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JOURNAL ARTICLE

Zona pellucida piercing enhances zona penetration by spermatozoa from normospermic and teratospermic domestic cats

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Poor quality ejaculates appear associated with reduced zona penetration and poor fertilization in vitro in some felid species or populations. Even morphologically normal sperm from these teratospermic ejaculates are compromised in ability to penetrate the zona pellucida and fertilize oocytes. A domestic cat model and zona piercing were used to study the function of normal and malformed sperm. Male cats naturally producing different proportions of morphologically normal sperm (group I, > 60%; group II, 45-55%; group III, < 40%) were identified. Electroejaculates were subjected to sperm washing (WS) and half of these to swim-up (SU) processing following WS, and all samples were assessed for a sperm motility index (SMI) over time. Zonae of salt-stored (SS), domestic cat oocytes were mechanically pierced (ZnPd) three times each. Control (nonmanipulated) SS oocytes (n = 430) and ZnPd-SS oocytes (n = 430) were coincubated with sperm in vitro. The proportion of morphologically normal sperm/ejaculate differed ($P < 0.05$) among groups averaging 68.8% for group I, 53.5% for group II, and 34.7% for group III. After SU processing, the percent normal sperm among groups was similar ($P > 0.05$; range, 70.8-80.2%). Average SMI for all groups was high (> 70) at 0 hour and decreased over time, but the descent of slope was greater ($P < 0.05$) for group III than groups I and II. The proportion of oocytes penetrated was not influenced ($P > 0.05$) by sperm-processing treatment. For all groups, inner zona penetration was greater ($P < 0.05$) in ZnPd-SS than SS oocytes (group I, 52.3% vs. 34.9%; group II, 37.9% vs. 20.3%; group III, 32.0% vs. 17.2%). (ABSTRACT TRUNCATED AT 250 WORDS)

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