Early cardiovascular remodelling in the offspring of rats exposed to undernutrition during pregnancy

Program LB626

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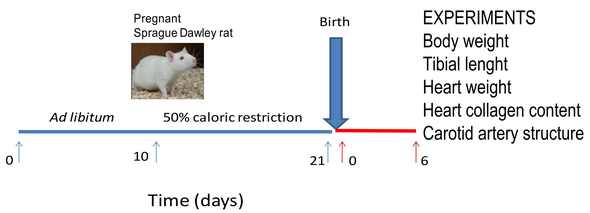
INTRODUCTION

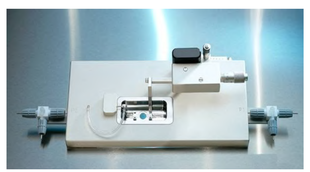
Adverse intrauterine and perinatal life predispose to development of cardiovascular disease in adulthood. The link between deficient diet during pregnancy and hypertension has been established in humans and rat models but the mechanisms responsible are not completely understood. We aim to assess if undernutrition during pregnancy induces early structural cardiovascular alterations in the offspring.

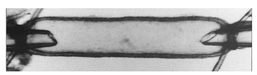
METHODS

Animal model



Pressure myography





Pressure-diameter curve internal/external diameters (10-140 mmHg) PFA fixation at 40 mmHg

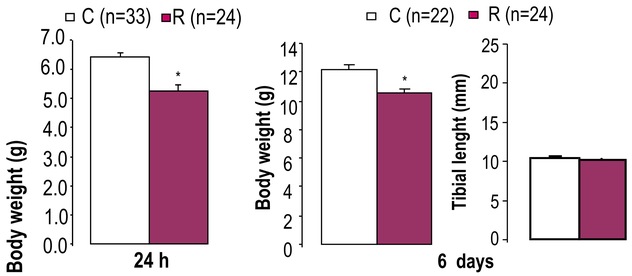
Confocal microscopy

Mounting on small well
Filled with mountig fluid
Avoids compression

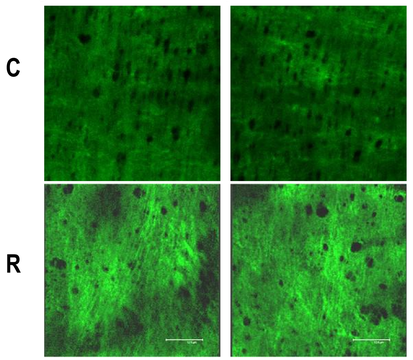
Internal elastic lamina
(Autofluorescence at Ex488nm)

RESULTS

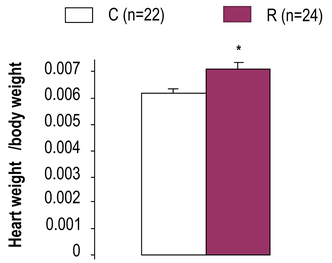
Maternal undernutrition induced a significant reduction of the offspring body weight at birth and at the age of 6 days, with no significant reduction of tibial lenght



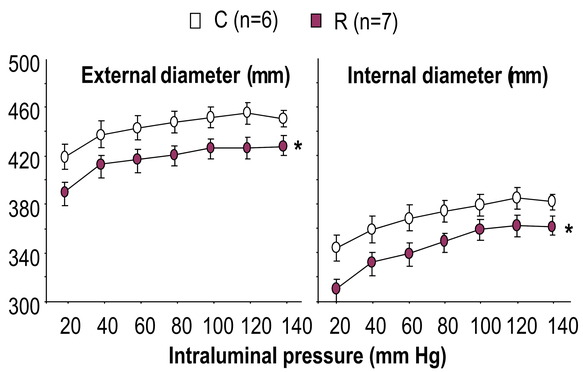
Internal elastic lamina from rats exposed to undernutrition exhibited and increased fluorescence intensity of the internal elastic lamina, suggesting increased or more compact elastin



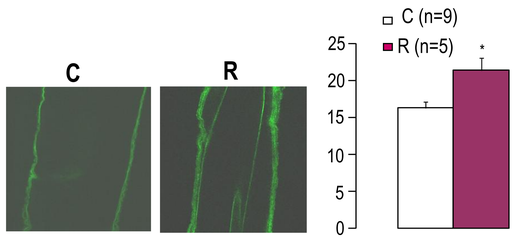
Maternal undernutrition induced a significant heart hypertrophy with increase in 6 day-old offspring



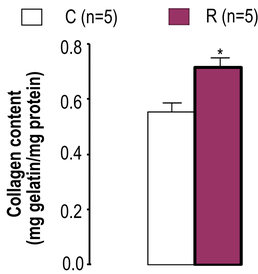
Maternal undernutrition induced a significant reduction of internal and external diameters of the carotid artery from 6 day old offspring



Confocal microscopy demonstrated a significant increase of wall tickness in the carotid artery from 6 day old rats derived from maternal undernutrition



Maternal undernutrition induced a significant increase in collagen content in 6 day-old offspring



CONCLUSION

Maternal undernutrition during pregnancy induces arterial narrowing and heart hypertrophy at an early age which might contribute to hypertension development in the adult.

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