

ORIGINAL ARTICLE

The effects of methylphenidate combined with exhaustive practice on the white cells of the male rat

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ABSTRACT

Aim of the study

To observe the effects of methylphenidate, in various doses, combined with exhaustive exercise, on the white cells of male rats. This research study is investigating the harmful results of the drug on athletes, using an experimental rat model.

Material and Methods

The study groups were six in total, each of them comprised of 10 randomly chosen young male rats (3.5 months of age) with an average weight of 282 ± 52 gr. The control group (Group 1) was excluded from the activities and methylphenidate administration procedures. Group 2 did not receive any drugs but underwent the exercise test. Group 3 received a dose of 25% diluted LD₅₀ (median Lethal Dose) along with exercising. Group 4 received a dose of 50% diluted LD₅₀ and exercise test. Group 5 was administered 75% LD₅₀ and performed the exercise test and Group 6 had LD₅₀ along with exercise. Methylphenidate was given orally and each animal was located into a treadmill device allocated for rats being exercised with the speed of 2 km/h for the maximum exhaustion. Blood samples were taken at the end of the experiment. The number of white cells of each blood sample was determined using an auto-analyzer. Statistical analysis was conducted with ANOVA and Tukey's test.

Results and Conclusions

The increase of leukocytes was correlated to the physical activity of the experiment. With the use of methylphenidate, a leucocyte reduction occurred, with a dose-dependent variation. This result resembled to the effects of other CNS stimulant drugs. The differences among the studied groups were statistically important ($p \leq 0.05$).

Keywords: methylphenidate, retalin, male rat, white cells, exercise test, exercise tolerance

INTRODUCTION

Medical doctors and athletes are aware of the close correlation between exercise and immune system; several years ago, exercise safety experiments have been included in the topics of Stress Immunology.¹

On the other side, energy providing supplements and various performance enhancing unauthorized drugs, not widely used in the past, are increasingly used. As a result, novel diagnosing methods for doping have made their appearance. Nowadays, the exercise life has turned out to be a bitter reality. Athletes undertake this job to achieve championship titles and various bonuses earned through winning.^{2,3,4} Technological advances in medical diagnostics, competition among pharmaceutical companies and new discoveries in *doping world*, make up a dangerous and uncontrollable problem.^{2,3,4,5}

Methylphenidate is classified in stimulant drugs. It is a pyridine derivative closely similar to Amphetamine in aspect of structure. It is induced by CNS (Central Nervous System) bearing a weaker effect than amphetamine and stronger than Caffeine, with the molecular formula C₁₄H₁₉NO₂HCL. Its surface resembles to crystal powder in white with melting point of 224-226° C, soluble in the water, alcohol and chloroform. The lethal dose of this drug for adult humans is 200 mg per kg of weight or 376 mg/kg of weight of the body for rats. Ritalin (methylphenidate) is used by athletes due to its obstructive effect on the exhaustion, creating euphoria, increasing mental/psychic power of the individual and enhancing the performance in sports to athletes. Long term usage of methylphenidate may disrupt the cycles of growth in young individuals, accompanied by side effects as: headache, insomnia, nausea and dry mouth. Excessive usage of methylphenidate can raise the blood pressure, heartbeat,

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