

FOLLICULAR DEVELOPMENT DURING THE PREPUBERAL PERIOD OF DIFFERENT MORPHOLOGICAL TYPES OF OVARIES IN HAMPSHIRE AND YORKSHIRE GILTS FED TWO PLANES OF NUTRITION¹

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ABSTRACT

Changes in follicular development of the ovary at 105, 140 and 175 d of age were observed on 48 prepuberal Yorkshire and Hampshire gilts raised on two planes of nutrition. The follicles from the left ovary were counted and measured by histological techniques. Both the nonatretic and the atretic (more than four pyknotic bodies) antral follicles were classified into six categories according to size, and each category was expressed as percentage of the total number. The proportion of nonatretic follicles belonging to the first category (.19 to .36 mm in diameter) was higher in Hampshire than Yorkshire gilts at d 105 (65.4 vs 47.6%; $P < .05$), but not at d 140 and 175. The proportion of atretic follicles to the total number observed was higher in Yorkshire at d 175 than at d 140 and 105 (38.6 vs 21.9 vs 11.6%, respectively; $P < .05$), whereas in Hampshire, significant differences were observed only between d 140 and 105 (25.2 vs 3.9%, respectively). The low-plane regimen reduced the percentage of nonatretic follicles of the third (.63 to 1.12 mm) and fourth (1.13 to 2.00 mm) categories in Yorkshire gilts from 14.4 and 7.2% to 9.7 and 4.0%, respectively ($P < .05$). According to grouping, size and number of antral follicles, three morphological types of ovaries could be distinguished: honey-comb, grape-like and an intermediate class. Reanalyzing the data accounting for types resulted in radical reduction in the residual variation, hence many significant differences between the two breeds could be identified. At 140 and 175 d of age, Hampshires with honey-comb- and grape-like ovaries had greater numbers of medium and large follicles than Yorkshires ($P < .001$). It is concluded that the slower follicular development observed at 105 d of age in Hampshire, as compared with Yorkshire gilts, allows accumulation of greater numbers of antral follicles at 140 and 175 d for both morphological types of ovaries. (Key Words: Follicles, Morphology, Breeds, Prepubertal Period, Gilts.)

Introduction

Casida (1935) demonstrated that ovulation can be induced in prepuberal gilts at approximately 107 d of age. However, according to Dziuk and Gehlback (1966), regular estrous cycles cannot be expected before gilts reach 175 to 200 d of age. Follicular growth occurs during the prepuberal period as indicated by morphological (Dyck and Swierstra, 1983) and hormonal (Lutz et al., 1984) studies. In these studies it was not clear, however, whether

follicular growth observed in 140- and 170-d-old gilts, resulted from a change in the rate of atresia or growth of follicles. Neither was it evident if the advance of age at puberty, observed in some studies after feeding high-energy diets, was caused by a decreased rate of atresia of ovarian follicles. A comprehension of the regulation of ovarian follicular growth during the prepuberal period would clarify the problem. It may also explain the differences in follicular populations observed between breeds. For example, it has been reported that secondary follicles were more numerous in Yorkshire than Poland China gilts at 42 d of age, but not at birth (Bhalla et al., 1969).

The purpose of the present study was to characterize the follicular development in prepuberal gilts of two breeds with different rates of postweaning growth (Fahmy and Holtmann, 1977) and, presumably, different follicular populations as a result of two different

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