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The Influence of Selenium on the Reproduction of Rats

Wpływ selenu na rozmnażanie się szczurów

Selenium is a vestigial element indispensable for man and animal, having adverse effects when in bigger quantities. Among the diseases resulting from selenium deficiency in animals the most important are nutritional muscular dystrophy, exudative disthesis (most common in poultry), and nutritional hepatic dystrophy (1). In the man chronic intoxication occurs most of all, which is observed in selenium bearing regions (2).

Taking into consideration geographic distribution on some of the diseases beneficial influence of selenium is observed in cardiac and vascular diseases, and hypertension. The correlation between selenium deficiency and mortality caused by neoplasm is also notable (5). It is unquestionable that selenium inhibits the activity of enzymes, especially those containing sulfohydrilic groups. The stabilization of lysosomal membranes leads to the presumption that selenium prevents peroxidation processes in tissues and cell membranes.

The influence of selenium on reproduction is also worth noticing. Its supply turns out to be effective in cases of infertility of sheep, and partly in rats, pigs, and poultry. The embryo dies in pigs fed on fodder poor in selenium and vitamine E. The degeneration of the ovaries and placenta accretion occur in cows in cases of selenium deficiency. The excess of selenium can affect negatively the reproductive system. The element is thought to be a teratogenic agent. Since it permeates through the placenta and lactic gland easily, the symptoms of selenosis appear in new-born animals; many of them have developmental anomalies occurring at the same time (3, 4). In birds the decrease in laying eggs and their incubation occur in case of selenium deficiency.

The purpose of the research was to find out if selenium, being a vestigial element indispensible for proper functioning, affects the number of offspring in rats.

MATERIAL AND METHODS

We examined white female rats, Wistar strain, the body weight 160-250 g, in the groups of 8 animals each. The effects of 20 μg/kg and 50 μg/kg doses of *Monoparel selenium*, manufactured by "Polfa" Pharmaceutical Plant, Kutno, were tested. The examined animals were given intraperitone-

ally these doses during 15 days' period. After 10 days since the onset of the drug application the male rats were put into the cages with the female rats for 10 days. On the 21st day after the conception we started to observe the delivery. The number of offspring was noted for each female. The tables present the results obtained in particular groups. The statistic evaluation was made by means of *t*-Student test.

RESULTS

The tested effectiveness of *Monoparel selenium* on rats reproduction revealed that after it had been administred there appeared an increasing tendency in the number of offspring. It refers to both doses: 20 and 50 μg/kg. The total numbers of offspring in the groups treated with *Monoparel selenium* are bigger in comparison with the control group (Table 1). The examinations let us presume that the results were affected by the drug doses. Nevertheless, after the statistic evaluation of the results we found that the differences in mean numbers of offspring in three observed groups were not statistically significant (Table 2).

Table 1

No.	Number of offspring		
	control group	group I 20 μg/kg	group II 50 μg/kg
1	8	5	10
2	6	3	11
3	7	7	6
4	7	8	7
5	1	1	10
6	4	11	1
7	3	4	7
8	4	8	7
Total	40	47	59

Table 2

Groups	Mean number of offspring	±*SD*
control	5.00	0.845
I (20 μg/kg)	6.625	1.117*
II (50 μg/kg)	7.375	1.117*

* No variability.

Moreover, in the groups treated with *Monoparel selenium* the bigger number of female foetuses than of male ones was noted. In the control group the ratio of male and female foetuses was fifty-fifty (Table 3). The detailed examination of selenium affecting the increased number of foetuses in rats and the explanation of

its mechanism needs separate anatomical and pathophysiological examinations of the ovaries.

Table 3

Groups	Female	Male
control	20	20
I	31	22
II	35	24

Conclusions

1. *Monoparel selenium* given to female rats causes increased reproduction.
2. The selenium drug given in the doses of 20 and 50 μg/kg increases the number of foetuses, which is proportional to the dose.
3. In the groups treated with *Monoparel selenium* we found a considerably bigger number of female foetuses in comparison with the control group, where the ratio of male and female foetuses appears to be fifty-fifty.

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STRESZCZENIE

Przeprowadzone badania nad wpływem *Monoparel selenium* na rozrodczość szczurów wykazały, że po zastosowaniu tego preparatu zaznaczyła się tendencja zwyżkowa co do liczby potomstwa. Dotyczyło to zarówno dawki 20 μg/kg, jak i dawki 50 μg/kg. Ogólnie liczby potomstwa w grupach zwierząt, którym podawano preparat selenowy, były większe od liczby potomstwa w grupie kontrolnej. Wykonane badania pozwalają przypuszczać, że na otrzymane wyniki może mieć wpływ również dawka leku. Mimo to po dokonaniu oceny statystycznej wyników stwierdzono, że średnie liczby potomstwa w obserwowanych 3 grupach zwierząt nie różniły się statystycznie istotnie. Ponadto zaobserwowano, że w grupach, którym podawano preparat selenowy, występowało więcej płodów żeńskich niż męskich. W grupie kontrolnej liczba płodów płci żeńskiej i męskiej była jednakowa (po 50%).

Dokładne sprawdzenie istnienia wpływu selenu na zwiększenie liczby płodów u szczurów oraz wyjaśnienie mechanizmu jego działania wymaga przeprowadzenia badań anatomicznych i patofizjologicznych jajników.