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INDICATORS OF RENAL FUNCTIONS UNDER THE CONDITIONS OF ALUMINUM CHLORIDE INTRODUCTION IN DIFFERENT AGE GROUPS OF ANIMALS

Abstract. *The experiments on 36 immature and mature nonlinear male albino rats, weighing 0,60-0,10 kg respectively, under the condition of aluminium salts introduction, have shown more significant nephrotoxic effect of studied xenobiotic in immature rats on excretory and acid regulating function, according to the increase of concentration and excretion of protein in urine. However, in mature rats, it was detected a trend towards an increase of ammonium excretion and ammonia ratio under the condition of aluminum salts introduction.*

Key words: *kidneys, aluminium chloride, immature rats, mature rats.*

Introduction. Chemical contaminants of the environment can get into the body via respiratory, digestive, dermal and mucous layers and as a result, cause pathological changes of different organs. Also, increasing pollution by industrial waste plays an important role in ecological disasters [1, 3, 4, 6]. Given problematics is also associated with a high level of urbanization, industrialization and high psycho-emotional stress. The question about the impact of aluminum salts on the excretory and acid regulating functions of kidneys in mature and immature rats is still remained insufficiently studied [2, 5, 8].

The aim of the study was to investigate the nephrotoxic effect of aluminum chloride on the excretory and acid regulating renal function in different age groups of animals [7, 9].

Materials and methods. We performed experiments on 36 immature and mature nonlinear albino male rats weighing respectively 0,16-0,21 kg; studied the impact of aluminum chloride on the excretory and acid regulating functions of kidneys in group comparison, during 14 days.

Results and discussions. Analysis of the evaluation of excretory and acid regulating renal function in intact immature rats, under the

condition of aluminum salts (table 1) showed, that the level of diuresis in immature rats against the background of aluminum salts introduction was characterized by a downward trend. Indicators of concentration and excretion of potassium ions with urine did not undergo changes. The concentration of protein in the urine and its excretion against the background of aluminum salts introduction in immature rats, while the excretion of titrated acids was inhibited. It was manifested a tendency towards an increase in ammonia excretion and probable increase of ammonia ratio upon the introduction of aluminum salts in immature rats.

Characteristics of indicators of excretory and acid regulating renal functions in intact mature rats under the impact of aluminum salts (table 2) showed, that the level of diuresis and the creatinine excretion in mature rats against the background of aluminum salts introduction decreased in group comparison. The concentration of protein in the urine and its excretion increased when introducing aluminum salts in mature rats. It was detected the probable increase in ammonia ratio upon the introduction of aluminum salts in mature rats, as to the control.

Table 1

Indicators of renal function in intact immature rats under the condition of aluminum salts

introduction ($\bar{x} \pm S_x$)

Indices	Immature rats (Al) (n=6)	Control (n=6)
The diuresis, ml / 2 h · 100 g	1,62±0,164	2,21±0,27
The concentration of protein in urine, g / l	0,22±0,017	0,065±0,001 p<0,001
The excretion of protein, mg / 2 h · 100g	0,39±0,039	0,14±0,019 p<0,001
The excretion of titrated acids, kmol / min 100 r	4,65±0,831	14,2±3,12 p<0,02
The ammonio ratio, conventional units.	5,2±0,324	2,64±0,311 p<0,001

Table 2

Indicators of renal function in intact mature rats under the condition of aluminum salts introduction

($\bar{x} \pm S_x$)

Indices	Mature rats (Al) (n=6)	Control (n=6)
The diuresis, ml / 2 h · 100 g	1,97±0,314	3,21±0,088 p<0,05
The excretion of kreatinine, mkmol/ 2 h · 100 g	1,22±0,217	2,27±0,213 p<0,05
The concentration of protein in urine, g / l	0,24±0,019	0,07±0,008 p<0,001
The excretion of protein, mg/ 2h · 100 g	0,45±0,049	0,22±0,006 p<0,001
The ammonio ratio, conventional units.	1,46±0,188	1,04±0,048 p<0,001

The usage of forest plot of meta-analysis of the comparative evaluation of the nephrotoxic effect of aluminium salts introduction in mature and immature rats, on the assumption of low sodium diet at water induced diuresis in the volume of 5% of the body weight, provided the opportunity to demonstrate more significant nephrotoxic effect of the investigated environmental factor on immature animals (figure)

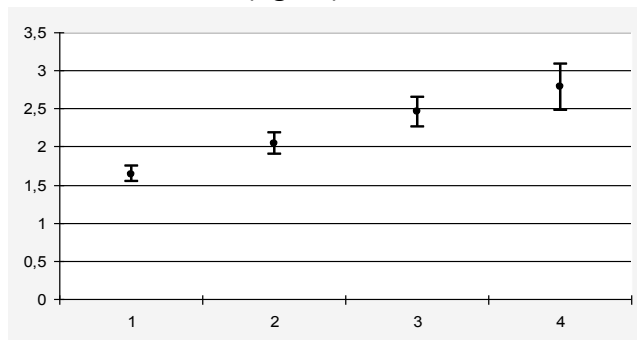


Figure.1 Forest plot of the meta-analysis of the comparative evaluation of the nephrotoxic effect of aluminum salts in mature and immature rats under low sodium diet at water induced diuresis in the volume of 5% of body weight. 1 – the excretion of potassium ions (mlmol / l) in mature rats; 2 – the excretion of protein (mg / 2 h · 100 g) in mature rats; 3 – the excretion of potassium ions (mlmol / l) in immature rats; 4 – the excretion of protein (mg / 2 h · 100 g) in immature rats. Control for all studies is presented in the form of a horizontal line and accepted for 1.

Conclusion. Thus, impact analysis of aluminum

chloride on the excretory and acid regulating function of kidneys in mature and immature rats showed, that the investigated environmental load is accompanied by a nephrotoxic effect characterized by proteinuria due to the damage of tubular part of the nephron.

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