

Molloy, AM, et al. Choline and homocysteine interrelations in umbilical cord and maternal plasma at delivery. *AJCN* 2005; 82: 836-842.

Background: Little is known about the interactions between choline and folate and homocysteine metabolism during pregnancy despite the facts that pregnancy places considerable stress on maternal folate and choline stores and that choline is a critical nutrient for the fetus. Choline, via betaine, is an important folate-independent source of methyl groups for remethylating homocysteine in liver. Objectives: Our aims were to examine the intermediates of choline oxidation in maternal and umbilical cord plasma and to determine the relations between this pathway and folate-dependent homocysteine remethylation.

Design: Blood samples were taken from 201 pregnant women and, at delivery, from the umbilical cord veins of their healthy, full-term infants. The blood samples were analyzed for plasma free choline, betaine, dimethylglycine, folate, vitamin B-12, total homocysteine (tHcy), and creatinine concentrations.

Results: Choline concentrations in umbilical cord plasma were ≈ 3 times those in maternal plasma (geometric \bar{x} : 36.6 and 12.3 $\mu\text{mol/L}$, respectively; $P < 0.0001$). Betaine and dimethylglycine concentrations were also significantly higher in umbilical cord than in maternal plasma. Choline was positively associated with tHcy ($r = 0.34$, $P < 0.0001$), betaine ($r = 0.58$, $P < 0.0001$), and dimethylglycine ($r = 0.30$, $P < 0.0001$) in maternal blood. Much weaker relations were seen in the fetal circulation. In a multiple regression model, choline was a positive predictor of maternal tHcy, whereas vitamin B-12 and betaine were negative predictors.

Conclusions: The positive association between maternal choline and tHcy during pregnancy suggests that the high fetal demand for choline stimulates de novo synthesis of choline in maternal liver, with a resultant increase in tHcy concentrations. If this is confirmed, it may be appropriate to provide choline supplements during pregnancy to prevent elevated tHcy concentrations