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BRIEF NOTE

# Outcomes of testosterone enanthate on kidney of male Wistar rats subjected to resistance training

*Effets de l'énanthate de testostérone sur les reins de rats mâles Wistar soumis à un entraînement en résistance*

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## KEYWORDS

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## Summary

**Background.** – Anabolic androgenic steroids (AAS) are the most common doping agents in the sports and AAS abusers may show different renal side effects. The purpose of this study was to determine the effects of 8 weeks testosterone enanthate (TE) injection and resistance training (RT) on kidney in male Wistar rats.

**Materials and methods.** – Twenty-eight male adult Wistar rats were randomly divided into 4 groups; C: control, RT: resistance training, TE: testosterone enanthate, TE + RT. Resistance training protocol consisted of climbing (5 reps/3 sets) a ladder for 8 weeks. TE and placebo (20 mg/kg BW, IM) were injected twice a week. At the end, rats were euthanized and serum biochemical analysis and pathological examinations of kidney tissue were conducted.

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## MOTS CLÉS

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**Results.** – serum creatinine concentration in RT group was significantly ( $P < 0.05$ ) higher than that in TE and TE + RT groups and mild hyperemia and congestion were observed in all treatment groups.

**Conclusion.** – Although, we showed that 8 weeks consumption of TE (20 mg/kg) accompanied with RT does not negatively affect renal function, but further studies are necessary to obtain more detailed information.

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## Résumé

**Contexte.** – Les Stéroïdes Anabolisants Androgéniques (AAS) sont les produits dopants les plus utilisés dans le sport et sont susceptibles d'exercer des effets secondaires sur le rein. Le but de cette étude était de déterminer les effets d'une injection d'énanthate de testostérone (TE) lors d'un entraînement en résistance (RT) de 8 semaines chez des rats Wistar mâles.

**Matériels et méthodes.** – Vingt-huit rats Wistar mâles ont été randomisés en en 4 groupes : C : contrôle, RT : exercice en résistance + placebo, TE : énanthate de testostérone, et l'association des deux (TE + RT). Le Protocole d'entraînement en résistance consiste en la montée d'une échelle (5 fois à 3 reprises) pendant huit semaines. Le TE et le placebo (20 mg/kg de poids corporel, en IM) ont été injectés deux fois par jour. A la fin, les rats ont été euthanasiés pour réaliser l'analyse biochimique du sérum et l'examen histopathologique du tissu rénal.

**Résultats.** – Dans le groupe RT, une augmentation significative ( $p < 0,05$ ) de la créatinine sérique a été observée en comparaison avec les groupes TE et TE + RT. Une hyperémie modérée et une congestion du tissu ont été observées dans tous les groupes de traitement.

**Conclusion.** – Nous ne mettons pas en évidence de détérioration de la filtration glomérulaire après 8 semaines de TE (20 mg/kg) mais d'autres études sont nécessaires pour préciser l'effet rénal de ce traitement.

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## 1. Introduction

It is known that testosterone has nuclear receptors on renal tubules and mesangial cells in male rats [1]. There are reports of renal side effects due to using AASs [2,3] and it has been suggested that testosterone replacement affected the deterioration of renal function in rats [1]. Testosterone enanthate is a long act AAS that used extensively by athletes due to its low cost and availability. Since, there is no study about renal effects of repeated and long-term use of this AAS especially in athlete abusers; this study was performed to assess the safety of 8 weeks use of testosterone enanthate along with resistance training on renal function and histological parameters in adult male Wistar rats.

## 2. Materials and methods

In this study, 28 male adult Wistar rats were reared under normal environmental condition (temperature:  $22 \pm 1.4^\circ\text{C}$  and humidity: 65–75%) and 12/12h light/dark cycle and free access to water and standard chow. After 1 week acclimation of rats, they were randomly divided into 4 groups including; C: control, RT: resistance training+placebo, TE: testosterone enanthate (20 mg/kg BW); TE+RT: testosterone enanthate (20 mg/kg BW)+resistance training. TE was injected deeply intramuscular, twice a week, at 10 a.m. considering the priority of evening exercises. Control and RT groups received the olive oil solution as placebo. The RT protocol consisted of climbing (5 reps/3 sets) a ladder

carrying a load suspended from the tail. At the first week the amounts of load weights were 50% of rat's body weight and every week according to the weights of rats, 10% were added and finally reached to 120% of the body weights. After 8 weeks, blood specimens were obtained from the orbital sinus and serum was separated by centrifugation ( $3000 \times g$ , 10 min). Within 24–36 h after the last TE administration and RT session, all rats were sacrificed under chloroform (Merck, Germany) anesthesia and renal tissue samples were collected and fixed in 10% buffered formalin. After processing, stained by H&E for histopathology evaluation. The serum concentration of urea and creatinine were measured by an autoanalyzer (Biotechnica Targa 1500, Italy) and commercial kits (Pars Azmoon, Iran).

### 2.1. Ethics and animal experimentation

All animal experiments were performed in strict accordance with the guidelines approved by the Animal Ethics Committee of Ferdowsi University of Mashhad, Iran.

### 2.2. Statistical analysis

The SPSS Software, version 16, was used in order to perform the statistical analysis. Kruskal–Wallis test and Mann–Whitney test were applied to do inter-group and dual comparisons respectively and the values ( $P < 0.05$ ) were considered as statistically significant.

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