

**Supplementary Table1.** Sperm motility parameters were analyzed by CASA

Time	0 h				
	0 $\mu$ M	30 $\mu$ M	60 $\mu$ M	90 $\mu$ M	120 $\mu$ M
Sperm parameters					
Total motility (%)	81.66 $\pm$ 1.91	83.21 $\pm$ 3.06	83.03 $\pm$ 4.94	84.54 $\pm$ 2.41	85.11 $\pm$ 3.52
Progressive motility (%)	63.66 $\pm$ 3.19	64.90 $\pm$ 2.98	65.63 $\pm$ 3.69	64.82 $\pm$ 3.04	65.98 $\pm$ 3.30
VCL ( $\mu$ m/s)	84.94 $\pm$ 3.43	83.24 $\pm$ 4.06	84.20 $\pm$ 6.80	84.16 $\pm$ 6.57	82.93 $\pm$ 5.16
VSL ( $\mu$ m/s)	64.63 $\pm$ 3.13	64.69 $\pm$ 3.18	66.84 $\pm$ 2.35	65.65 $\pm$ 2.31	64.60 $\pm$ 3.08
VAP ( $\mu$ m/s)	66.17 $\pm$ 3.56	65.20 $\pm$ 5.32	71.00 $\pm$ 4.62	70.25 $\pm$ 5.32	70.83 $\pm$ 6.83
BCF (Hz)	7.95 $\pm$ 0.31	8.12 $\pm$ 0.28	8.16 $\pm$ 0.88	8.73 $\pm$ 1.14	8.11 $\pm$ 0.55
ALH ( $\mu$ m)	3.86 $\pm$ 0.25	4.19 $\pm$ 0.67	5.26 $\pm$ 0.50	4.82 $\pm$ 0.17	4.95 $\pm$ 0.15
STR (%)	85.26 $\pm$ 2.09	84.82 $\pm$ 4.12	84.57 $\pm$ 4.71	83.41 $\pm$ 5.45	84.02 $\pm$ 5.72
LIN (%)	69.38 $\pm$ 2.05	67.62 $\pm$ 3.76	70.24 $\pm$ 5.72	68.10 $\pm$ 5.06	69.48 $\pm$ 4.52
WOB (%)	75.14 $\pm$ 4.16	73.20 $\pm$ 4.69	76.79 $\pm$ 3.48	75.38 $\pm$ 3.82	76.17 $\pm$ 3.31

(Values are expressed as mean  $\pm$  standard deviation. Different letters within column indicate significant difference ( $P < 0.05$ ). VCL, curvilinear velocity; VSL, straight-line velocity; VAP, average path velocity; BCF, beat-cross frequency; ALH, lateral head; STR, straightness (VSL/VAP); LIN, linearity (VSL/VCL); WOB, wobble (VAP/VCL).