STUDY OF THE EFFECT OF ADIPOSE TISSUE DERIVED STEM CELL (ASC) IN PROGRESSION OF RENAL DISEASE IN SHR RATS INDUCED TO METABOLIC SYNDROME

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Introduction: The visceral obesity, the main factor of Metabolic Syndrome (MS), determines a set of metabolic and hemodynamic abnormalities, which is linked to increased risk of kidney disease in the overall population. The adipose tissue is also considered an important source of stem cells, which can proliferate and differentiate into multiple cell lines reducing the expression of inflammatory proteins.

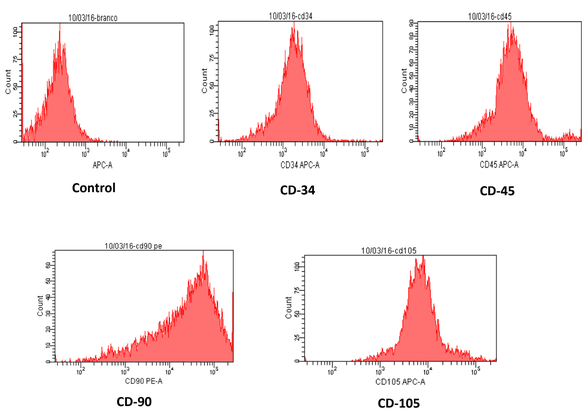
Objective: The aim of the study is to evaluate the effect of ASC on the kidney disease progression in SHR rats induced to Metabolic Syndrome.

✓**Subjects and Methods:** SHR male rats were induced to MS by hyperlipid diet for 12 weeks, and then treated with $2x10^5$ of ASC for 1 and 2 weeks, respectively. The rats were sacrificed for analysis the proteinuria, as well as the serum concentration of creatinine and lipid profile. Moreover, urine concentration of cystatin C and Ngal was measured by ELISA method. The characterization of ASC extracted from subcutaneous tissue of SHR control rats was performed through flow cytometry method. The results were expressed as mean values ± S.D. Difference groups were analysed by unparied Student's *t* test. *p* -Values <0.05 were considered significant.

Results

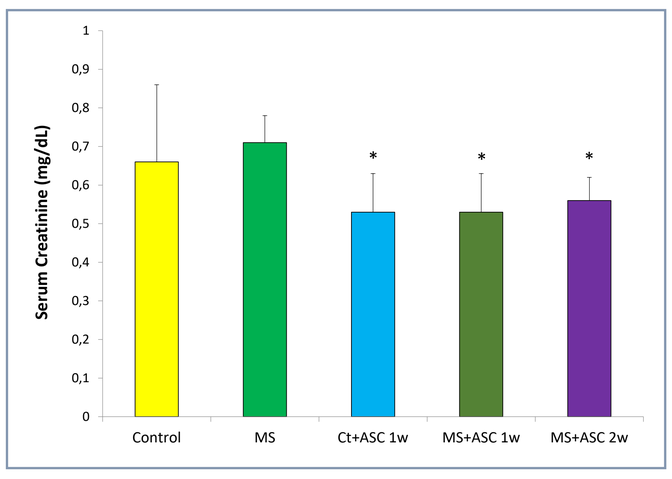
ASC characterization

❖ Figure 1: Characterization of ASC by flow cytometry method



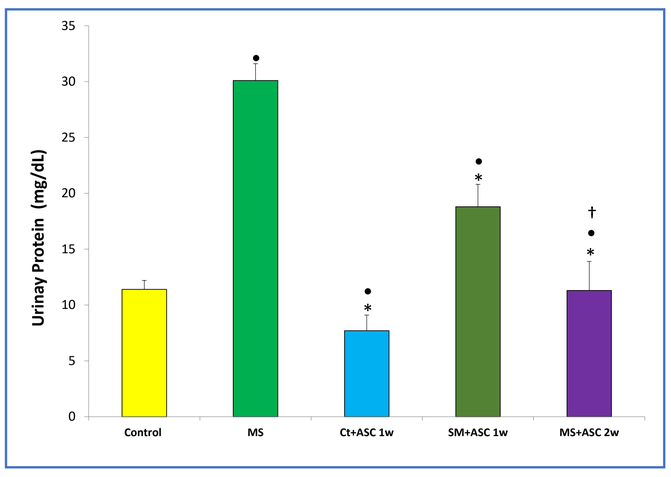
Urinalysis and blood chemistry

❖ Figure 2: Level of serum creatinine in SHR rats exposed to MS and treated with ASC



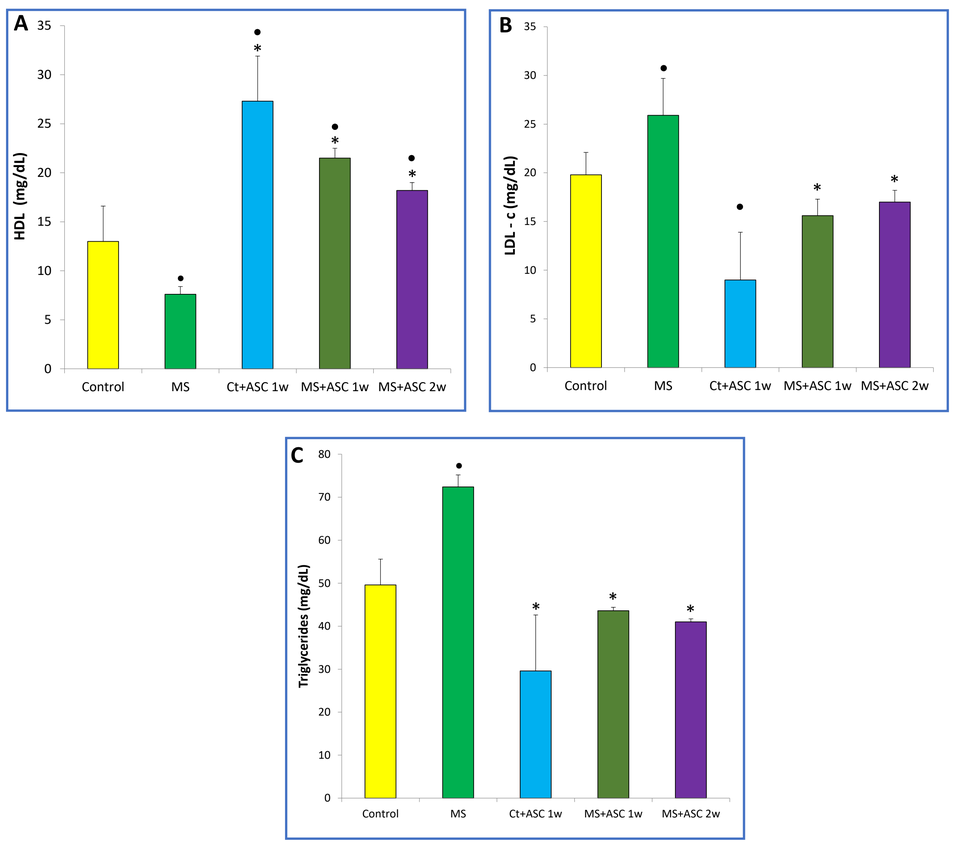
*p<0.05 *vs.* Control. MS: Metabolic Syndrome, Ct+ASC 1w: Control+ ASC treatment for 1 week, MS+ASC 1w: Metabolic Syndrome+ ASC treatment for 1 week, MS+ASC 2w: Metabolic Syndrome for 2 weeks (n=6)

❖ Figure 3: Level of urinary protein in SHR rats exposed to MS and treated with ASC



•p<0.05 *vs.* Control, *p<0,05 *vs.* MS, †p<0.05 *vs.* MS+ASC 1w; MS: Metabolic Syndrome, Ct+ASC 1w: Control+ ASC treatment for 1 week, MS+ASC 1w: Metabolic Syndrome+ ASC treatment for 1 week, MS+ASC 2w: Metabolic Syndrome + ASC treatment for 2 weeks (n=6)

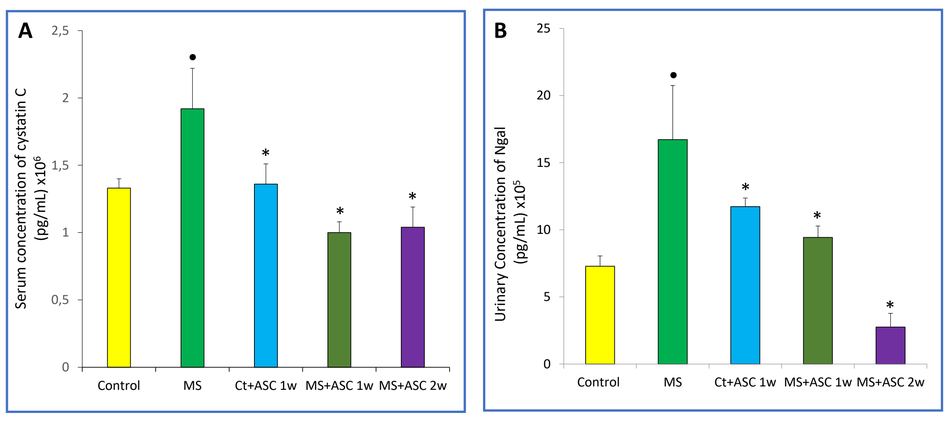
❖ Figure 4: Level of serum LDL,HDL and triglycerides in SHR rats exposed to MS and treated with ASC



(A) Serum HDL-c, **(B)** Serum LDL-c, **(C)** Serum Triglycerides in SHR rats. •p<0.05 *vs.* Control, *p<0,05 *vs.* MS. MS: Metabolic Syndrome, Ct+ASC 1w: Control+ ASC treatment for 1 week, MS+ASC 1w: Metabolic Syndrome+ ASC treatment for 1 week, MS+ASC 2w: Metabolic Syndrome+ASC treatment for 2 weeks (n=6)

Renal Injury Biomarkers

❖ Figure 5: Measurement of Ngal and cistatin C in SHR rats exposed to MS and treated with ASC



(A) Serum cystatin C, **(B)** Urinary Ngal in SHR rats. •p<0.05 *vs.* Control, *p<0,05 *vs.* MS. MS: Metabolic Syndrome, Ct+ASC 1w: Control+ ASC treatment for 1 week, MS+ASC 1w: Metabolic Syndrome+ ASC treatment for 1 week, MS+ASC 2w: Metabolic Syndrome+ASC treatment for 2 weeks (n=6)

Conclusion:

The treatment with ASC in SHR rats exposed to MS resulted in the attenuation of kidney disease progression.

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