

Deadly carbon monoxide prevents miscarriage

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Heme oxygenase-1 is essential for the growth of blood vessels in the placenta and in establishing blood flow in the umbilical cord. Too little HO-1 can lead to a restriction in the growth of the fetus and even in fetal death and miscarriage. New research published in BioMed Central's open access journal *Medical Gas Research* has shown that low dose carbon monoxide therapy is able to restore placental function and prevent fetal death in mice, without any detrimental effects.

Intrauterine growth restriction due to problems in placental function and blood flow can result in a 'small for gestational age' baby, miscarriage or [perinatal death](#). Both miscarriage and pre-eclampsia are associated with low levels of HO-1 in the placenta, however research suggests that carbon monoxide can mimic the effects of HO-1. Researchers from the Otto-von-Guericke University, Germany tested carbon monoxide therapy on [intrauterine growth restriction](#) in mice. They found that an extended course of low dose (50ppm) carbon monoxide was able to reduce fetal loss from 30% to zero – all the babies survived.

Prof Ana Claudia Zenclussen, who led the research explained, "At the levels used to prevent fetal death we found that inhaled low dose carbon monoxide was anti-inflammatory. It reduced the amount of cell death (apoptosis), and increased levels of the anti-apoptotic molecule BAG-1, in the placenta and additionally increased the level of vascular endothelial growth factor (VEGF), which is associated with angiogenesis and blood vessel repair."

Intrauterine growth restriction is a serious complication of pregnancy. Surviving babies have a lifelong increased risk of hypertension, cardiovascular disease and renal disease. In the face of these fears carbon monoxide therapy may provide a lifeline to mothers at risk. However there is a cautionary note - higher doses of carbon monoxide were able to improve placental function but were damaging to the fetus, shorter treatment at low dose was not enough to prevent [fetal death](#). Prof Zenclussen warned, "It is very important, given the inherent dangers in using carbon monoxide, that the dose and length of treatment are tightly controlled."

More information: Exploring the potential of low doses carbon monoxide as therapy in pregnancy complications. Tarek El-Mousleh, Pablo A Casalis, Ivonne Wollenberg, Maria L Zenclussen, Hans D Volk, Stefanie Langwisch, Federico Jensen and Ana C Zenclussen, *Medical Gas Research* (in press)

Provided by BioMed Central

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