

Unisex Contraception Could Target Male Sperms' Ability to Swim



By Alex Berezow, PhD — September 15, 2016



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Some men would give their right testicle to have access to contraception that doesn't involve pleasure-killing condoms or cringe-inducing surgical snips. Biology, unfortunately, has made targeting contraception at the female reproductive system far easier than targeting the male reproductive system. In a nutshell (no pun intended), preventing a single egg cell from being fertilized is simpler than deactivating the [40 million to 1.2 billion sperm cells](#) [2] found in a single ejaculation. Also, it's [easier to block ovulation than sperm production](#) [3].

But it's not like scientists haven't tried to find something effective for men. One of the more promising technologies is called [Vasalgel](#) [4], a polymer that is injected directly into the [vas deferens](#) [5], the tube that carries sperm out of the testicles. The Parsemus Foundation, which is promoting this technology, believes it will be easier to reverse than a vasectomy, which cuts the tube.

Still, this form of contraception requires an injection "down there," which may make men squeamish. Will it ever be possible for a man to just pop a pill? Possibly. A new review in *Trends in Biochemical Sciences* explains how this might work.

In order to swim, sperm cells rely on special membrane proteins, called ion channels, that regulate ion flow. Ion channels are found in most cells, and their role is particularly well-known for heart, muscle, and nerve cells. Some ion channels, however, are unique to sperm cells, and these could be attractive targets.

Flagellar targets:

CatSper complex (human/mouse)
Slo1/Slo3/LRRC52 (human/mouse)
Na,K-ATPase alpha 4 (human/mouse)
ABHD2 (human)
sNHE (human/mouse)
Hv1 (human)
Sperm calcineurin(PPP3CC and PPP3R2)
(human/mouse)

Sperm surface targets:

EPPIN (human/mouse)
Defensin B126 (human)



Trends in Biochemical Sciences

Various potential sperm-specific targets.

The ion channel CatSper, for instance, regulates calcium ion flow in the sperm's tail. Men who have a defective CatSper-encoding gene are infertile. But crucially, nothing else appears wrong with them. In theory, that means a drug that targeted this ion channel should function as a contraceptive without causing side effects.

Earlier this year, the lab also published a paper in the journal *Science*, which elucidated some of the molecular mechanisms behind [sperm activation](#) [6]. ("Activated" sperm use a forceful, "whip-like" motion as a final push to get inside the egg.) This investigation suggested that the enzyme ABHD2, which is involved in this process and is activated by the female hormone progesterone, might also serve as a target. The trouble is that ABHD2 is expressed everywhere in the body. But because men have very little progesterone, the enzyme probably doesn't do anything in men. Targeting it, therefore, should (once again, in theory) produce few side effects, while blocking the activation of sperm.

Additionally, drugs aimed at these two targets would have the added benefit of being "unisex"; they could be taken by either men or women.

Obviously, much of this research is still in the theoretical stage. But someday in the future, guys too may be "on the pill."

[Source](#) [7]: Polina V. Lishko. "Contraception: Search for an Ideal Unisex Mechanism by Targeting Ion Channels." *Trends in Biochemical Sciences*. (In press.) DOI:

<http://dx.doi.org/10.1016/j.tibs.2016.08.002> [8]

[Source](#) [9]: Melissa R. Miller et al. "Unconventional endocannabinoid signaling governs sperm activation via sex hormone progesterone." *Science*. Published: 17-Mar-2016: DOI: 10.1126/science.aad6887

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Links

- [1] <http://www.shutterstock.com/pic-153870965/stock-vector-mascot-illustration-featuring-a-sperm-cell-giving-a-thumbs-up.html>
- [2] <http://www.livescience.com/32437-why-are-250-million-sperm-cells-released-during-sex.html>
- [3] <http://motherboard.vice.com/read/developing-contraceptives-for-men-is-really-hard>
- [4] <https://www.parsemusfoundation.org/projects/vasalgel/>
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- [7] [http://www.cell.com/trends/biochemical-sciences/fulltext/S0968-0004\(16\)30102-5](http://www.cell.com/trends/biochemical-sciences/fulltext/S0968-0004(16)30102-5)
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