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## JOURNAL ARTICLE

# Sperm motion predicts fertility in male hamsters treated with alpha-chlorohydrin

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An understanding of the relationship between altered sperm motion and sperm function (fertility) is important when interpreting the biological significance of toxicant-induced changes in sperm velocity in rodent test species. Previous studies showed that a brief (4-day) exposure of male hamsters to the model chemical alpha-chlorohydrin (ACH) results in significant deficits in epididymal and uterine sperm velocity, which are associated with both a delay and a failure of fertilization *in vivo*. To characterize this effect in terms of fertility, similarly treated male hamsters were bred to untreated females and pups were counted the day before parturition. ACH treatment resulted in a dose-dependent decline in the percentage of sperm-positive females that were pregnant at the end of gestation (100, 78, 67, 22, and 0 where males were treated with 0, 33, 49, 66, and 83 mg ACH/kg/day, respectively). Cauda epididymal sperm from the same males were assayed for motion characteristics using computer-assisted sperm analysis (CASA), and for fertilizing ability *in vitro*. While the percentage of motile sperm was unaffected by ACH treatment, sperm velocity declined in a dose-dependent manner at all ACH treatment levels. Furthermore, the velocity of sperm from infertile males was shifted downward consistently across the entire velocity distribution. Since treated males tended to either be infertile (no pups) or have near normal litter size, the correlation between sperm velocity and litter size was nonlinear. Therefore, logistic regression models using velocity cut-off values were the most useful models for predicting fertility. These results support the contention that fertility relies on there being a sufficient number of sperm that exceed a velocity threshold. Sperm from treated males were also less likely to support *in vitro* fertilization (IVF), providing further evidence of impaired sperm function associated with acute exposure to ACH.

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