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Uroanalysis of Wistar, Wistar Kyoto and Spontaneous Hypertensive Rats

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Abstract

Uroanalysis reveals information about metabolic, hepatic, and renal function as well as indications of the dysfunction etiology. It is a simple, practical and quick method to perform analysis of the biochemical urine constituents by markers in reagent strips. In this study, we evaluated the urine of Wistar, Wistar Kyoto (WKY) and spontaneously hypertensive rats (SHR). Uroanalysis of WKY and SHR rats indicated ketosis and increased protein presence than Wistar. The WKY and SHR urine was more diluted than Wistar. Only the WKY presented haemolysis. The results indicate absence of hepatic dysfunction and infections in the urine of the different strains of rats. Ketonuria corroborates with the fasting rat's state, hematuria is an indicative of the urinary system dysfunction and proteinuria specifically refers to renal dysfunction, these are related to high WKY weight and SHR hypertension. Dilution of urine may be related to hydroelectrolytic imbalance due to changes in the HPA axis presented by WKY and SHR.

Key words: Urine markers, uroanalysis, rats.

Introduction

Urine is an easily obtainable fluid. The uroanalysis reveals information about the general function of the organism related to the metabolic, hepatic and renal state, providing indications on the dysfunction etiology (1). This analysis is a fast, practical and low-cost method. Frequently, reagent strips are used for the analysis of the biochemical constituents of urine which are a simple and rapid way of performing ten or more analyzes of important biochemical markers, such as urobilinogen, proteins and ketones (1). SHR rats (spontaneously hypertensive), developed by Okamoto & Aoki (2), present a multifactorial condition extremely similar to the essential hypertension in human (3) and have the Wistar Kyoto (WKY) as control that is heavier than the SHR and Wistar rats. WKY, as well as SHR, exhibit increased activation in the hypothalamic-pituitary-adrenal axis (HPA) (4), however, they are normotensive, such as the Wistar. We aimed to evaluate the metabolic, hepatic and renal function of 15 weeks old Wistar, WKY and SHR rats from urine samples.

Results and Discussion

Uroanalysis (Figure 1) of WKY and SHR rats indicated ketosis and increased protein presence than Wistar. The urine of WKY and SHR was more diluted than Wistar. Only WKY showed hemolysis (Table 1).

Table 1- Uroanalysis in 15 week old Wistar, WKY and SHR rats.

Marcadores	Wistar	WKY	SHR
Proteína	22,5 ($\pm 2,835$)	30 (+) 0.3	30 (+) 0.3
Cetonas	Neg	5 (0.5)	5 (0.5)
Sangue	Neg	Hemólise traços	Neg
Leucócitos	Neg	Neg	Neg
pH	7	7	7
Nitritos	Neg	Neg	Neg
Urobilinogênio	Normal	Normal	Normal
Densidade Específica	1.020	1.010	1.010
Bilirrubina	Neg	Neg	Neg
Glicose	Neg	Neg	Neg

Figure 1- Image of urine markers and an result example.



Conclusions

Prolonged fasting promotes the lipid metabolism, which have as byproduct ketone bodies. Ketonuria corroborates to the fasted rats status. Hematuria is a sign of urinary system dysfunction and proteinuria specifically refers to renal dysfunction. These results are related to the high WKY weight (5) and the hypertension presented by SHR (6). The exams indicated absence of hepatic dysfunction and infections in the urine of the different strains. The decrease in specific density may be related to hydroelectrolytic imbalance due to changes in the HPA axis presented by WKY and SHR.

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