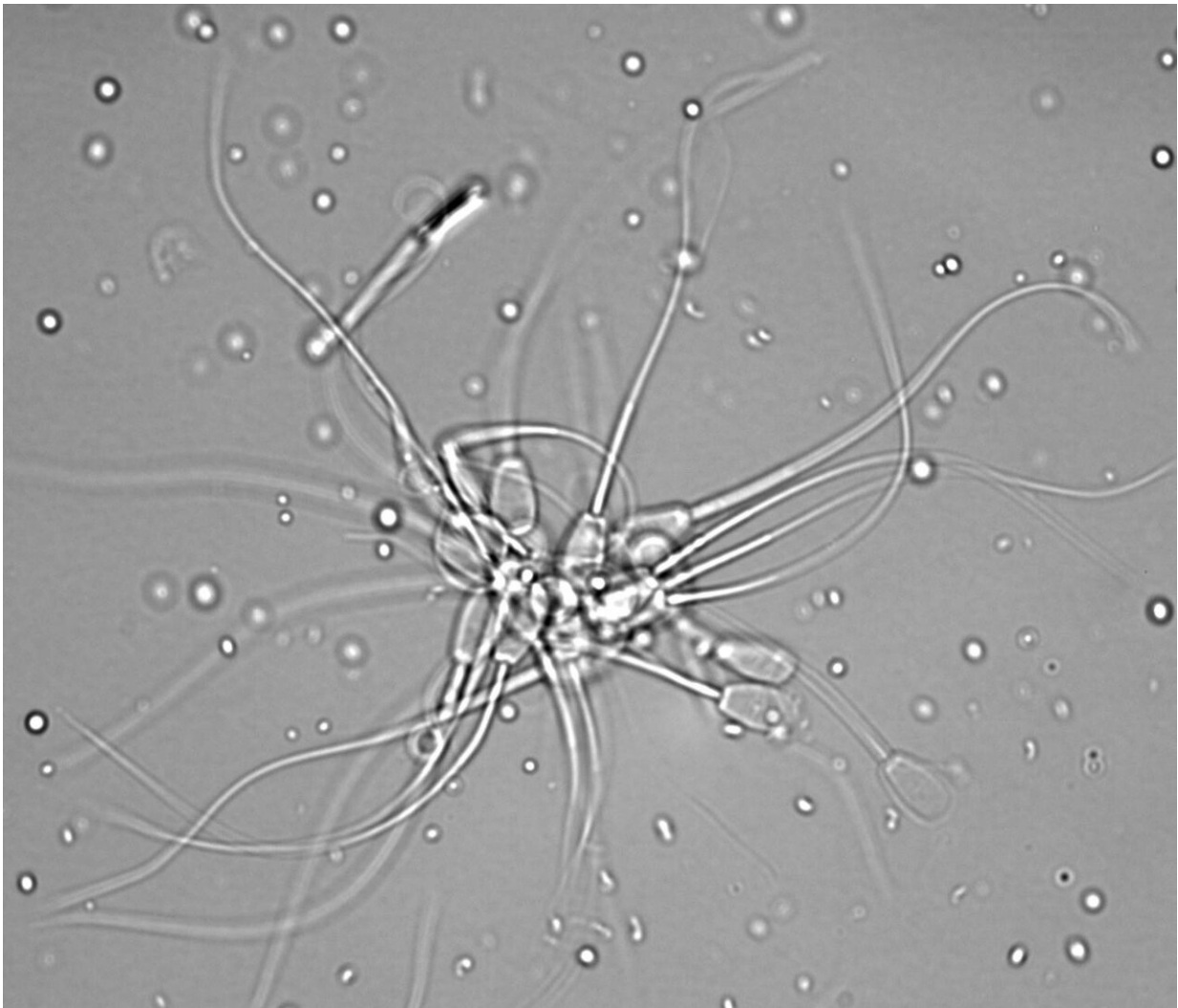


# Biologists examine sperm quality on the basis of their metabolism

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Bovine sperm in bright-field microscopy with differential interference contrast.  
Credit: Dr. Veronika Magdanz

Every tenth couple worldwide is affected by infertility. The reasons for this are manifold, but mostly well researched. Nevertheless, about fifteen percent of cases remain unexplained. A team of biologists at TU Dresden has now gained new insights into the metabolic properties that make up a good sperm cell.

Thanks to the advanced possibilities, in vitro fertilization is part of everyday medical practice. The so-called swim-up method is a sperm purification method that is being used daily in andrology labs around the world as a simple step for in vitro sperm selection. This method accumulates the most motile sperm in the upper fraction and leaves sperm with low or no motility in the lower fraction by adding them to a culture medium. The reasons for the different sperm qualities are still poorly understood.

A team of biologists from TU Dresden has now compared bovine sperm from the upper and lower layers with regard to their metabolic rate, their motility and sperm tail length. In their study, they identified clear connections: the faster sperm selected by swim-up show higher metabolic rates and longer driving flagella than non-selected cells.

Dr. Veronika Magdanz, head of the study, explains the results as follows: "However, it is not quite as easy as that these sperm simply metabolize more. The stored energy is also lower in the selected sperm, which shows that they consume more energy reserves. Understanding the metabolism of the selected spermatozoa is important because certain [metabolic pathways](#) can also have a detrimental effect on the spermatozoa. For example, cell respiration in the mitochondria, one of the possible metabolic pathways, produces harmful oxygen radicals that affect the genetic integrity and cell functions of the sperm."

The results of the study are the first to provide a metabolic explanation for why the swim-up method selects sperm that appear to be functionally

superior. These findings can be applied to all human and animal sperm and provide valuable new insights into the origins of life.

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**More information:** Veronika Magdanz et al. The motility-based swim-up technique separates bull sperm based on differences in metabolic rates and tail length, *PLOS ONE* (2019). [DOI: 10.1371/journal.pone.0223576](https://doi.org/10.1371/journal.pone.0223576)

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