IMPACT OF HIGH FAT DIET FEEDING DURING CHILDHOOD ON ADULT SYSTEMIC AND RENAL PARAMETERS: ROLE OF THE PHYSICAL EXERCISE

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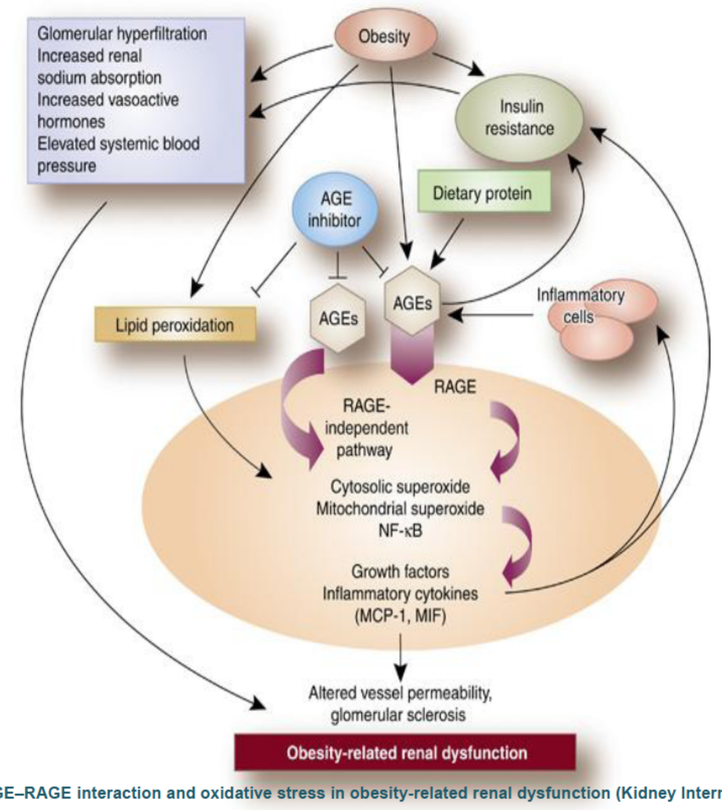
INTRODUCTION



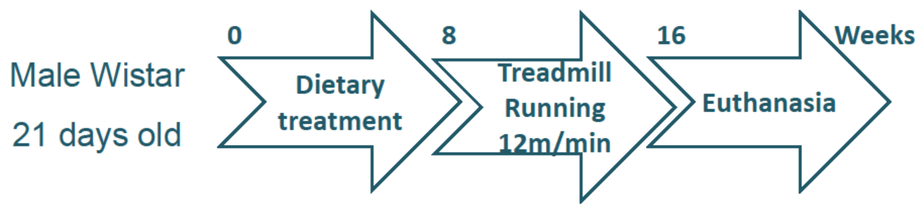
AGE–RAGE interaction and oxidative stress in obesity-related renal dysfunction (Kidney International 2014)

OBJECTIVES

To evaluate:

1. **The consequences of high fat feeding during the childhood on adult systemic parameters and renal function**
2. **The possible beneficial effects of the physical exercise**

METHODS



Groups:
Control (4% fat)
Control Exercise
High Fat (21% fat)
High Fat Exercise

24 hr Urine
Blood
Kidney
Liver
Visceral Fat

Statistics: ANOVA post test Tukey or Dunn

RESULTS

Table 1: Body Weight and Adiposity

	CT (n=5)		CTEX (n=5)		HF (n=6)		HFEX (n=4)	
Initial Body Weight (g)	67	0,7	68	4,1	67	2,1	66	2,4
Final Body Weight (g)	441	8,8	410	10,9	520	9,9[a]	482	25,6[b]
Weight Body Gain (g)	374	9,2	342	8,1	452	8,2[a]	417	23,6[b]
Epididymal fat Weight (% BW)	1,2	0,1	0,8	0,1	2,4	0,2	2,0	0,4[b]
Retroperitoneal fat Weight (% BW)	0,6	0,1	0,5	0,1	2,5	0,2[a,b]	2,2	0,4[a,b]
Mesenteric fat Weight (% BW)	0,4	0,1	0,3	0,1	1,6	0,1[a,b]	1,1	0,2
Adiposity Index (%)	2,2	0,1	1,6	0,1	6,5	0,4[a,b]	5,3	0,9[a,b]
Carcass Fat (% BW)	5,6	0,3	4,1	0,4	13,5	0,8[a,b]	12,4	2,0[a,b]

Data expressed mean EP; [a] vs CT and [b] vs CTEX

Table 2: Physiological Parameters

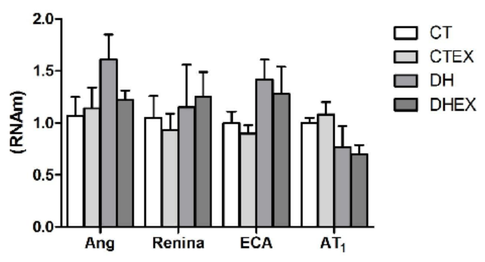
	CT (n=5)	CTEX (n=5)	HF (n=6)	HFEX (n=4)
Food Intake (g/day)	18 ± 1,4	20 ± 1,3	10 ± 1,1[a,b]	13 ± 1,0[a,b]
Water Intake (mL/day)	28 ± 3,7	34 ± 2,4	11 ± 0,8[a,b]	22 ± 2,0
Urinary Volume (mL/day)	14 ± 1,4	16 ± 1,6	7 ± 0,3[a,b]	10 ± 2,3
Sistolic Blood Pressure (mm Hg)	138 ± 3,3	140 ± 3,5	144 ± 1,3	145 ± 5,1
Fasting Blood Glucose (mg/dL)	99 ± 4,3	97 ± 3,8	120±5,7[a,b]	114 ± 3,0
Fasting Blood Insulin (mg/dL)	0,34 ± 0,1	0,23 ± 0,1	0,92 ±0,2[a,b]	0,77 ± 0,2[b]

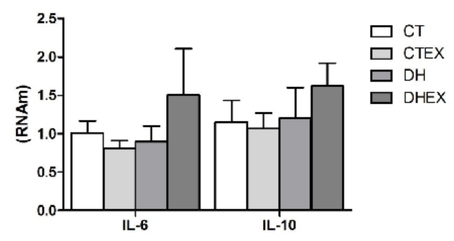
Data expressed mean ± EP; [a] vs CT and [b] vs CTEX

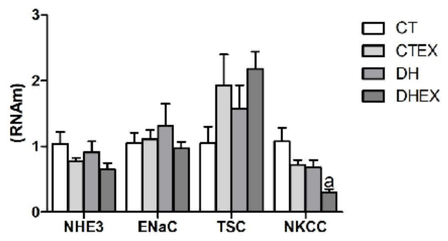
Table 3: Biochemical Parameters

	CT (n=5)	CTEX (n=5)	HF (n=6)	HFEX (n=4)
Total Cholesterol (mg/dL)	64 ± 4,8	71 ± 7,0	87 ± 5,1[a]	80 ± 7,5
HDL Cholesterol (mg/dL)	22 ± 1,0	21 ± 1,4	24 ± 1,9	22 ± 1,6
LDL Cholesterol (mg/dL)	32 ± 3,8	41 ± 5,5	44 ± 3,3	40 ± 7,7
VLDL Cholesterol (mg/dL)	10 ± 0,2	9 ± 0,9	19 ± 1,8[a]	18 ± 2,3[a,b]
Triglyceride (mg/dL)	47 ± 0,7	43 ± 4,0	95 ± 9,4[a]	90 ± 11,3[a]
P creat (mg/dL)	0,39 ± 0,1	0,38 ± 0,1	0,38 ± 0,1	0,34 ± 0,1
Cl creat (mL/min)	2,40 ± 0,5	2,22 ± 0,2	2,20 ± 0,3	3,26 ± 0,7
UNaV (mEq/24hrs	0,99 ± 0,2	1,42 ± 0,1	0,19 ± 0,1[a,b]	0,46 ± 0,1[a,b]
UKV (mEq/24hrs)	3,98 ± 0,3	4,50 ± 0,6	2,15 ± 0,2[a,b]	2,30 ± 0,1[a,b]
FENa (%)	0,24 ± 0,1	0,33 ± 0,1	0,04 ± 0,1[a,b]	0,05 ± 0,1 [a,b]
FEK (%)	20 ± 3,6	20 ± 1,7	11 ± 0,8[a,b]	8 ± 1,5[a,b]
Proteinuria (mg/24hrs)	15 ± 2,6	15 ± 2,0	7 ± 0,7	10 ± 0,9[a,b]

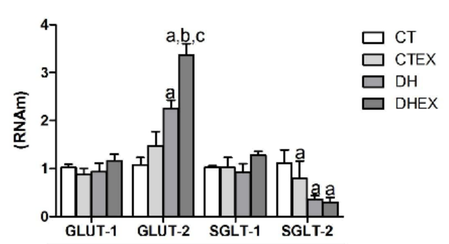
Data expressed mean ± EP; [a] vs CT, [b] vs CTEX and [c] vs HF.







[a] vs CT p=0,003



[a] vs CT; [b] vs CTEX; [c] vs DH p=0,04

SUMMARY AND CONCLUSION

The consumption of high fat diet induced:

- **Body weight gain and visceral fat accumulation**
- **Metabolic disorders (diabetes, hyperinsulinemia and dyslipidemia)**
- **No significant change in the creatinine clearance**
- **Reduction in FENa and FEK**
- **No effect in gene expression of the intrarenal RAS components, inflammatory markers and of the main sodium transporters, however, there was an increase in Glut-2 and a reduced in SGLT-2 mRNA expression levels**
- **The physical exercise was able to attenuate these changes**
- **These results suggest that the high-fat diet during childhood contributes to development of metabolic disorders, that can be relevant since they appear very early and may be aggravated lifelong**
- **Exercise was able to attenuate these metabolic disorders**

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