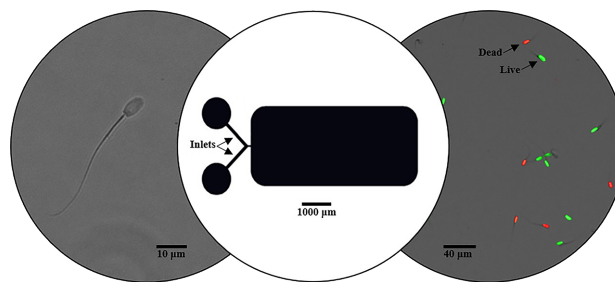


3 August 2020

Microfluidic devices do not significantly harm boar and bull spermatozoa viability

Savannah Mandel

Microfluidic processing does not significantly harm the viability of boar and bull spermatozoa and is less damaging than other processing techniques used for artificial insemination.



Microfluidic devices are used in the veterinary industry to sort debris and other cells from spermatozoa samples for artificial insemination. As semen quality is crucial for the successful insemination of animals, it is paramount to identify whether existing microfluidic processing techniques negatively affect the quality of the samples.

Hamacher et al. measured the shear stress on boar and bull spermatozoa caused by microfluidic processing, and compared it to the shear stress caused by the initial ejaculation to find out if the process harmed the viability of the sperms.

Shear stress during ejaculation and shear stress during microfluidic processing, which occurs inside the microfluidic chips and connection tubing, was estimated for both species.

The researchers found that boar spermatozoa were slightly affected by the microfluidic processing, which incurred a 6% decrease in viability. Though the processing method did affect the viability, the impact was small compared to other techniques such as flow cytometry. On the other hand, the researchers did not observe a measurable impact on the bull spermatozoa by microfluidic processing.

According to the authors, the difference between the two could be due to physiochemical and biochemical differences in the semen.

“Our study shows that microfluidic processing is not more harmful to the cells than any other commonly used processing technique, such as centrifugation and flow cytometry,” said author Stella Kruit. “Although, we were not surprised by this result, we were surprised that the effect is different for different animal species.”

In the future, the authors intend on implementing microfluidic processing to hopefully improve the semen quality of various animal species and humans.

Source: “Effect of microfluidic processing on the viability of boar and bull spermatozoa,” by Tanja Hamacher, Johanna T. W. Berendsen, Stella A. Kruit, Marleen L. W. J. Broekhuijse, and Loes Segerink, *Biomicrofluidics* (2020). The article can be accessed at <https://doi.org/10.1063/5.0013919>.

Published by AIP Publishing (<https://publishing.aip.org/authors/rights-and-permissions>).