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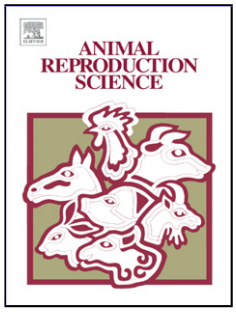

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ACCEPTED MANUSCRIPT

Fertilizability of oocytes derived from Holstein cows having different antral follicle counts in ovaries

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Abstract

In this study, to clarify the relationship between ovarian reserve and oocyte quality, cumulus-oocyte complexes (COCs) were collected repeatedly by ovum pick-up (OPU) from cows with high and low antral follicle counts (AFCs) at short (3-4 days) and long (7 days) intervals, and COC morphologies and oocyte fertilizability were examined. The relationship between AFC and follicular growth after OPU was also investigated. Cows showing AFC of ≥30 in at least one OPU session were grouped into the high-AFC group. At a short interval, follicular sizes and COC morphologies were similar between the different AFC groups. However, the normal fertilization rate was higher in the high-AFC group than in the low one, although total penetration rates were similar. At a long interval, the percentage of COCs with poor morphology in the high-AFC group was higher and the normal fertilization rate was lower than in the low one. In the low-AFC group, normal fertilization rates at short and long intervals were similar, and mean follicular size became larger at a long than at a short interval. However, mean follicular sizes at short- and long-interval OPU were similar in the high-AFC group. In conclusion, it is suggested that oocytes derived from cows with high AFC had higher fertilizability than those from cows with low AFC when OPUs were performed at a short (3-4 days) interval. However, oocyte quality in high-AFC cows was impaired by long-interval (7 days) OPU, possibly due to the degradation of follicles.

Keywords

Dairy cattle; Ovarian reserve; Antral follicle count; Ovum pick-up; Oocyte quality

Introduction

The constant decline in fertility of dairy cattle has been a problem globally for the last few decades. The conception rate of first insemination after parturition declined from 53.4% (1989) to 41.2% (2008) in Japan (Dochi et al., 2010) and the non-return rate at 70 days after breeding declined from 54% (1996) to 45% (2007) in the United States (Norman et al., 2009). Many researchers focused on nutrition, genetic

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