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Carbon monoxide modulates infection-induced proinflammatory cytokine milieu in human placenta

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There is growing recognition that cytokines and inflammatory mediators present at the maternal-fetal interface play a fundamental role in regulating labor. IL-10 is an essential pro-pregnancy cytokine and therapies leading to its placental induction might be useful in preventing preterm deliveries. Although toxic in high concentrations, inhaled carbon monoxide (CO) in low concentrations can confer potent anti-inflammatory effects. Several pre-clinical and clinical studies have used CO as a therapeutic agent for a variety of vascular complications and sepsis; no published studies have evaluated the utility for this novel anti-inflammatory gas for preventing preterm delivery. The objective of this work is to investigate the role of CO in modulating infection-induced proinflammatory cytokine milieu in human placenta. Using placental explants culture system, samples from normal second trimester placentas were treated with LPS (250 ng/ml), 108 heat killed *E. coli* or 108 heat killed *Urealyticum parvum* with or without exposure to CO (250ppm) for 18 hours. Conditioned media were collected and analyzed for cytokines production using Bio-PlexTM array. Cultured tissues were analyzed by western blots for COX-2 and heme oxygenase-1 expression. To determine if CO exposure will induce cytotrophoblasts cell death, early pregnancy cytotrophoblasts cell lines (HTR8) were exposed to RA or CO (for 18 hours). Apoptosis was analyzed by FACS array. Our data indicate that CO effectively inhibits infection-induced proinflammatory mediators in second trimester placentas. Moreover, CO induced the pro-pregnancy cytokine IL-10 pointing to a potential role of CO in treatment of preterm labor.

Biography

Nazeeh Hanna is the Chief of Neonatology at Winthrop University Hospital. He is also the President-elect of the American Society for Reproductive Immunology. He is currently a Professor of Pediatrics, State University of New York at Stony Brook. He is an established Investigator who has international recognition for his work in reproductive immunology. His research track is focused in the area of "Developmental immunology and the impact of maternal exposure to environmental toxicants on preterm births".

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