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RELATIONSHIP OF ESTROUS NON-RETURN RATES
TO IN VITRO FERTILIZATION AND ACROSOME REACTION
RATES OF FROZEN-THAWED BOVINE SPERM

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The purpose of this study was to investigate the relationship of estrous non-return rates after artificial insemination of bovine spermatozoa to in vitro fertilization (IVF) and acrosome reaction rates.

In the first experiment, in vitro matured bovine oocytes were inseminated with frozen-thawed sperm collected from nine individual bulls in the presence of heparin, and the relationship between estrous non-return rates and IVF results was examined. It was observed that IVF rates varied in individual bulls at the sperm concentrations of both $5 \times 10^6/\text{ml}$ and $2.5 \times 10^6/\text{ml}$. At the concentration of $2.5 \times 10^6/\text{ml}$, wide variation in results was obtained. However, there was no significant correlation between IVF and estrous non-return rates ($r=0.434$; $P>0.05$).

In the next experiments, the proportion of sperm exhibiting an acrosome reaction was determined by staining the sperm with naphthol yellow S and erythrosin B, and then the relationship between estrous non-return rates and acrosome reaction rates was examined. First, the author tried to detect the proportion of capacitated sperm after incubation of sperm with heparin and exposure to lysophosphatidylcholine (LC). However, it was difficult to determine the capacitation induction rate using heparin and LC. In the next trial, an acrosome reaction rate was determined after the incubation of sperm with heparin but without LC. The differences in acrosome reaction rates of heparin-treated and non-treated sperm seemed to increase with prolonged incubation period. At 6 hr after incubation, a significant correlation was shown between the estrous non-return rates and differences in acrosome reaction rates of heparin-treated or non-treated sperm ($r=0.913$; $P<0.05$).

It was suggested by this study that estrous non-return rates among bulls correlate with the acrosome reaction rates of sperm treated with heparin. However, there was no significant correlation between the IVF and estrous non-return rates. Since the number of samples examined in this study was small, it is recommended that more samples should be examined and/or related studies should be conducted.