

Partner selection ultimately happens in the woman's reproductive tract

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Achieving pregnancy has been shown to be more likely between partners who carry dissimilar human leucocyte antigen (HLA) immune genes. Accordingly, humans are expected to choose HLA dissimilar

reproductive partners. Earlier studies have demonstrated that HLA dissimilarity preferences are mediated either by body odors or facial preferences. However, it has been unclear whether HLA-based mating preferences could occur after sexual intercourse in the female reproductive tract. Researchers at the University of Eastern Finland have now shown that the women's reproductive tract is capable of mediating post-mating sexual selection (known as the "cryptic female choice") toward the sperm of HLA-dissimilar men. This indicates that the ultimate mating bias toward genetically compatible partners occurs only after mating, at the gamete level.

The researchers conducted two experiments, where they activated sperm from multiple men with follicular fluid (the oocyte surrounding bioactive liquid) or cervical mucus from several different women. Then they examined [sperm motility](#) and other functionally important physiological changes of sperm in all possible male-female combinations. All the participants were also genotyped for their human leucocyte antigen (HLA) class I and II alleles.

In both studies, the results showed that the fertilization capability and viability of sperm are strongly dependent on the male-female combination. In other words, women's reproductive secretions had a stronger effect on the sperm performance of some males than others. Both datasets also showed that the sperm performance was better in HLA dissimilar male-female combinations than in HLA similar males and females.

Together, the results indicate that the fertilization capability of sperm is dependent on the immunogenetic compatibility of the reproductive partners and that the fusion of the gametes may be a highly selective process.

"These findings can have important implications for a deeper

understanding of [sexual selection](#) and the fertilization process in humans and other mammals," Associate Professor Jukka Kekäläinen from the University of Eastern Finland says.

"Since the gametes of some partners may be immunologically more compatible than others, our results may also open up novel possibilities for the development of more accurate infertility diagnostics," Annalaura Jokiniemi, MSc, adds.

More information: Annalaura Jokiniemi et al. Post-copulatory genetic matchmaking: HLA-dependent effects of cervical mucus on human sperm function, *Proceedings of the Royal Society B: Biological Sciences* (2020). [DOI: 10.1098/rspb.2020.1682](https://doi.org/10.1098/rspb.2020.1682)

Annalaura Jokiniemi et al. Gamete-level immunogenetic incompatibility in humans—towards deeper understanding of fertilization and infertility?, *Heredity* (2020). [DOI: 10.1038/s41437-020-0350-8](https://doi.org/10.1038/s41437-020-0350-8)

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