The effect of sperm-bound antisperm antibodies (ASAs) on bull fertility is poorly understood. It is thought that ASAs affect sperm-oviduct interactions and impair the ability to form a sperm reservoir. The objective of the present study was to assess the effect of sperm-bound IgG and IgA on the ability of bovine spermatozoa to bind to oviductal epithelial cells in vitro. The in vitro binding index (BI) was hypothesized to decrease in the presence of sperm-bound IgG and IgA. Three ejaculates were cryopreserved from each of four ASA-negative satisfactory breeder yearling bulls. Bulls were then immunized three times 21-d apart with autologous spermatozoa. Three ASA-positive ejaculates were cryopreserved from each bull after immunization. Presence of ASAs was evaluated with flow cytometry before cryopreservation.1 Frozen/thawed washed spermatozoa were incubated in SP-TALP with bovine oviductal explants for 30 min at 37 °C in 5% CO2.2 The fluorescent stain JC-1 was then added to improve visualization of spermatozoa. The number of spermatozoa bound to each explant was counted with phase contrast and fluorescence microscopy at 40 X. At least 10 explants were evaluated per ejaculate and digital images were captured. The area of the explants was measured on the photos with image analysis software (ImageJ, National Institute of Health). The binding index (BI) was calculated as the number of spermatozoa bound per 0.1 mm² of explant. The BI was compared between the ASA-negative and ASA-positive group with a Wilcoxon Rank Test, and the correlation between BI and the percentage of IgG- and IgA-bound spermatozoa was analyzed. The BI was lower in ASA-positive (114.9; 0 to 201.8 sperm/0.1 mm²) than ASA-negative samples (218.9; 24.7 to 276.8 sperm/0.1 mm²) (median; interquartile range; P=0.0002). There was a low but significant negative correlation between BI and the percentage of IgG-bound spermatozoa (P= 0.024; R² = -0.119) but not IgA-bound spermatozoa (P=0.091). The percentage of IgG-bound spermatozoa was higher after (55.4; 45.1 to 77.4 %) than before immunization (0.04; 0 to 0.6 %) (P<0.0001). Similarly, the percentage of IgA-bound spermatozoa increased after immunization (11.7; 7.3 to 24.3 %) compared with pre-immunization samples (0.9; 0.5 to 2.5 %) (P=0.002). Sperm morphology and motility did not differ significantly between pre- and post-immunization ejaculates. In conclusion, presence of sperm-bound antisperm antibodies significantly reduced the ability of bovine spermatozoa to form a sperm reservoir.

Keywords: Bovine, bull, antisperm antibodies, oviductal binding, sperm reservoir

References