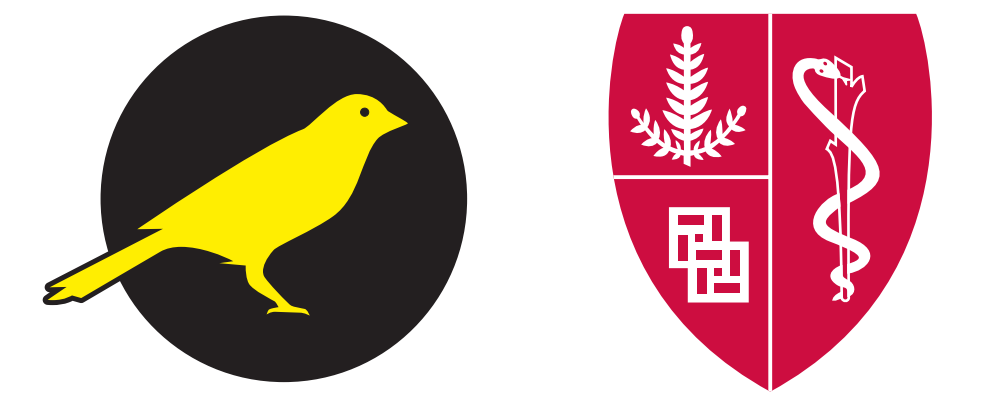




MICROFLUIDIC SPERM SORTING DEVICE FOR SELECTION OF FUNCTIONAL HUMAN SPERM FOR IUI APPLICATION



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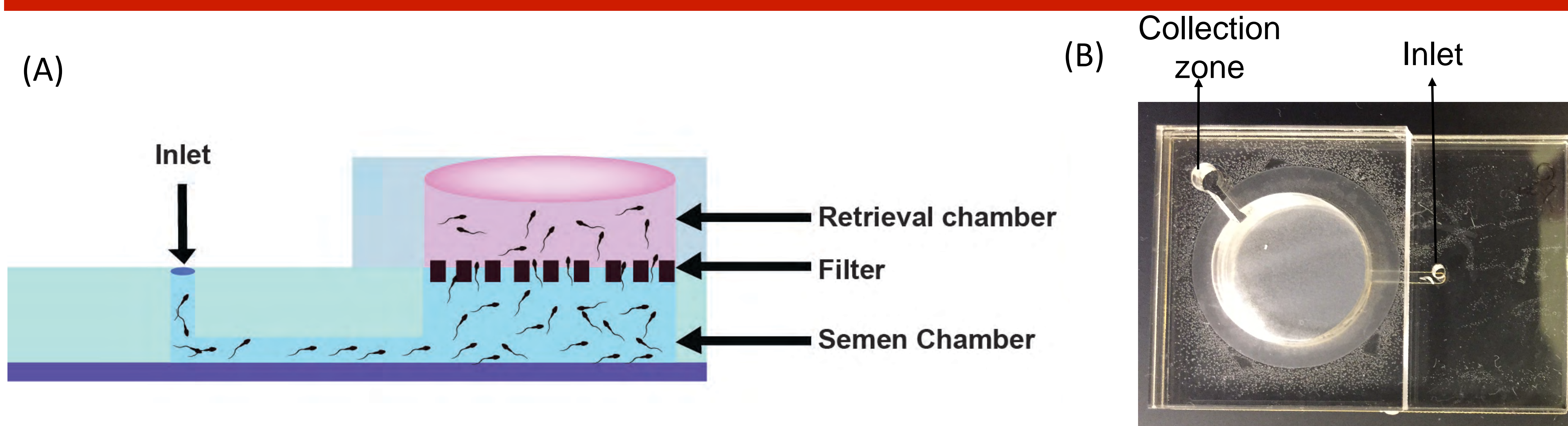
Background

According to the American Society for Reproductive Medicine, infertility affects about 5.3 million American couples of reproductive age (9%), among which male infertility accounts for 40-50% of cases [1]. The leading cause of male infertility is low sperm count, which is usually associated with low sperm motility, abnormality and impaired sperm function, thus resulting in the inability to fertilize an oocyte naturally [2]. Assisted reproductive technologies (ARTs) have offered an alternative to address challenges associated with male infertility [3]. A major clinical challenge is, however, the selection of highly motile and morphologically viable sperm to optimize the effectiveness of the procedures.

Objective

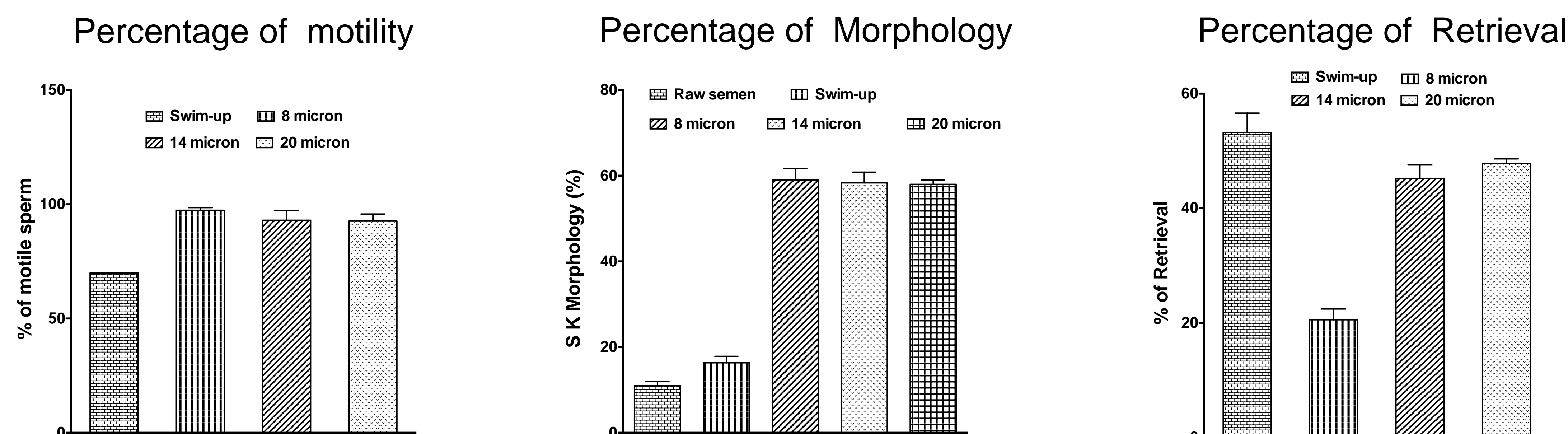
The present study is to develop a microfluidic chip for sorting a highly motile and morphologically normal sperm for IUI application.

Principle and Method



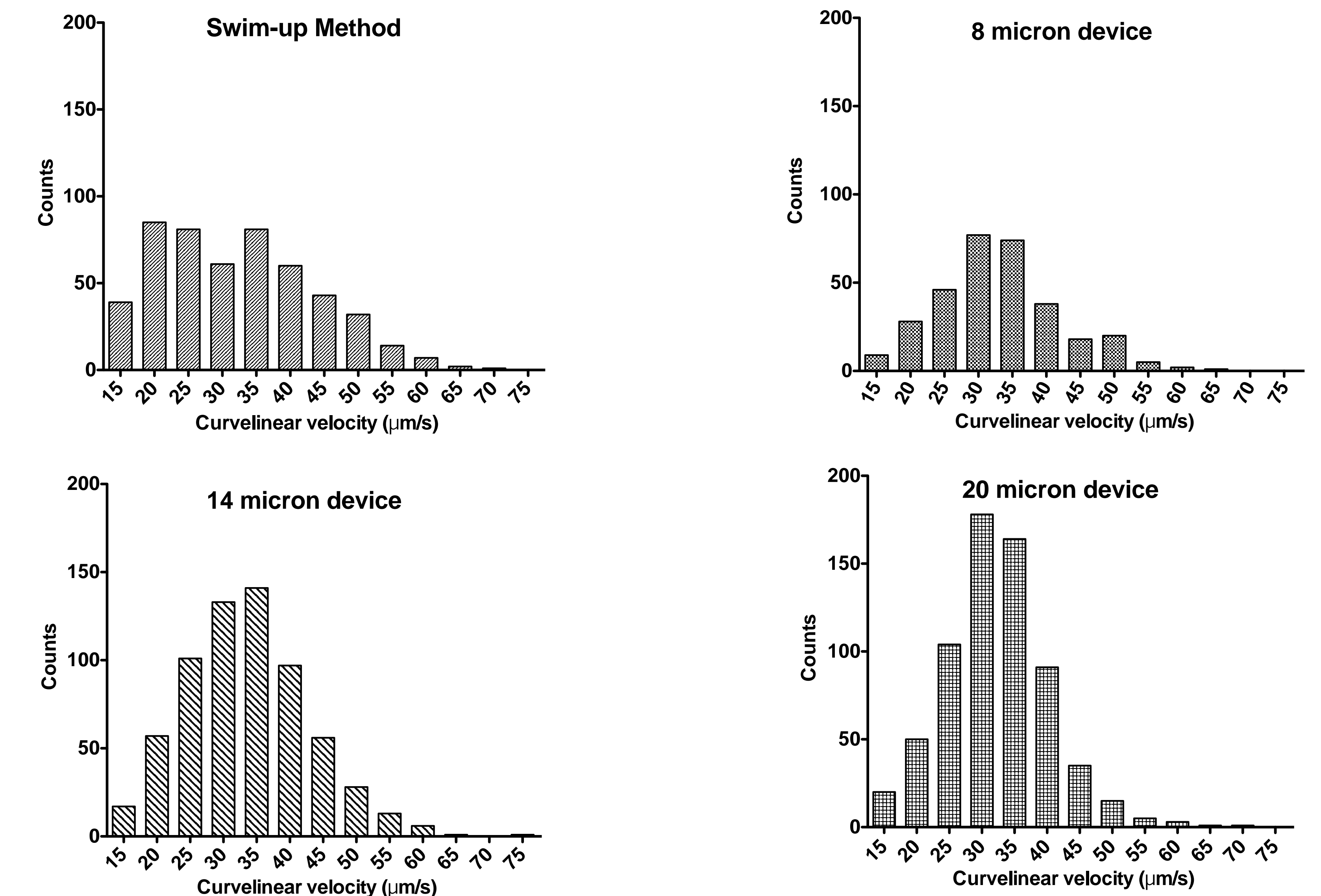
(A) Schematic representation of microfluidic sperm-sorting device and (B) The photograph of the microfluidic sperm sorting device showing inlet, filter, and retrieval chambers

Results



Results Contd.

Curvilinear velocity distribution of sorted sperm using swim-up and microfluidic chip method



Conclusions

The developed microfluidic device shows higher sperm sorting efficiency as compared to conventional method and it can be an alternative approach for routine sperm sorting to improve clinical outcomes and further validated by clinical trail.

References

- Abbey, A., F.M. Andrews, and L.J. Halman, *Gender's role in responses to infertility*. Psychology of Women Quarterly, 1991. **15**(2): p. 295-316.
- Asghar, W., et al., *Selection of functional human sperm with higher DNA integrity and fewer reactive oxygen species*. Advanced healthcare materials, 2014. **3**(10): p. 1671-1679.
- Tasoglu, S., et al., *Exhaustion of Racing Sperm in Nature-Mimicking Microfluidic Channels During Sorting*. Small, 2013. **9**(20): p. 3374-3384.

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