

Comparison of follicular components from young and old mares

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Fertility in the mare decreases with increasing age, with mares older than 20 years having limited fertility. Fertility has been associated with reduced oocyte quality in old versus young mares. However, intrinsic defects of oocytes were not differentiated from effects of a changing follicular environment. The present study was designed to test the hypothesis that differences are present in preovulatory follicles of young and old mares that could result in reduced oocyte viability. Objectives were to compare the following endpoints between age groups: 1) follicular fluid and serum hormones (estrogen, progesterone and inhibin), 2) follicular carbohydrates (glucose, lactose and pyruvate), 3) follicular fluid characteristics (%CO₂, %O₂, osmolarity, pH), and 4) viability of follicular cells.

Young (4 to 11 years, n=15) and old (18 to 24 years, n=10) mares were used for the study. Reproductive tracts of mares were examined with ultrasound at regular intervals until estrus. During estrus, reproductive tracts were scanned daily. When a follicle > 9 mm² in area and uterine edema were observed, mares were given an injection of human chorionic gonadotropin (hCG, 2500 IU, i.v.). Twenty-four hours after hCG administration, samples were collected. Serum was collected by jugular venipuncture, and follicular fluid and cells were collected through transvaginal follicular aspirations. Follicular fluid collected for gas tensions was not exposed to air. Samples for carbohydrate analyses were immediately packaged and snap frozen. Cells were maintained at body temperature and stained with acridine orange and ethidium bromide for examination with fluorescent microscopy. Data were analyzed by t-tests.

Characteristics of follicular fluid (%CO₂, %O₂, osmolarity, pH and carbohydrates) were not significantly different between young and old mares. The percentages of viable cells were not different for the corona cells directly surrounding oocytes. However, percentages of viable cumulus and granulosa cells tended to be higher for young than old mares (79 versus 62%, P=0.08 and 66 versus 58%, P=0.16, respectively). Concentrations of estrogen in serum and follicular fluid tended (P=0.11 and P=0.07, respectively) to be higher in young than old mares; and concentrations of inhibin in serum were lower (P=0.03) in old than young mares. Results of the study demonstrated differences in the follicles of young and old mares. The extent that these differences could affect oocyte viability must be determined.

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