Effect of photoperiod on ovrain endocrine function in rabbits

Hussein Mostafa Mohamed El-Zaher

The present work was carried out at rabbit colony established in Endocrinology Research Unit, Applied Radiobiology Department, Nuclear Research Center, Atomic Energy Authority, Inshas, Egypt. The hormonal radioimmunological assays were performed in the laboratories of the sameResearch Unit.It was planned to point out the effect of treating adult does subjected tothree regimes of photoperiodicity (8 hrs D/16 hrs L, 12 hrs D/12 hrs L and 16 hrs D/8 hrs L), with different hormonal treatments including HCG and pharmaceutical preparations including Melatonin, Serotonin, Bromocriptine (anti prolactin), Indomethacin (anti prostaglandins) alone or in combinedwith HCG.A total number of 300 young adult female New Zealandwhite does aged 3-4 months and weighed 2-3 Kg were individually caged and kept in an environmental chamber under controlled ambient temperature of 25°C, isolated from outdoorsday light and well ventilatedThis work was accomplished in two separate experiments spaced withtwo weeks rest to adapt the animals for the photoperiod regime, does subjected to study were kept under these condition for pre-experimental period leaved two weeks then divided into three groups (photoperiods) each of 100 does.The first experiment:was planned and conducted to detect the possibility for improving the reproductive performance of does by magnifying the hormonal coordination related to productive activity with relation to different lighting regimes tested, to fulfill this aim applying human chorionic gonadotropin as well as other chemical compounds that thought to have considerable effect on hormonal regulation of reproduction (Melatonin, Serotonin, Bromocriptine (anti prolactin) and indomethacin (anti prostaglandin)).The second ’experiment:Was planned and conducted to point out the magnitude of improving the hormonal pattern in does subjected to different lighting regimes by treating animals with HCG alone or in combination with pharmaceutical preparations in double dose 2hrs separated that are thought to have considerable effect on efficiency of biosynthesize and secretion of progesterone along a period of 16 hrs after injection.Results could be summarized as follows: The first experiment1-Serum progesterone level in untreated does subjected to different lighting regimes applied:Averages of progesterone level were almost higher in does exposed to short lighting regime (16 hrs Darkness (D) / 8 hrs Light (L)) when compared to others. On the other hands, the higher levels of serum progesterone were detected after two hours .This was quitetrue in all lighting regimes applied.The higher levels of serum progesterone found along the experimental period for does exposed to short lighting regime (16 hrs D and 8 hrs L), may lead to conclude that surge of LH hormone needs at least 8 hrs lighting to show its biological effect of ovulation in the animals of induced ovulation pattern, like rabbits. Thus the photoperiod regime show its significant effect on ovulation mechanism in accordance with the time of ovulation which occurred at approximately at the same time in all experimental animals.2- Effect of HCG:Data obtained revealed an increase in serum progesterone levels as a result of injecting does with HCG, The rate of increment differed obviously according to the lighting regimes applied. Does subjected to long lighting regime (8 hrs darkness and 16 hrs lighting) resulted in gradual increase in serum progesterone level reaching its lightest level at the 4th hr after injection then decreased up to the end of experimental period. Subjected does to short lighting regime (16 hrs darkness (D) / 8 hrs light (L)) increased serum progesterone level with greater rate up to 4th hr after injection reaching highest level at the 2nd hr and at 4th hr then decreased steadily to reach lowest level at the 16th hr after

injection. The same trend was found in does subjected to equal lighting regime (12 hrs D / 12 hrs L) but with lowest magnitude serum progesterone level increased after injection to reach its highest level after 2 hrs of injection then decreasedsharply and steadily towards the 16th hr after injection to reach the lowest level at this time. Analysis of variance for obtained data revealed significant variation in serum progesterone level due tolighting regime , injecting material and the interaction between them ($P < 0.01$) 3-Effect of melatonin:Treating experimental does with melatonin increased serum progesterone level at all intervals of estimation. However, the rate of increase varied according to either lighting regime applied or interval of estimation after injection. The highest progesterone level was estimated after 1 hr of injecting does subjected to long lighting regime (8 hrs D/16 hrs L) which,sharply decrease at the second hr after injection and still decrease up to 16th hr after injection.Different pattern of change along the whole intervals of estimation was found in does subjected to other two lighting periods. Serum progesterone level increased in does subjected to equal lighting regime (12 hrs D /12 hrs L) to reach its highest value at two hours after injection then steadily decrease till 16 hrs after injection. Same trend ofvariation along all times of estimation was found in does subjected to short lighting regime (16 hrs D /8 hrs L) but with lower magnitude when compared to the other photo regimes applied. However, analysis of variance for obtained data revealed insignificant variation inserum progesterone level due to either lighting regime, injection or the interaction between them.