

Infertility and the battle of the sexes

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About 10% of all couples hoping for a baby have fertility problems. Environmentalists say pollution is to blame and psychiatrists point to our stressful lifestyles, but evolutionary biologist Dr. Oren Hasson of Tel Aviv University's Department of Zoology offers a different take. The reproductive organs of men and women are currently involved in an evolutionary arms race, he reports in a new study. And the fight isn't over yet.

"The rate of human [infertility](#) is higher than we should expect it to be," says Dr. Hasson. "By now, evolution should have improved our [reproductive success](#) rate. Something else is going on." Combining empirical evidence with a [mathematical model](#) developed in cooperation with Prof. Lewi Stone of the department's Biomathematics Unit, the researchers suggest that the bodies of men and women have become reproductive antagonists, not reproductive partners. The conclusions of this research were published recently in the journal *Biological Reviews*.

Favoring the "super-sperm"

Over thousands of years of evolution, women's bodies have forced sperm to become more competitive, rewarding the "super-sperm" -- the strongest, fastest swimmers -- with penetration of the egg. In response, men are over-producing these aggressive sperm, producing many dozens of millions of them to increase their chances for successful fertilization.

But these evolutionary strategies demonstrate the Law of Unintended Consequences as well, says Dr. Hasson. "It's a delicate balance, and over

time women's and men's bodies fine tune to each other. Sometimes, during the fine-tuning process, high rates of infertility can be seen. That's probably the reason for the very high rates of unexplained infertility in the last decades."

The unintended consequences have much to do with timing. The first sperm to enter and bind with the egg triggers biochemical responses to block other sperm from entering. This blockade is necessary because a second penetrating sperm would kill the egg. However, in just the few minutes it takes for the blockade to complete, today's over-competitive sperm may be penetrating, terminating the fertilization just after it's begun.

Sexual evolution explained

Women's bodies, too, have been developing defenses to this condition, known as "polyspermy." "To avoid the fatal consequences of polyspermy, female reproductive tracts have evolved to become formidable barriers to sperm," says Dr. Hasson. "They eject, dilute, divert and kill spermatozoa so that only about a single spermatozoon gets into the vicinity of a viable egg at the right time."

Any small improvement in male sperm efficiency is matched by a response in the female reproductive system, Dr. Hasson argues. "This fuels the 'arms race' between the sexes and leads to the evolutionary cycle going on right now in the entire animal world."

Advice for doctors and marriage counselors

Sperm have also become more sensitive to environmental stressors like anxious lifestyles or polluted environments. "Armed only with short-sighted natural selection," Dr. Hasson argues, "nature could not have

foreseen those stressors. This is the pattern of any arms race. A greater investment in weapons and defenses entails greater risks and a more fragile equilibrium."

Dr. Hasson says that IVF specialists can optimize fertility odds by more carefully calculating the number of sperm placed near the female ova. And nature itself may have its say as well. Sexually adventurous women, like females of many birds and mammals who raise their offspring monogamously but take on other sexual partners, help create a more fertile future. But not always, says Hasson and Stone's mathematical model — certain types of infertile sperm race to the egg as competitively as any healthy sperm, and may block the [sperm](#) of a fertile lover.

But whatever the source of infertility, Dr. Hasson, who also works as a marriage counselor, can't recommend cheating, not even as an evolutionary psychologist. Infertile marriages can be stressful, but unlike birds, we have the capacity for rational thinking. He advises infertile couples to openly communicate about all their options, and seek counseling if necessary.

Source: Tel Aviv University ([news](#) : [web](#))

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