternal and umbilical cord plasma samples (N=36) were analyzed for inflammatory markers (IL-10, IL-8, and TNFα) via multi-analyte bead array and arachidonic acid and linoleic acid metabolites via HPLC-MS/MS. Average daily maternal dietary intake of omega-6 fatty acids (arachidonic acid, linoleic acid, and total) were calculated using the validated Harvard Food Frequency Questionnaire (N=116). Spearman's correlation coefficients were used to assess the relationship between inflammatory markers, omega-6 fatty acid metabolite plasma concentrations, and omega-6 fatty acid intake, with $p \leq 0.05$ considered statistically significant. IL-8 cord plasma concentrations were positively correlated with both cord and maternal plasma concentrations of 11-HETE and 15-HETE. Additionally, IL-8 cord plasma concentrations were positively correlated with maternal 9-HETE and cord 11(12)-EET, 11β-PGE2, 14(15)-EET, 8-HETE, PGF2α, and thromboxane B2. IL-10 cord plasma concentrations were inversely correlated with cord 11(12)-DiHET, 12(13)-EpOME, and 9(10)-EpOME. TNFα cord plasma concentrations were positively correlated with maternal arachidonic acid intake. No other significant associations were observed. This preliminary study provides evidence that omega-6 fatty acid metabolites are positively correlated with an inflammatory cytokine (IL-8) and inversely correlated with an anti-inflammatory cytokine (IL-10). Additional research

is needed to identify how dietary interventions to modify omega-6 fatty acid intake during pregnancy may impact infant inflammatory status and associated long-term health outcomes.