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# The effects of energy drinks, drugs and hormones that taken by the bodybuilding sportsmen on the some liver and kidneys functions in Kirkuk city

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## Abstract
The present study included one hundred ten volunteers (bodybuilding sportsmen; Ninety sportsmen took stimulants and twenty without stimulants). Then, volunteers distributed to four groups according to the types of stimulant. The first group was control group without stimulants. The second group sportsmen who used energy drinks (Red bull and Power Horse). The third group sportsmen who used drugs (max miz (100mg), XXL protein (100mg)، sirios mass (200mg). The fourth group sportsmen who used hormones(testosterone، insulin، growth hormone، nandrolone، primobolan and stanazol).
The results showed significant increased ($P<0.05$) in serum aspartate transaminase (AST), alanine transaminase (ALT), cholesterol, triglyceride, urea, creatinine, potassium and decreased sodium in all groups who consumed energy drinks, drugs and hormones compared with control groups.
The aim of this study was to investigate some biochemical parameters included AST, ALT, cholesterol, triglyceride, urea, creatinine, potassium and sodium concentrations in sera of all bodybuilding sportsmen.
**Conclusions:** concluded from this study that the stimulants which used by bodybuilding sportsmen have risk effects on the liver and kidneys functions.

**Keywords:** bodybuilding; liver; kidneys; energy drinks; drugs; hormones.

## Introduction
The liver is second largest organs (largest gland) in the body. It has not only considerable, reserves but also the ability to regenerate itself and building new cells [1]. The hepatocytes possess different metabolic functions that deal with very essential processes such as deamination, detoxification, transamination, removal of ammonia in the form of urea, biosynthesis, and release of the plasma proteins, and non-essential amino acids with the exception of immuno gamma globulins, gluconeogenesis, storage of glycogen, conversion of carbohydrates, and proteins into lipids, synthesis of cholesterol,, lipoproteins and phospholipids, oxidation of fatty acids, storage of iron in the form of ferritin, as well as storage of some vitamins [2,3,4,5]. The most common, functions test to explore hepatic status consists of serum total protein,, albumin, alkaline phosphatase (ALP), aspartate aminotransferase (AST), total bilirubin (TB) and alanine aminotransferase (ALT) [6].

The kidney is an important organ has, excretory function and other functions such as enzymatic reaction, immunization, maintenance and counter regulation of complex electrolyte, disturbances [7]. The markers of renal function test assess the normal functioning of kidneys. Renal function tests, like creatinine, and urea are parameters to diagnose functioning of the, kidney [8].

So, the aim of this study was to find the effect of energy drinks, drugs and hormones that take by the sportsmen of bodybuilding on the some liver and kidney functions.

## Subjects & methods
The study included one hundred ten volunteers (male) were taken in this study. Ninety sportsmen body building randomly who referred to Al-Rafedain hall ، Omer hall and Iskan hall in Kirkuk city-Iraq between May،2015 to October،2016 ،range between different age group (18-40 years).

## Experimental design
In this study One hundred and, ten volunteers were used, and distributed for four groups, as follow (table 1):

**1. Group A**: control group sportsmen without use any drugs or hormones.

**2. Group B**: sportsmen who used energy drinks (Red bull and Power Horse)، this group divided to two subgroups:

**1.** Used energy drinks for five years. **2.** Used energy drinks more five years.

**3. Group C**: sportsmen who used drugs (**1.**vitamins like :A، D3 (100mg) and sintrom (100mg).

**2.** Proteins like: max miz (100mg), XXL protein (100mg)، sirios mass (200mg)، cell tech miga mass and true mass (150mg). **3.** Acids like: amino acid (200mg) and BCAA (100mg)), this group divided to two subgroups:

**1.** Used drugs for five years. **2.** Used drugs more five years.

**4. Group D**: sportsmen who used hormones (testosterone، insulin، growth hormone، nandrolone، primobolan and stanazol), this group distributed to two subgroups:

**1.** Used hormones for five years. **2.** Used hormones more five years.

**Table 1: The percent of volunteers in each group**

| Groups | 0-5 years | More then five years |
|---|---|---|
| **Control** | 7.3%(8) | 11%(11) |
| **Energy drinks** | 18.18%(20) | 11.81%(13) |
| **Drugs** | 15.45%(17) | 13.63%(15) |
| **Hormones** | 9.09%(10) | 14.45%(16) |

**Sample Collections for serological analysis**

After preparation general information from sportsmen bodybuilding according to questionnaire were taken Eight milliliters (ml) venous blood was obtained from the subjects. All blood samples. Sera were obtained after samples and centrifuged and stored at -20°C until assayed for laboratory investigations [9]. Levels of serum AST, ALT, cholesterol, triglyceride, urea, creatinine, sodium, and potassium were measured using standard kits [10, 11, 12].

**Statistical analysis**

Data were analyzed by using a statistical Minitab, program under SPSS. Results were analyzed statistically using, Analysis of Variance (ANOVA) test, in order to evaluate the significance of variability, between treated and control groups.

## Results

**AST & ALT**

The results of AST & ALT activity in all bodybuilding sportsmen (energy drinks, drugs and hormones) less than five years groups show significant increased ($P<0.05$) compared with all control groups as show in table (2). Also, AST & ALT activity in all bodybuilding sportsmen more than five year groups show significant increased ($P<0.05$) compared with all control and less than five years groups as show in table (2).

**Table 2: AST & ALT activities in serum**

| Groups | 0-5 years | | More then five years | |
|---|---|---|---|---|
| | AST (U/L) | ALT (U/L) | AST (U/L) | ALT (U/L) |
| **Control** | 29.3 ± 4.57 d | 34 ± 4.69 d | 29.3 ± 4.57 d | 34 ± 4.69 d |
| **Energy drinks** | 42 ± 6.27 c | 41.5 ± 5.45 c | 63.3 ± 6.24 c | 48.9 ± 4.48 c |
| **Drugs** | 56.8 ± 5.38 b | 59.8 ± 5.74 b | 79.5 ± 5.45 b | 69.3 ± 8.3 b |
| **Hormones** | 72 ± 6.27 a | 77 ± 6.93 a | 106 ± 7.16 a | 98.4 ± 9.41 a |

* Note: same letters mean non-significant changes and different letters mean significant changes.

**Cholesterol & triglyceride**

The results of Cho & Tri levels in all bodybuilding sportsmen (drugs and hormones) less than five years groups, showed significant increased ($P<0.05$) compared with all control group, but Cho & Tri levels in the bodybuilding sportsmen energy group drinks show non-significant changes ($P<0.05$) compared with all control group as showed in table (3). Also, Cho & Tri levels in all bodybuilding sportsmen more than five year groups showed significant increased ($P<0.05$) compared with all control and less than five years groups as show in table (3).

**Table 3: The levels of cholesterol & triglyceride in serum**

| Groups | 0-5 years | | More then five years | |
|---|---|---|---|---|
| | Cho (mg/dl) | Tri (mg/dl) | Cho (mg/dl) | Tri (mg/dl) |
| **Control** | 160 ± 18.4 c | 129 ± 9 c | 158.3 ± 19.7 d | 125.3 ± 9.1 c |
| **Energy drinks** | 169.4 ± 28 c | 131.8 ± 14.3 c | 193.8 ± 44.1 b c | 162.6 ± 25.6 c |
| **Drugs** | 236.6 ± 43.9 b | 172 ± 13.6 b | 267.4 ± 58.9 b | 228.4 ± 45.7 b |
| **Hormones** | 276.5 ± 39.1 a | 217.8 ± 22.1 a | 349 ± 79.6 a | 310.8 ± 57 a |

**Urea & creatinine**

The results, of urea & creatinine levels in all bodybuilding sportsmen (energy drinks, drugs and hormones) less than five years groups showed significant increase ($P<0.05$) compare with all control groups as show in table (4). Also, urea & creatinine levels in all bodybuilding sportsmen more than five year groups showed significant increased ($P<0.05$) compare with all control and less than five years groups as show in table (4).

**Table 4: The levels of urea & creatinine in serum**

| Groups | 0-5 years | | More then five years | |
|---|---|---|---|---|
| | Urea (mg/dl) | Creatinine (mg/dl) | Urea (mg/dl) | Creatinine (mg/dl) |
| **Control** | 26.4 ± 2.78 d | 0.8 ± 0.1 d | 27.8 ± 4.5 d | 0.7 ± 0.16 d |
| **Energy drinks** | 35.2 ± 7.3 c | 1.2 ± 0.19 c | 47 ± 2.28 c | 1.4 ± 0.3 c |
| **Drugs** | 49.7 ± 5.54 b | 1.6 ± 0.09 b | 53.71 ± 3.68 b | 1.9 ± 0.14 b |
| **Hormones** | 59.4 ± 6.9 a | 1.9 ± 0.23 a | 64.3 ± 2.33 a | 2.4 ± 0.33 a |

**Sodium & potassium ions**

The results, of sodium & potassium concentrations in all bodybuilding sportsmen (drugs and hormones) less than five years groups showed significant changes ($P<0.05$) compare with all control group, but Sodium & potassium concentrations in the

bodybuilding sportsmen energy drinks group showed non-significant changes (P<0.05) compare with control group as showed in table (5). Also, Sodium & potassium concentrations in bodybuilding sportsmen (drugs and hormones) more than five year groups showed significant increased (P<0.05) compare with all control and less than five years groups, but potassium concentrations in the bodybuilding sportsmen energy drinks group more than five years showed non-significant changes (P<0.05) compare with control group and bodybuilding sportsmen energy drinks group less than five years as show in table (5).

**Table 5: The concentrations of sodium & potassium in serum**

| Groups | 0-5 years | | More then five years | |
|---|---|---|---|---|
| | Na (mg/dl) | K (mg/dl) | Na (mg/dl) | K (mg/dl) |
| **Control** | 134.6 ± 5 a | 4 ± 0.23 c | 136.4 ± 4 a | 3.7 ± 0.32 c |
| **Energy drinks** | 131.5 ± 4.4 a | 3.9 ± 0.36 c | 125.7 ± 3.2 b | 4.2 ± 0.54 c |
| **Drugs** | 123.2 ± 3.5 b | 5.6 ± 0.59 b | 114.8 ± 2.8 c | 6.6 ± 0.64 b |
| **Hormones** | 112.8 ± 6.6 c | 6.8 ± 0.45 a | 98.7 ± 11 d | 8.8 ± 0.62 a |

## Discussion

Backer & Hanadi (2014) referred that the energy drinks (Red bull, Power House, etc) has severity effects on liver functions. They were administrated rats with energy drinks and than, they found the activities of AST and ALT increased in rats administrated with energy drinks compare with control group. They suggested that the most energy drinks cause a disorder in liver which effect the production of their enzymes [14]. Pertusi et al (2001) referred that the Evaluation of aminotransferase elevations in a bodybuilder sportsmen using anabolic steroids. They found that the players whose used anabolic steroids the ALT and AST activities increased compare with control group. They suggest that anabolic steroid–induced hepatotoxicity and disregard muscle damage when interpreting elevated aminotransferase levels [15], that is in agreement with results of present study. Also, In study carried by *Ghaly et al. (2015)* referred that the effect of Testonon (Body Building Agent) on liver and kidneys functions. They found the activity of AST, ALT, cholesterol, triglyceride and urea activities increased in all rats injected with Testonon. They suggested that Testonon injection at doses used by bodybuilders act to increase the risk of liver damage and kidney failure [16], that is in agreement with results of present study.

In study of Khayyat et al. (2014) to demonstrate the effect of energy drinks (Red bull, Power House, etc) on the kidney functions in rats. They found the levels of urea and creatinine increased in rats administrated with energy drinks compare with control group. They suggested that energy drinks may cause irreversible structural changes in rat renal tissue, which could play an important role in renal dysfunction [17]. In study of Farkash et al. (2009) referred that the anabolic steroids that used by bodybuilder lead to increased the levels of potassium [18], that is in agreement with results of present study. They suggested anabolic steroids can cause acute and chronic health problems. On other hand, the agents that lead to kidneys dysfunctions could caused imbalance of electrolytes and may lead to decrease the levels of sodium [19]. It was concluded from this study that the stimulants which used by bodybuilding players have severity effects on the liver and kidneys functions.

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# تاثير مشروبات الطاقة والعقاقير والهرمونات التي توخذ من قبل لاعبي بناء الاجسام على بعض وظائف الكبد والكلى في مدينة كركوك

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**الملخص**

اجريت الدراسة الحالية على مائة وعشرة متطوع من رياضي بناء الاجسام (تسعين منهم يستخدمون المنشطات وعشرون لايستخدمون اي نوع من عوامل بناء الاجسام). تم تقسيم المتطوعون الى اربع مجاميع اعتمادا على نوع المنشطات. المجموعة الاولى (مجموعة السيطرة) تتضمن اللاعبين الذين لايستخدمون اي منشطات, المجموعة الثانية تتضمن اللاعبين الذين يستخدمون مشروبات الطاقة (ريد بول هورس باور)، المجموعة الثالثه تتضمن اللاعبين الذين يستخدمون العقاقير(ماكس مايز ،بروتين XXL، سيريس ماس)،المجموعة الرابعه تتضمن اللاعبين الذين يستخدمون الهرمونات (هرمون التستستيرون، الانسولين، هرمون النمو ،هرمون الناندرلون،هرمون البريموبولان،هرمون ستانازول).

هدفت هذه الدارسة الى متابعة بعض المتغيرات الكيموحيوية التي تضمنت AST, ALT الكوليسترول, الشحوم الثلاثية, اليوريا, الكرياتنين, الصوديوم والبوتاسيوم في جميع مجاميع لاعبي بناء الاجسام.

اظهرت النتائج زيادة نشاط انزيمي AST, ALT زيادة تركيز الكوليسترول, الشحوم الثلاثية, اليوريا, الكرياتنين, وايون البوتاسيوم وانخفاض في مستوى ايون الصوديوم لدى جميع مجاميع رياضي بناء الاجسام الذين يستخدمون المنشطات, كما اظهرت النتائج ان جميع المعايير اظهرت زيادة معنوية ($P<0.05$) مقارنة مع مجموعة السيطرة.

يستنتج من هذه الدراسة ان المنشطات المستخدمة من قبل رياضي بناء الاجسام ذات تاثيرات خطيرة على بعض وظائف الكبد والكلى .