Preventing Preterm Birth: Maximizing GSH Synthesis to Fight Oxidative Stress

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Nearly one in eight deliveries in the United States is preterm. Preterm birth has been correlated with oxidative stress, damage caused to cells by free radicals, in the uterine myometrium. Oxidative stress is counteracted by the donation of electrons by antioxidants, among which the most potent is reduced glutathione (GSH). This experiment tests the effect either the maqui berry (0.0125 g/L, 0.1875 g/L, and 0.375 g/L) or cysteine (0.0025 g/L, 0.02 g/L, 0.0375 g/L) on the level of intracellular GSH in uterine myometrial cells. Cells were cultured in RPMI with 15% FBS by volume, stressed through subculture into media containing 10% ethanol, and treated with maqui and cysteine. Two control groups were tested: untreated/unstressed cells and untreated/stressed cells. The presence of GSH was measured via violet fluorescence assay. Kruskal-Wallis and ANOVA tests showed that the highest concentration of cysteine raised GSH levels significantly, as did the lowest concentration of maqui berry. To help explain these results, RT-PCR is being conducted to quantify the levels of glutathione synthetase and glutathione S-transferase, two enzymes involved in the synthesis and function of GSH. This will help to determine the role of maqui berry as a GSH-promoting agent. Supplementation with cysteine (0.0375 g/L) and maqui (0.0125 g/L) is demonstrated to be a feasible treatment for raising GSH levels, counteracting oxidative stress, and preventing preterm birth.

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