The Effect of Weak x-rays on Some Physiological and Psychological Behaviors of Adult Hamsters

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Abstract

The present job shows the effect of x-rays of DEXa device, we found the effect of weak x-rays radiation in 30,50 and 70 µSv x-ray doses for 60 d / 8 times /d irradiation on sex ratio of adult hamsters. The targets of the paper is to obtained the impact of x-rays at 3 doses in µSv as x-ray doses for two months with 8 times /d exposure on Sex Ratio (SR) of male and female gender of hamster. Important reduces have been obtained (P ≤ 0.05) in the offspring summation No. The number respect to hamster Male and hamster female (SR)when irradiated to the doses values range 30-70 µSv and comparative with sham or comparison group. The reduce is agreement with the elevated of weak doses rate values little by little. Second case, the x-ray with declared weak doses rate values rather than at the similar case of mating noticed clearance elevates (P ≤ 0.05) in the gender of offspring's No. of hamster female and behavior (SR)%. Elevate is modulation to the doses rate values increase directly. The outcomes appeared that the weak x-ray (as electromagnetic waves EMW) have risk impacts on some physiological factors of adult hamsters. This job also noticed significant various in male Number and female No. hamsters (SR). The offspring hamster female percentage irradiated to X-Ray became higher than of the percentage of offspring male No. hamsters comparative with comparison group.

Key Words: DEXa, Sex Ratio Behavior, x - Ray Radiation, Male and Female Adult Hamster, Mating Hamster.

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Introduction

DXa uses high and low power x-ray photons and is depend on the contrast action of x-rays by contrast body parts. These photons can be obtained in two ways, depending on the equipment used. 6 In some cases, while motion pass the plane of the body to be detected, the device sends alternating radiation of high (0.14 M Vp) and low (0.07—0.1 MVp) kilovoltage (Lorente et al, 2012).

"In clinical practice, the original DXa modes are axil bone densitometry with fixed scan tble, which is used to detect BMd, and whole body densitometry, which is to determine body composition."

Most kinds of ionizing wave cause strong genetic and cytotoxic effects in evolution. Production of Mutation is divided into 2 kinds: somatic biological cell mutations (Laliic et al, 2001) and germ cell mutations (Ehling, 1980) Between days 3 and 10, the radio sensitivity of rat embryos fluctuated (Rugh and Grupp, 1959) by a factor of 3-4.

The radiation resulted in 11% more deaths than the comparison in cf1. Femle Swiss mice were injected with x-rays at Gesttionl Dy intervals ranging from 0.5 to 43.85 mGy (Rugh and Grupp, 1959). The CF1 female Swiss mice were irradiated with 50 mGy (dose rate value at 0.0455 Gy/m) with x-ray untile fertilization but before any cleavage motions from 6 - 24 hours after Irradiation.

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The original cleavage was finsh rather than the No. of abnormals increased from 2.5 percent in the controls to 20% in the Irradiated mice (Rugh and Grupp, 1961). The sex ratio F/a and NMRI have been exposed to x-radiation for Gestational Day 8, 10 mGy, for a period of 5 days. There has been a important rise in the No. of abnormal characteristic (Michel and Fritz-Niggli, 1977). The Swiss albino mic was irradiated with x-ray at 9 mili Gy dose rate value 0.83 Gy/m on Gestational Days from 3.5-11.5 dose rate value 0.83 Gy/m. Prenatal mortality has increased, as has the incidence of retarded fetuses, and decreased of fetal head volume rather than brain mass significantly (Devi and Hande, 1990). At 7 hours after fertilization, Bal b/c and cf1 Mice have been irradiated with x-radiation at dose of 100 - 1000 mGy with dose rate value 0.8 Gy/m. The number of malformed fetuses increased, and CF1 mice developed dwarfism (Jacquet et al, 1995). Four hours after the priming irradiation, the ICR mice were irradiated at only 20 mGy with dose rate value 0.667 mGy/m x-ray at Gestational Day 4-9 h after the starting irradiation on Gestational Day 5-9 at 20 mGy with dose rate value 0.667 mGy/m. The c57bl/6J mice were exposed to X-rays on Gestational Day eleven with a weak dose of 50 or 300 mGy with dose rate value 0.33 Gy/m on Day eleven and a evaluate dose of 3.5 Gy respect to the next24 hour. Before brith feticide, malformation, and/or low body mass resulted by the challenge increased dose of exposed were significantly reduced by the starting soft dose of X rays (Wang et al, 2012).

The majority of evidence suggests that prenatal low and appropiat dose irradiation is harmful to development of brain and next prefornance awareness, but the emphasis on excitement and adult soft and appropiate dose exposure is unclear due to psychological parameters. The psychologic stress we feel as adults as a result of weak dose coincidental exposure may be the best threat to our prefornance awareness. In fact, the psychologicl impacts with trined classified (e.g., rdiation therpy ptients) are less clear and require more research (Collett et al, 2020).

The value of the changing became neerly agreement in animls irradiated to gamma rays and the symble RBE of the latter with due to embryo destruction verged 100/10 during this enhancement interval.

While genetics progressed (Cox, 1964), one of the most important discoveries was that, while rising irradiated would, in theory, reduce the value (SR), it was impossible to predict the impact irrdition of fathers might have because, with the limintation that single Chromosome is inactive in the somtic biological histology offamels, it appeared critical that gender connected genetic change produced in mles we (Dichinson et al. 1996).

Rise (SR) of generations brith to irradiated in the Sell path (Winther et al, 2003), where the (SR) of generations brith to their all strongly irradiation 201 sons rather than 144 girls is elevated and variable compared to that of generations brith to femals who was takend limit radition 454 sons rather than 461 girls.

Furthermore, Dickinson's findings add to the body of knowledge that risk selection causes sex-related critical genetic changes in humans, which are passed down to future generations (SRs) of exposed families.

According to a new study (Johnson et al, 1998), 1100 surviving children with cancer appear the families of 2130 boies, and the SR for M //F tumor was agreed and did not change importantly respect to the Danish people. No effect on the SR of children born to M or F survivors by radiotherapy and there was no provement of dose-related changes in the detected dose to familial gonads respect to dose categories. All types of animals can be agreed upon in humans with mutations by employing cases that demonstrate mutagenic impacts at multiple scales, containing tissues.

The compounds of these tissue in expect genotoxicity at the beginning and then causes to be harmful in all people by referring to monitoring of Geno toxicity and second states genetic change happened with chromosome berrtion work in sometic biological tissue (Davis et al, 1998).

The SR of the generation is famed s ratio of M/F generation per summation offspring, implying a potentially significant reproductive harmful in pternl object. Exposed to different kinds of radioactive sources rather than fatal samples, undefined to EMR (Sdt, 2005) and environmental pollutants likes dioxins (Hm et al, 2001).

The proportion of offspring rises, and this has also been noticed in girls surgeons rather than girls radiologists who have been treated for risk rdition (Jms, 2001). The impact on the power hormone profile is a result of the Y chromosome change and mutation, which has an impact on the other stress. Methods have a greater impact than a shift in the SR. Other paper has found that risk reduction at the nonmedicinal scale has no effect on the SR (Volk, 2004). At this time, it is limited that crdiologists

using fluoroscopic guided jobs are starting irrrdition with a greater range of risk rdition than those using x-radiation prossesing (Rehni nd Ortiz–Lopez, 2006).

"Intervention collr level exposure has been determined with doses corresponding to 0.04 - 0.16 m Sv/case, and center scale exposure less than 0.005 cm cause clothes has been determined with doses ranging from 10- 20 micro Sv/case." (Delichs et al., 2003). rough handing that expose processes to increase scale of risk radiation respect to international standard. Many researchers have reported low dose rates of gamma radiation, that employed soft gamma wave in 0.001 Gray or rad on the reproductive program with taking chronic gamma wave and discovered that powerfuly to reproduce gradually decreases with increased dose rate."

Continuous exposure to low-frequency electromagnetic fields causes apoptosis in testiculr germ cells in musculus mice, according to (Hertel–s et al., 2007), with no significant impact on body mass or testiculr mass rather than a rise in testiculr germ cell destroyed. As a result of the findings, spermtocytes undergo apoptosis. Finally, (Flzone et al., 2010) discovered that the LDIR/LDRIR irradiation ratio is linked to decreased sperm and the number of live sperm, as well as a new number derived from genomic data.

In some test studies, LDIR/LDRIR exposure was shown to have beneficial effects such as decreased cancer cells, increased survival time, and stimulate fertilization. The effects of LDIR/LDRIR irradiation vary depending on the genetic background of animl's, postntl days, type of gender, energy of radiation exposure, mod of radiation, coupled of radiation with other biological effects as toxic parameters reported.

The chosen dose of radiation in mili Gray or rad was similar to (Tng et al, 2017), which took radioctive material, and the same scale of dose rate data at 0.00 6 Gy/h at 7h/dy with intervals of 25-50 days. Furthermore, (AL-Dulmey et al., 2020) employed similar methods from the dose rate scale, experimental animls, and risk radition to affect the reproductive program. This research is similar to that of (AL-Dulmey et al., 2021), who employed white mice to determine the biologic impact of white blood cells at dose rates ranging from 0.11-0.31 Gy/hour.

Male chickens were also irradiated with γ-rays at a dose rate of m G/hour ray to determine the physical effect of γ-rays on several blood factors (AL-Dulamey et al, 2021). The goals of this paper to find the γ-ray impact at 3 doses rate in m Gray/hour as dose ratio with period 55 days for seven hour /d irradiation on the (SR) of male and female gender No. white hamistar.

"For studying the influenced radiation on physiologicl cases like behavior of animls when mting mods there is the physiologicl happen affecting the physics and gender type of the newborn, a small dose rate was used to affected rats for an long time interval is needed." An important application to people who receive this dose on a daily basis for an long period of time in a polluted environment. On the other hand, if this paper was distributed to low-cost animals such as horses, camels, and goats, it could have a financial impact.

Materials and Methods

In this paper white hamsters have been employed. Which scales around two – three months of old rather than 180 to 210 gm of weight. There are a similar number of adult hamsters (Al-Jawwady et al, 2021). The best hamsters were obtained from the medicine college at the city of Mosul. Polymer box with copper covers (30x40x40cm^3 in size) were used, despite the fact that calculators were used to ensure good hygiene. as the soft wood mixture was prepared every last week, the control exposure and the ambient temperature and humidity of the x-ray radiation exposure groups throughout the job were fixed at 27C^o 2 and 36 percent 4 percent, respectively, as the soft wood mixture was obtained during the experiment (Aljanabi, 2008).

Work System

DEXa source with three dose ranges (30, 50, and 70 Sv). Each absorbed value was administered to the hamster eight times / day for 60 days, with the radioactive material placed centimeters away from the hmster box. In many papers similar to this job, selecting exposure times that agree with the similar value were used as exposed rather than the time interval were given, add to that, these fctors neer to natur bcak ground radiation Diagram 1: Experiment design.

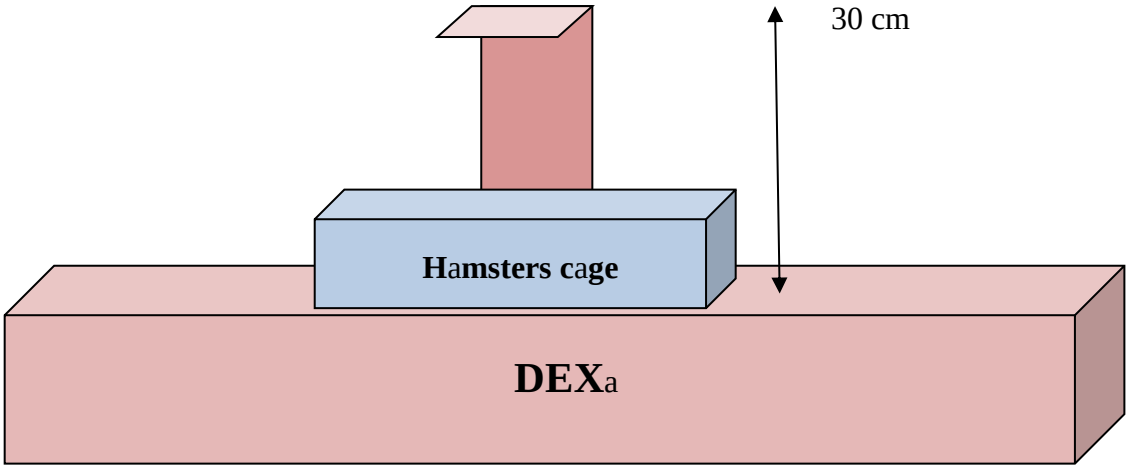

Diagram 1. Experimental set up

In total, forty-eight hamsters were prepared for the job; they have been classified into sections rather than the calculated doses were given as follows:

1. A beginning section (comparision or shm) consists of 12 hamsters who have not been exposed to x-rays and include one Femle across one Male rat in each box from six hamster boxes rather than in total sections.
2. Next section consists of 12 hamsters that have been irradiated with 30µ Sv 8 times over the course of 60 days.
3. The third group consists of 12 hamsters that have been irradiated with 50µ Sv eight times over the course of 60 days.
4. The fourth group consists of 12 hamsters that were exposed to 70 µSv 8 times over the course of 60 days.

The number of male hamsters used in groups (2-4) is 18 and is used 8 times per day for 60 days. On hamsters, the work system was adjusted by irradiating them eight times for 60 days at different exposure doses (30, 50, and 70µ Sv).
This task was completed in the biophysics department of Mosul University / Science College. Department of Biophysics.

Statistical analysis

In this job, the analysis of variance was used. Duncabs multiple levels test was used to compute differences in all processes. Using SaS, at the point (Ṕ≤ 0.05) % scale (Steel and Torrie, 1980).

Results

The results have been completed in table (1) which represent the x-ray effect with 30,50 and 70 µSv for 60 days on some sex ratio parameters.

Table 1. The x-ray effect with doses 30,50 and 70 µSv as dose rates with 8 times for 60 days irradiation on some sex ratio (SR) factors

Sections	details				
	Hamster Female (SR)percent	**Hamster Male (SR)percent**	**Offspring data of hamster FS**	**Offspring data of hamster MS**	**Summation number of hamster off spring**
Control	55.66 c± 1.208	44.34a± 1.121	5.89 c±1.011	4.7 a±0.721	10.6 a±0.911
Dose rate 30 µSv	62.773c ±0.289	37.237 b± 0.301	4.9 c± 0.298	31.5 b±0.322	8.4 b±0.110
Dose rate 50 µSv	75.107 b±0.402	25.0 bc±0.380	6.9 b±0.322	20.3c± 0.435	8.0 c± 0.322
Dose rate 70 µSv	83.00a± 0.878	17.00d± 0.655	7.3 a±0.678	1.5 d±0.822	8.8 d± 0.632

An effect of x-ray at 30,50 and 70 µSv Dose Rates value with 8 T / d for 60 days at x-wave on mating mod (irradiated hamster Male x Noture hamster Female):

1. Summation No. Respect to Hamster Offspring

The effect of x-ray at 30,50, and 70 µSv doses given 8 T/ d for 60 days on mating mod (irradiated

hamster Male x Notur hamster Female). When irradiated to 30, 50, and 70 µSv), the total number of offspring was found to be importantly decrease (P≤0.05) when compared to the comparision section. The reducation is retrun to the elevated values, as shown in Diagram (2).

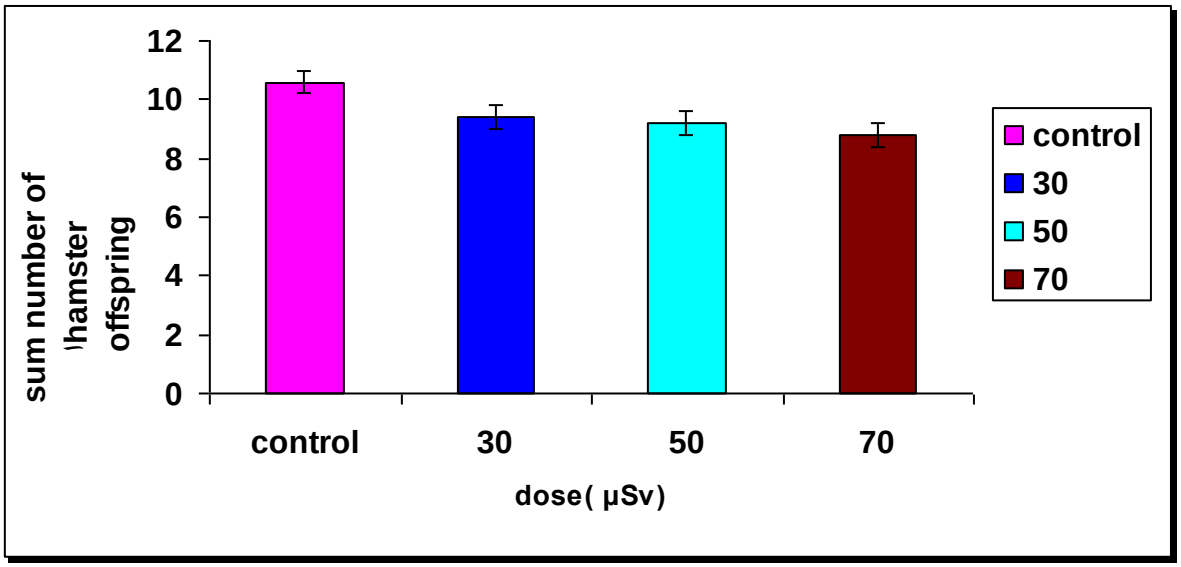

Diagram 2. Impact of x- wave values on summation offspring datadata

2. *Hamster Male Offspring No*

The effect of x-ray radiation at 30, 50, and 70 µSv doses on mating for 60 days at 8 T/d exposed on mating mod (irradiation hamster Male x Nature hamster Female). When hamster male offspring numbers were exposed to 30, 50, and 70 µSv. The important lower was happened (P≤0.05) when decleared to the comparision group. as shown in the figure, the reeducation is proportional to the increase in doses Dia (3).

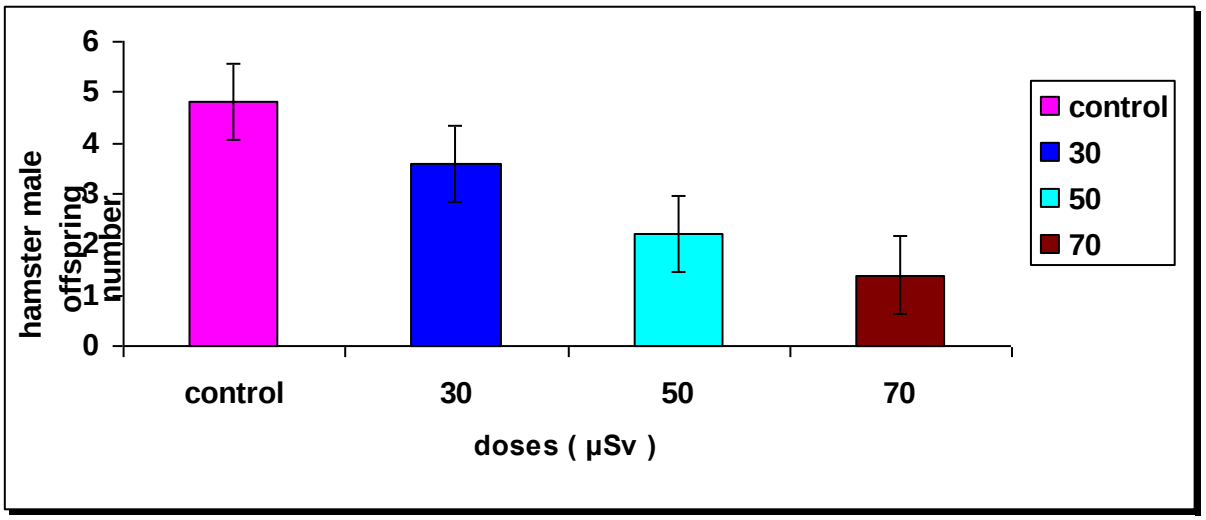

Diagram 3. X-wave impact values on hamster male ofspring data

3. *Hamster Female Offspring No*

The effect of x-ray radiation at 30, 50, and 70 µSv doses on mating mod to (irradiation hamster Male x Nature hamster Female). When hamster Female ofspring were irradiated to 30, 50, and 70 µSv, the number of offspring increased significantly (P≤0.05) when maching to the sham or comparision sections. as shown in the graph, this rise is proportional to the increase in doses (4).

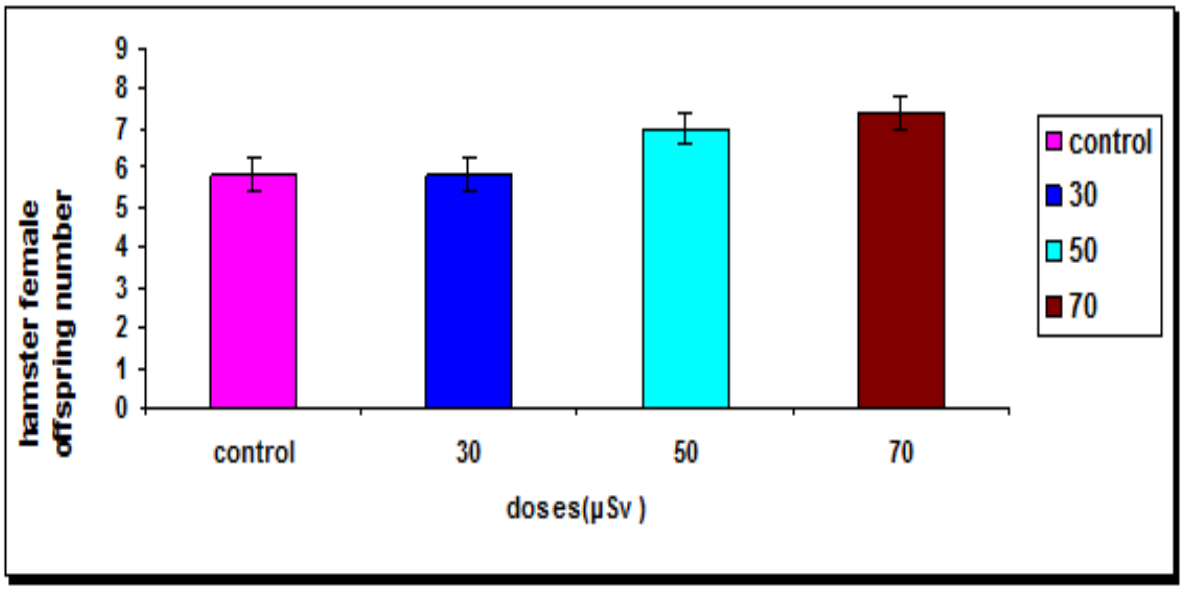

Diagram 4. Effect of x- ray doses on hamster female offspring No

4. Hamster Male Offspring (SR) Percent

The effect of x-ray radiation at doses of 30, 50, and 70 µSv for 60 days at 8 times per day on mating mod (irradiation hamster Male x Nature hamster Female). When hamster Male ofspring (SR) percent was irradiated to 30,40, and 70 µSv values for 60 days at 8 times matching to thecomparision section. An important increase (Ƥ≤ 0.05) was obtained. This reducation return to the rise in values, as shown in Dia (5).

6

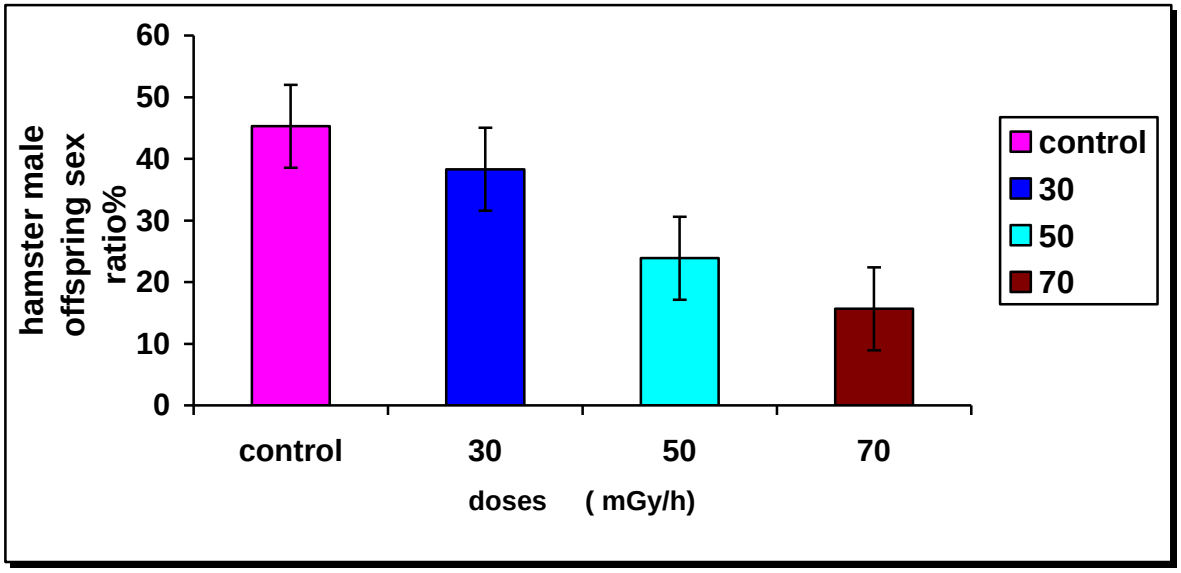

Diagram 5. x- wave values impact on hamster Male ofspring (SR) k)

5. Hamster Female Offspring (SR) Percent

The effect of x-ray radiation at doses of 30, 50, and 70 µSv for 60 days at 8 times per day on mating mod to (irradiated hamster Male x Nature hamster Female). When hamster Female offspring Sex Ratio(SR) percent was irradiated to 30, 50, and 70 µSv, a significant increase (p 0.05) was obtained when cmatching to thecomparision section. This rise is return to the evaluate in values, as shown in Dia(6).

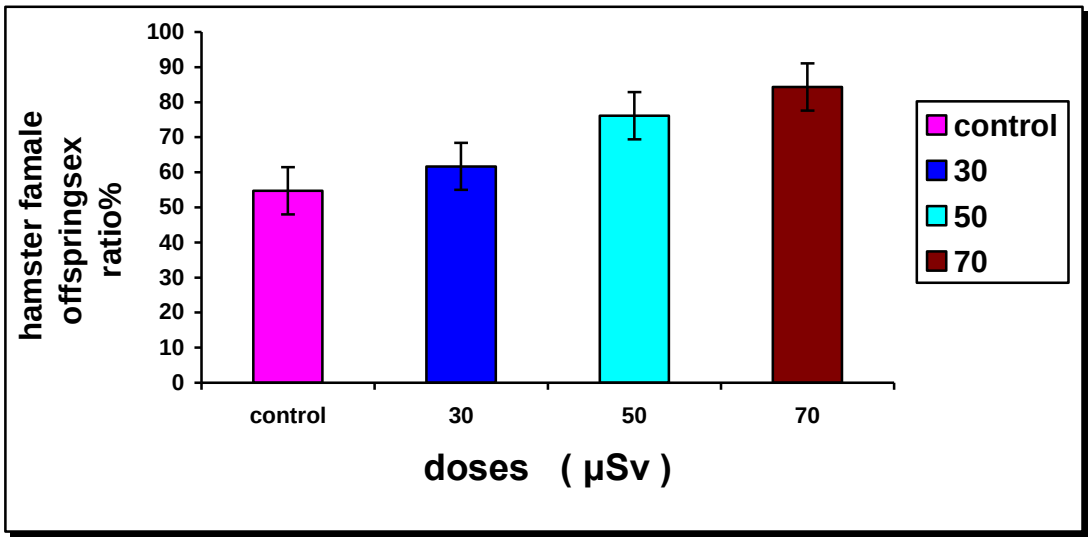

Diagram 6. Impact respect to X- Ray doses value rate on hamster female offspring gender (SR)

The Diagram (1-5) have been reported with the next information:

- Values considered with rate experimental error.
- The different symble on each rectangular show important contrast at the Ƥ≤0.05 % scale.
- Each section has 10 animals.

Table 2. Measurements psychology of hamsters

Measurements psychology					
Time/ days	**Depression**	**Temperament**	**Movement**	**Food**	**Concentration**
10	Very Low	Natural	Natural	Natural	Natural
20	Small elevate	Evaluated	evaluted	Small reduced	Small reduced
30	Evaluated	Evaluated	evaluted	Reduced	Reduced
40	More evaluated	More evaluated	More evaluted	More reduced	More reduced
60	High evaluated	Low	Low	Very Low	Very Low

Discussion

Diagram(1) we obtained reduces in the No. of summation offspring of hamsters which have been irradiated to weak x-ray doses rate and like in image (2,3) as wenoticed a reduce in summation offspring gender No. of males Sex and elevate in Female Sex white Rats limited at comparision group in methods with another mating case (irradiated hamster Female Sex cross control hamster male Sex) with the X-ray for 8 times /d with period sixty days for doses 30,50 and 70 µSv and this agree with (Chio et al, 2007) also identical with (Tang et al, 2017) (AL-Dulamey et al, 2020). Instead of the similar scale of radition dose value Rate, they were tacke placed on variable jobs such as blood factors and nature sperm. In addition, another study focuses on male and female chickens with the same dose rate hamster type in micro Sv.

Diagram (4) shows a reduction in (SR) of hamsters male sex who have been irradiated to x- ray, but Diagram (5) shows a significant increase in (SR) of female sex who have been irradiated to x-ray for the copulation method (irradiated hamster female sex ctoss normal hamster males.

The cases that convert in (SR) of MALE sex type and FEMALE sex type of hamsters which have been irradiated to x-ray with 8 times daily for (60) days of doses at 30,50 and 70 µ Sv RNA denaturation Because the EM waves impact is expressed as risk wave with the powerful of penetrating small range waves, biological tissue have been impacted with an increase in temperature. Thus, exposure to these waves indicates to evaluate the temperature of that piece which was irradiated to a high dose and led to a conversion in function nature and original structure of the biotissue. It is determined by the more band of the exposure rather than the magnitude of the adition power. Nkojim et al. (2015). In addition, a sixty-day irradiation period with a soft dose in Micro Sv has been chosen in multiple studies similar to this job (Al-Jwwdy et al, 2020). Rather than the dose rate corresponding to

the stores of radiological materials, these factors are corresponding to the dose value rate of annul nature nature back ground. When a particle loses its power inside the membrane, power deposition occurs, resulting in the formation of a new particle (Khalyl, 1990).

From Table 2. we note that depression increases with increasing exposure time to the equivalent radiation dose. The tester creates a sequences of collisions and chemical contrast that leas to many case of genetic information fixed in DNa to rise (Brutovska et al, 2010).

Radioactivity has an impact on spermatogenesis. Spermatogenesis is the process of turning germinal stem cells (spermatogonia) into mature male gametes (sperm). Gonocytes, also known as precursor germ cells, are the spermatogonia's precursors. Spermatogonia divide and evolve into first-order spermatocytes, which divide and evolve into second-order spermatocytes, and then spermatids, which differentiate and transform into spermatozoa (sperm) (Rube et al, 2010) rather than all germ biological cells have been divided into three types, and spermtogenesis has been divided into three cases: premeiotic, meiotic, and postmeiotic, sperm formation takes place through the meiosis program, as it controls the decrease in the data of chromosomes in the tissue cell nucleus that are essential for the bulding of a functional, hploid reproductive cell.

In comparison to somatic cells, spermatogonia are less radiosensitive in terms of DNa damage susceptibility. Spermatogonia are in a state of specific hypoxia, which protects them from radiation, due to their tight spatial organization in seminiferous tubules and, as a result, a limitation of oxygen supply (Zheng and Olive, 1997) Spermatogonia, on the other hand, repair DNa more slowly than somatic cells, and some DNa damages are skipped in their population

Conclusion

The results of using soft x- wave in m Sv like EMW to detect changes in the SR of Male and Female hamsters have risk impacts on several physiologicl factors of hamsters, and this information agrees with the super sensitivity of age, gender, and animl organs, rather than test design. The RP of offspring Femle hamsters irradiated to soft x-waves was found to be significantly contrast from the RP of offspring Male hmsters irradiated to soft x-waves in this study.

Given that humans are important and everything that happens to them has been effectively achieved to people, rather than the Usage potential that this outcome can impact economically important samples such as cows or sheep, this job is connected with many pplications that have been completed on several factors of physiologicl and psychologicl. We're given a dose that's appropriate for this type of research. To keep dose rate from obtaining like doses, the necessary precautions have been taken. In addition, all psychologic measurements, with the exception of depression, showed a decrease.

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