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JOURNAL ARTICLE

Correlation between clusterin-positive spermatozoa determined by flow cytometry in bull semen and fertility

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The objectives were to 1) develop a rapid and accurate method for detection of clusterin-positive spermatozoa (CPS) in bull semen and 2) determine the utility of incidence of CPS for prediction of fertility of bull semen in comparison to routine semen quality traits. Semen from 3 bulls was immunostained with anti-bovine clusterin antibody and with FITC-conjugated anti-rabbit IgG for method development.

Clusterin-positive spermatozoa were determined by flow cytometry (FCM) and fluorescence microscopy, and results were compared by paired t test. There was no difference between FCM and microscopic techniques ($P = .81$). Flow cytometry was then used for determination of CPS in semen of 48 bulls with known fertility. Significant inverse relationships were found between the percentage of CPS and raw nonreturn rate ($r = -.30$), adjusted nonreturn rate ($r = -.58$), and estimated relative conception rate (ERCR; $r = -.60$). Estimated relative conception rate is potentially a very accurate method for determining fertility, and it resulted in highest correlation with CPS. An inverse relationship was observed between the percentage of CPS and prefreeze and postfreeze motility ($r = -.51$), whereas a direct relationship was found between CPS and primary, secondary, tertiary, and total sperm abnormalities ($r = .52, .77, .32, \text{ and } .58$, respectively). The fractions of motile and abnormal spermatozoa, with the exception of tertiary abnormalities, were inversely correlated with 2 or more of the fertility estimates, but none of them showed the characteristic increase in correlation with improvement of accuracy of fertility estimate as demonstrated by CPS. We conclude that FCM is useful for objective and efficient detection of CPS in bull semen. The results suggest that the percentage of CPS in bull semen is potentially a better predictor of fertility than sperm motility or abnormal morphology.

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