

SEVERE HYPERTENSION DURING RAT PREGNANCY ALTERS PLACENTAL DEVELOPMENT AND FETAL GROWTH

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Background and aims

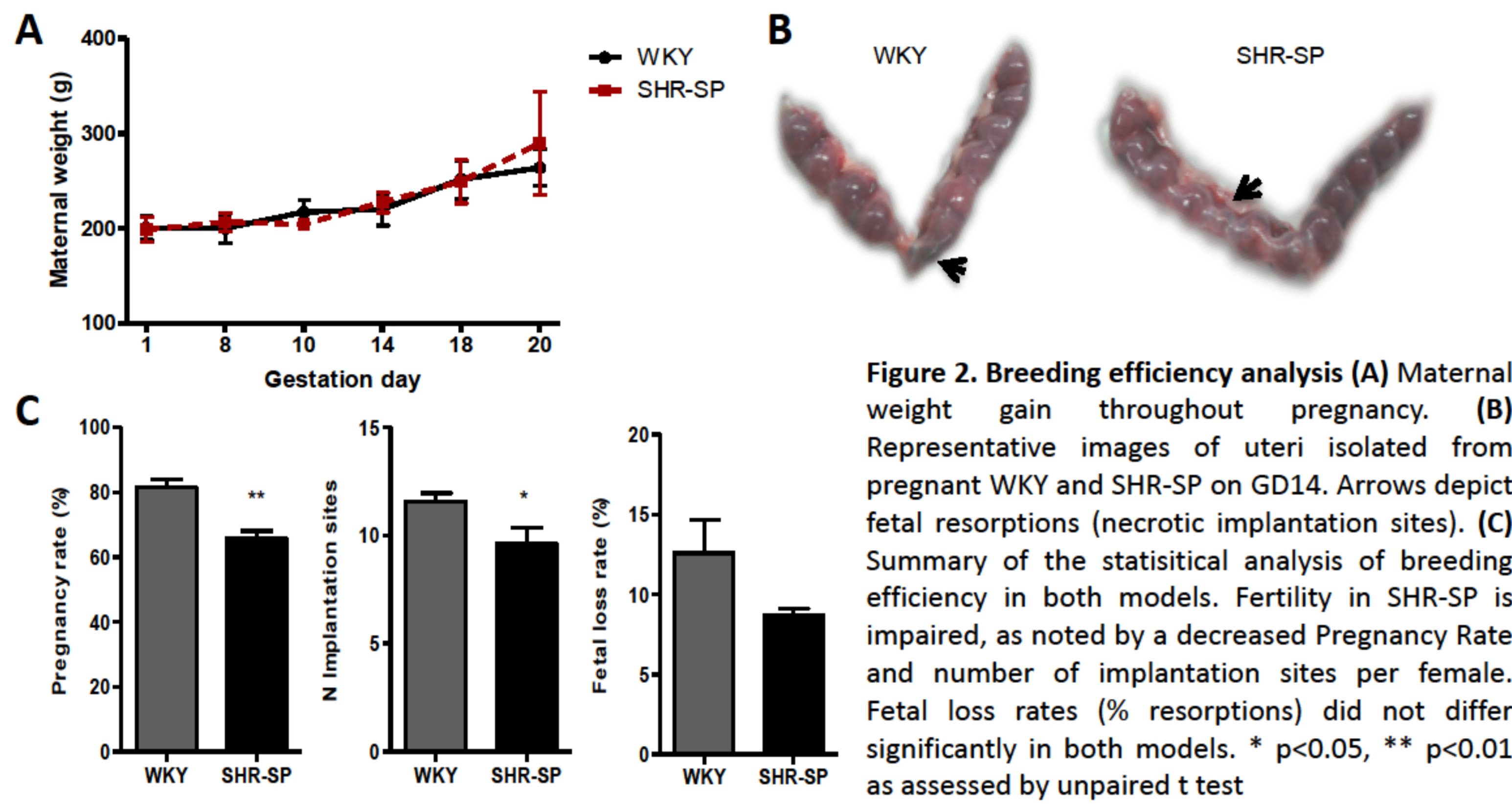
Arterial hypertension (HT) affects 1-5% of pregnant women worldwide, with a rising prevalence due to increasing maternal age, obesity, and type 2 diabetes. Pregnancies complicated by HT increase the risk of superimposed preeclampsia, fetal growth restriction (FGR), preterm delivery, and perinatal death. So far, there is scarce information available on placental development and function in severe HT animal models such as the Stroke-Prone Spontaneously Hypertensive Rat (SHR-SP) strain. Thus, the present study was conducted in order to characterize pregnancy in the SHR-SP focusing on the impact of blood pressure changes on placental development and fetal growth.

Experimental design and methods

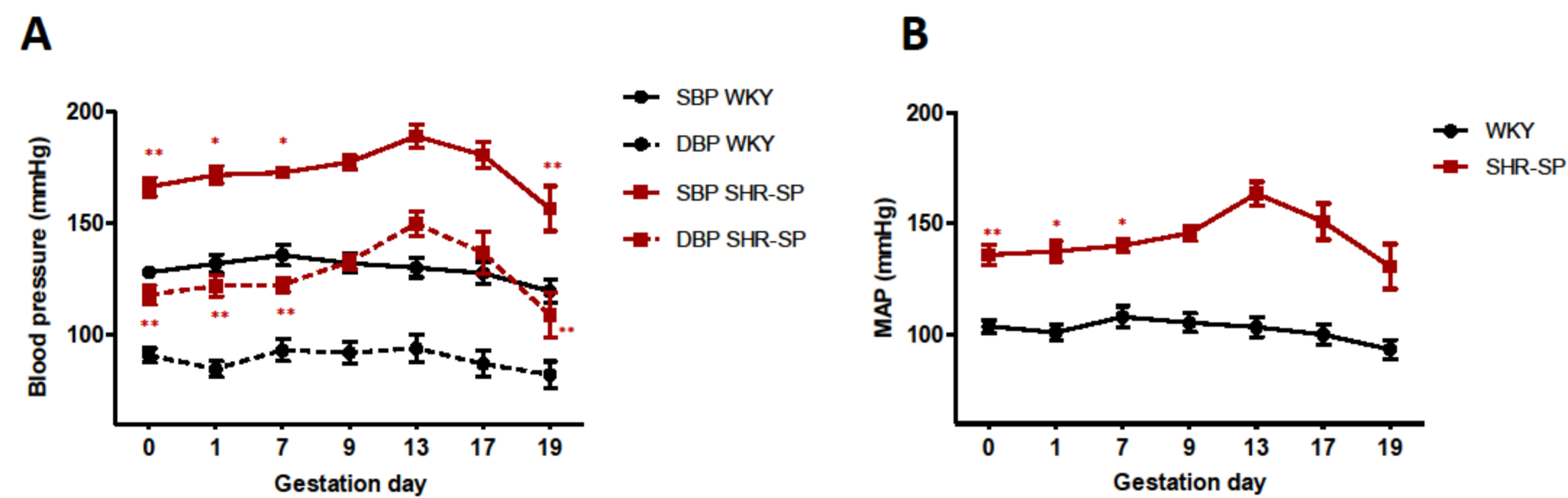
SHR-SP and Wistar Kyoto (WKY) females (10-12 weeks old, N= 5 animals/day analysed) were mated to congenic males and checked daily for vaginal plugs, denoted as gestation day (GD) 1. Blood pressure (BP) was determined by the tail-cuff method pre-mating and on the morning of GD1, 7, 9, 13, 17 and 19. On the selected dates, females were housed in metabolic cages for collection of 24 h urine samples. Following collection of blood samples, animals were euthanized and implantation sites isolated for morphological analyses. Fetal and placental weights were recorded on GD18 and GD20. Morphological analyses of placental development were performed in hematoxylin-eosin and Masson's Trichrome stained sections from GD14 and GD20.

Results

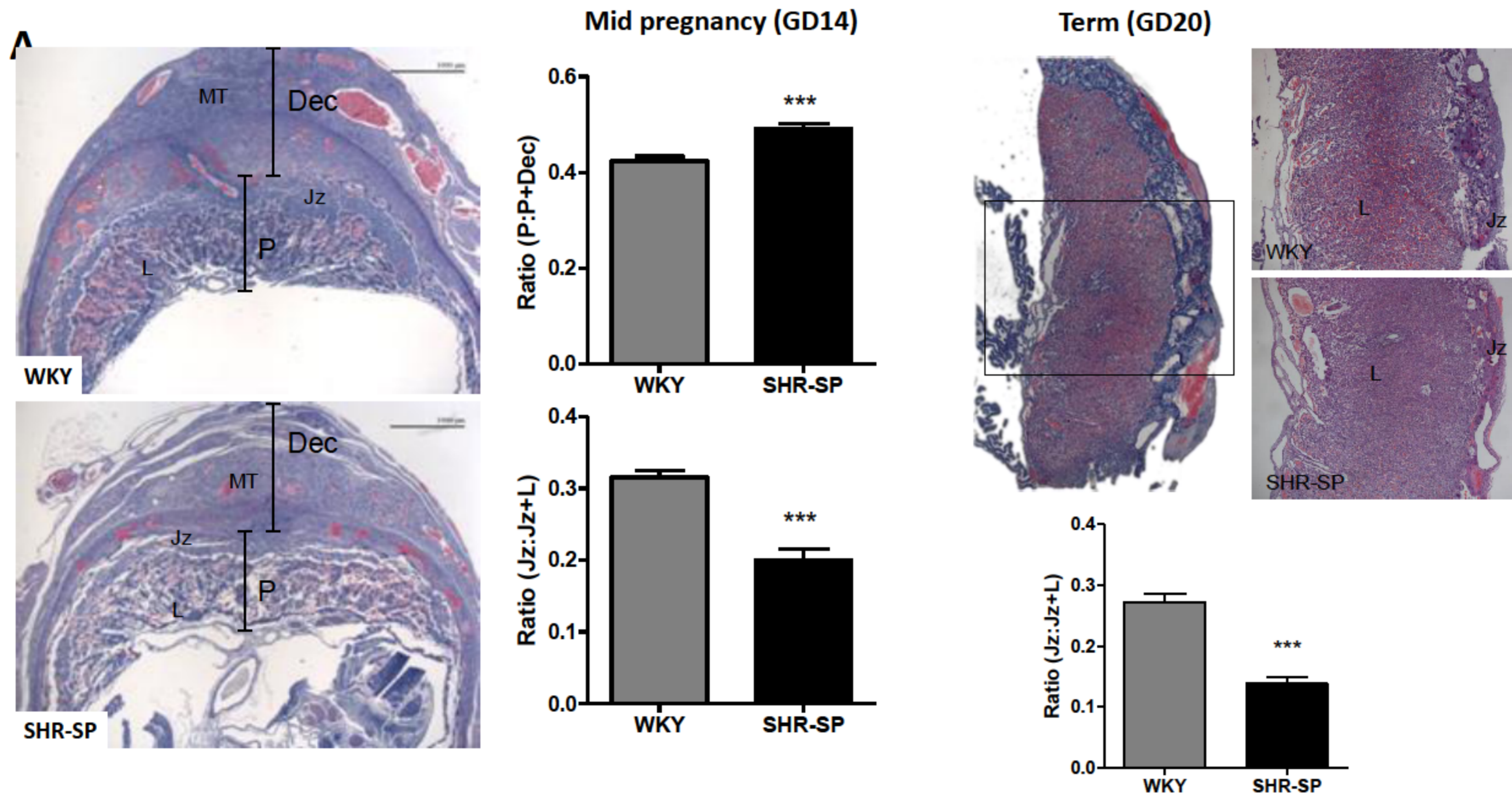
Breeding Efficiency is impaired in SHR-SP matings



SHR-SP females remain severely hypertensive throughout pregnancy



Placental development is markedly impaired in hypertensive pregnancies



Conclusions

SHR-SP females presented significant alterations in fetal growth probably due to defective placental development and function linked to the hypertensive scenario. Moreover, SHR-SP showed signs of altered renal function near term. These findings together suggest that the SHR-SP strain may be a useful model for further studies on pathogenic mechanisms in hypertensive pregnancies.

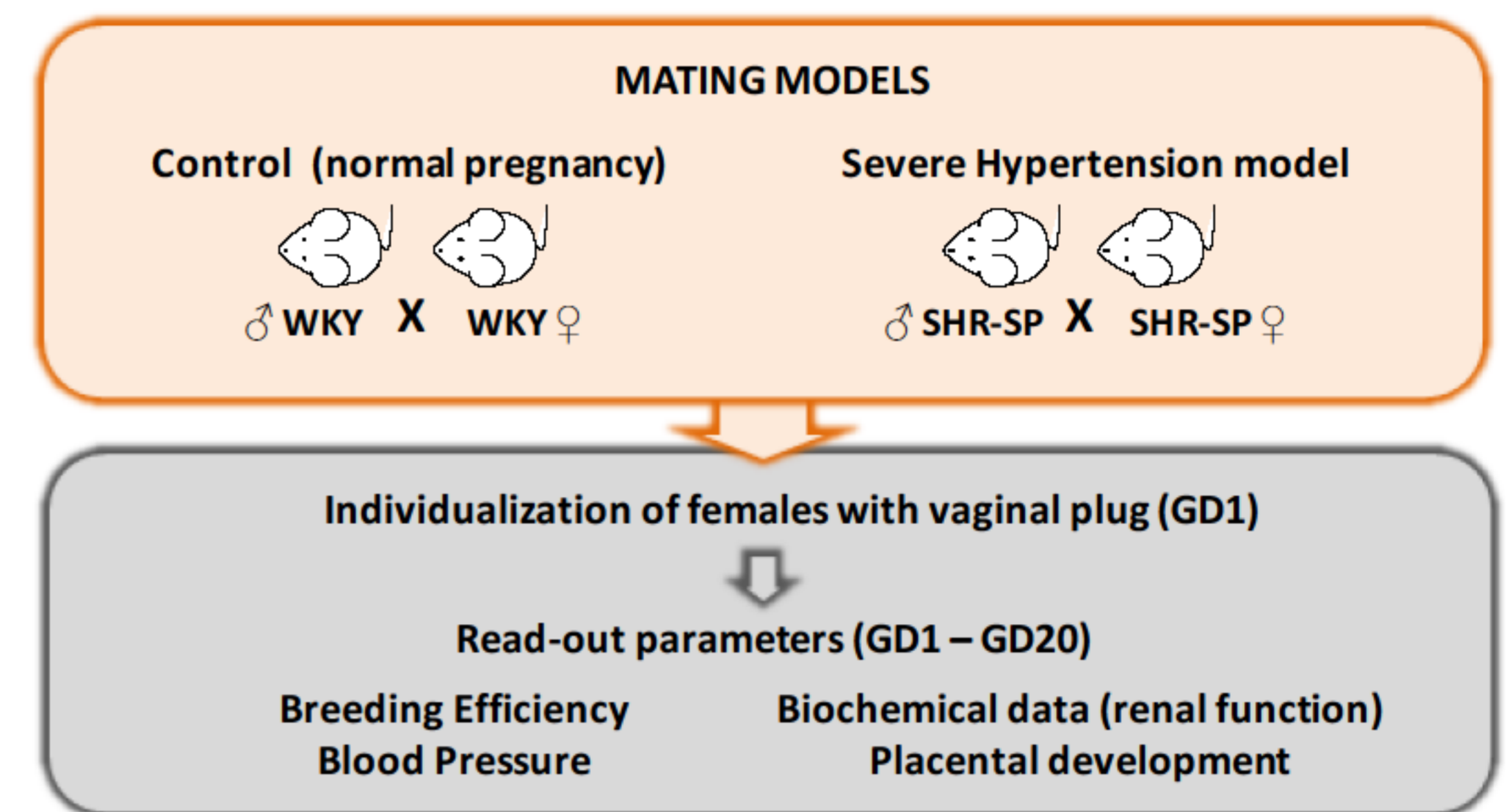
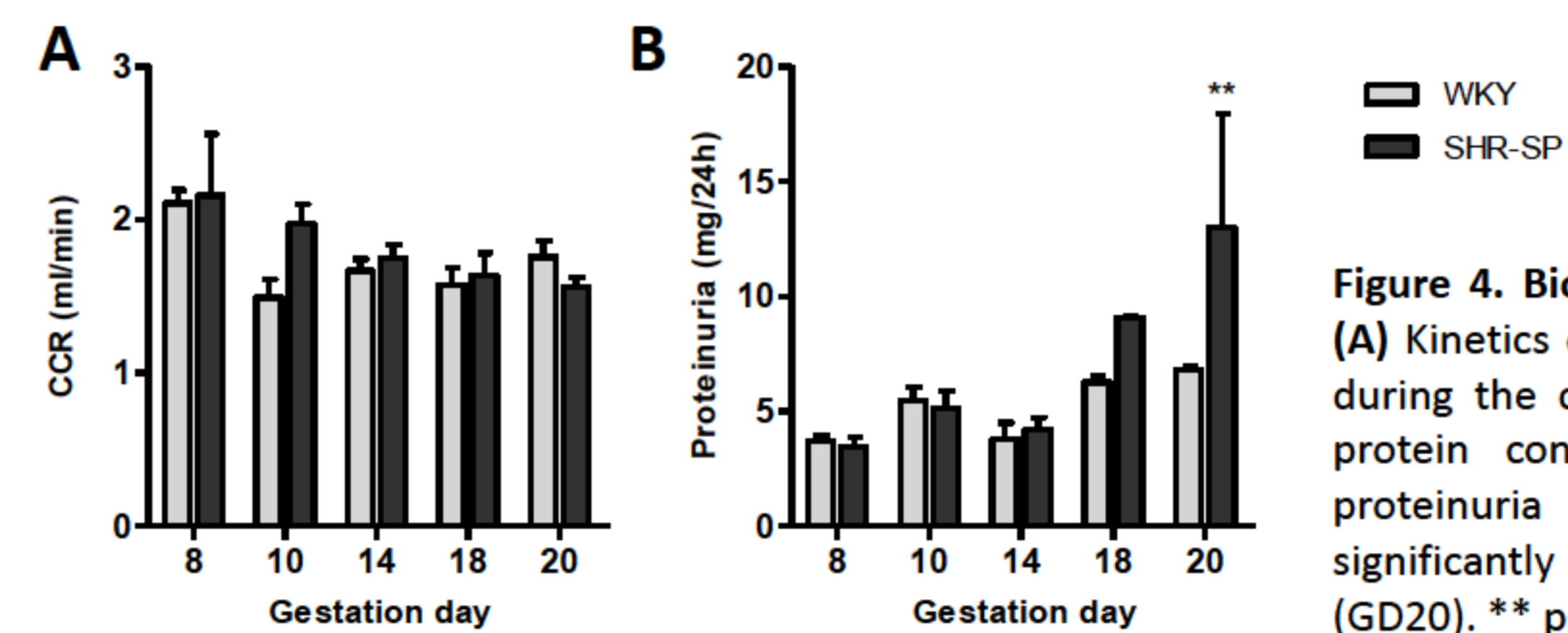


Figure 1. Summary of the experimental design to analyse the effect of severe hypertension in pregnant SHRSP rats

Proteinuria is increased at term pregnancy in SHR-SP females



SHR-SP dams show signs of placental insufficiency and FGR

