

# Nanocompos and nanomaterials

## Reproductive function of adult male rats after treatment liquid medicinal form of gadolinium ortovanadat nanoparticles

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New technologies open new horizons for finding drugs among vehicles with the properties of nano materials. Previously shown that the colloidal water solution of the NP GdVO<sub>4</sub> activated by Europium (GdVO<sub>4</sub> : Eu<sup>3+</sup>) has been obtained at the Institute for scintillation materials NAS of Ukraine, positive effect on the reproductive system of rats with age [1] and neonatal determination disorders of sexual function [2] that resulted purpose of this study, namely the determination of the effectiveness of GdVO<sub>4</sub> : Eu<sup>3+</sup> (a liquid medicinal form) and determination him gonadotoxicity.

**Materials and methods.** Work carried out on rats of the Wistar population reproductive disorders as a result of emotional stress and excessive phytoestrogenization during milk feeding. The efficiency correction via chronic injection (70 days) a liquid medicinal form GdVO<sub>4</sub> : Eu<sup>3+</sup> (at doses of 0.03, 0.3 and 3.0 mg / kg). Established indicators of reproductive function and the content of total cholesterol, triglycerides and arginine (Karpenko, 2013, 2015). Defined gonadotoxicness (Stefanov, 2001). Control data obtained served under the influence of the drug substance and of reference medicinal preparation –tribestan. The statistical analyze has been carried out using Excel program 2003. The results have been calculated as an arithmetic mean ( $\bar{x}$ ) and their statistical error ( $\pm S \bar{x}$ ) using the Q Dunn criterion for the polynomial equations. The differences between groups have been considered to be a statistical probability according to statistical reliability  $p < 0,05$ .

**Results.** In the model reproductive disorders in adult rats caused by emotional stress and phytoestrogenization effect during milk feeding it was investigated efficiency correction using liquid medicinal form LF GdVO<sub>4</sub> : Eu<sup>3+</sup>. Revealed normalization of males fertility (100% of fertilized females), reducing

fetal loss in pregnant females, fertilized by these males, improving the physical condition of the fruit, restoring the reproductive capacity of males (73% of control) and some altered biochemical characteristics (total cholesterol, triglycerides, arginine). There was no gonadotoxic action in medicinal form of compounds of the indicators of fertility, fertility and reproductive potential in chronic admission (70 days) NP GdVO<sub>4</sub> at doses of 0.03 and 0.3 mg / kg, despite the changes of semen in intact male rats. When a NP in a dose of 3.0 mg / kg there is a statistically significant reduction of potential fertility (25.6%). **Conclusions.** The efficiency of a liquid medicinal form NP, which was (just) slightly lower compared with the effect of the substance NP (as sexual behavior, concentration of morphologically normal sperm, fertile ability of sperm, fertility potential integral index, which in substance use rates higher than intact controls). This indicates the importance of environmental factors and the need for appropriate NP experiments and further research optimal medicinal form part of a potential drug.

1. Пат.105874 Україна, МПК (2014.01) А61К33/00, А61К9/08, А61К9/14 Засіб для корекції вікових змін чоловічої ендокринної системи [Текст] / В.Н.Клочков, Н.Я. Співак, С.Л.Єфімова [та інші] (UA) ; заявник і патентовласник Інститут сцинтиляційних матеріалів НАН України, ДУ «ІПЕП НАМН» ; заявл. 09.07.13 ; опубл. 25.06.14, Бюл. № 12. – 6 с.

2. The influence of the rare-earth metals nanoparticles on the rat's males reproductive function in the descending stage of ontogenesis / N. O. Karpenko, Ye. M. Korenieva, E. Ye. Chystiakova [et al] / Ukrainian biopharmaceutical journal, No. 4 (45) 2016, 2016, P. 75-80.