The Effect of Nitric Oxide Synthase Inhibition on Spiral Arteries and Venous Remodeling During Rat Pregnancy

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Preeclampsia is a condition responsible for 76,000 maternal deaths and 500,000 infant deaths a year, and is characterized by less nitric oxide being produced, which results in reduced uterine vascular growth and poor placental perfusion. Using Sprague-Dawley rats, this hypothesis was tested, nitric oxide synthase (NOS) inhibition will reduce both the widening and depth of trophoblast-induced spiral artery remodeling, which will decrease placental flow and lessen growth of the post placental veins. Two groups of rats were used: controls (water only; n=6) and NOS inhibition with L-NAME, (0.5g/L in drinking water; n=4). Treatments were for 10 days, beginning on day 10 in pregnant rats. Controls were age-matched and also treated for ten days. Late pregnant and L-NAME treated rats, were euthanized on day twenty of pregnancy. The entire uterus was removed, the pups and placentas were weighed, and arterial and venous dimensions were measured with a dissecting microscope. Pups from L-NAME treated animals were 12.5% smaller than controls. Although there were no differences in placental weight, spiral artery depth and width, or diameter of post-placental veins, the post-myometrial veins were 26.7% smaller. In summary, the hypothesis was not confirmed regarding spiral artery changes. These differences were not statistically significant, probably because the amount of data collected was too low. The reduced size of the post-myometrial veins is intriguing since it shows that NOS is important to functional venous growth which could help further research for a cure of preeclampsia.