

Mechanical characterization of arteries affected by fetal growth restriction in guinea pigs (*Cavia porcellus*)

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© 2018 Fetal growth restriction (FGR) is a perinatal condition associated with a low birth weight that results mainly from maternal and placental constrains. Newborns affected by this condition are more likely to develop in the long term cardiovascular diseases whose origins would be in an altered vascular structure and function defined during fetal development. Thus, this study presents the modeling and numerical simulation of systemic vessels from guinea pig fetuses affected by FGR. We aimed to characterize the biomechanical properties of the arterial wall of FGR-derived the aorta, carotid, and femoral arteries by performing ring tensile and ring opening tests and, based on these data, to simulate the biomechanical behavior of FGR vessels under physiological conditions. The material parameters were first obtained from the experimental data of the ring tensile test. Then, the residual stresses were determined from the ring opening test and taken as initial stresses in the simulation o