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ABNORMALITY OF OVARIAN FOLLICLES AND CORPORA LUTEA IN THE
ALLOXAN INDUCED DIABETIC RATS

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ALLOXAN INDUCED DIABETIC RAT

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ABSTRACT

The influence of alloxan-diabetes on ovarian structure and function was examined in adult female rats. Results obtained were compared between seven groups of experimental animals; untreated control (C); alloxan-diabetes with irregular estrous cycle for 4 cycles (DM₄); 8 cycles (DM₈); 12 cycles (DM₁₂); 16 cycles (DM₁₆); insulin-treated diabetes (DMI) and insulin-treated control (CI). All groups of diabetic rats showed significant reduction in body weight, the weights of anterior pituitary gland, ovary and uterus ($P < 0.01$). After insulin treatments for 4 cycles in the DM₄ group, the estrous cycle, body weight and uterine weight were restored to normal whereas the ovarian weight was significantly higher than in the control group ($P < 0.01$). This increase in ovarian weight different from that of the insulin-treated control (CI) group.

Morphometric study of ovarian follicles and corpora lutea showed that the total number of ovarian follicles and their size-distribution in diabetic rats were similar to that of controls. However, with diabetes, the number of graafian follicles showing atresia was markedly increased. The morphological changes in the ovary were accompanied by changes in steroid secretions. In diabetic animals, the level of serum estradiol was

not different from the basal level of the controls while the level of serum progesterone was much lower which was possibly due to non-functional corpora lutea. Administrations of insulin to diabetic rats resulted in an increase in the total number as well as the size of both ovarian follicles and corpora lutea and also resulted in a reduction in the number of atretic follicles. In consistent with the improvement in ovarian structure, the levels of estrogen and progesterone were also increased. Uterine peroxidase enzyme which is an indication of the systemic action of estrogen was found to correlate well with the level of serum estradiol in controls whereas the activity in all diabetic groups were found to be depressed ($P < 0.01$). This indicated that the diabetes may directly affect the uterus.

Ovarian peroxidase enzyme which is reported to involve with the progesterone synthesis could not be demonstrated to correlate with the level of progesterone in controls. Thus, the effect of diabetes on the synthesis of progesterone could not be evaluated. It appears, therefore, that follicular growth of diabetic rats persisted with an increasing incidence of atresia when the follicles approached the graafian stage. The secretory function was changed in parallel to the change of the structure. Insulin treatment of diabetes could favorably reverse these effects. In addition, insulin itself may have a trophic effect on the ovary.