

How the Male Birth-control Pill Will Work

<http://health.howstuffworks.com/sexual-health/contraception/male-bc-pill.htm>

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Condoms are one of the few birth-control options available to men today.

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The birth control pill celebrated its 50th birthday in 2010, prompting anniversary essays and opines lauding how the oral contraceptive revolutionized the sexual and maternal landscape for women. By 1978, birth control was freely prescribed to both married and unmarried women, and since then, those tablet packets have doubled as daily doses of independence. Today, the pill is the most popular form of birth control for American women under 30, providing reversible contraception for nearly

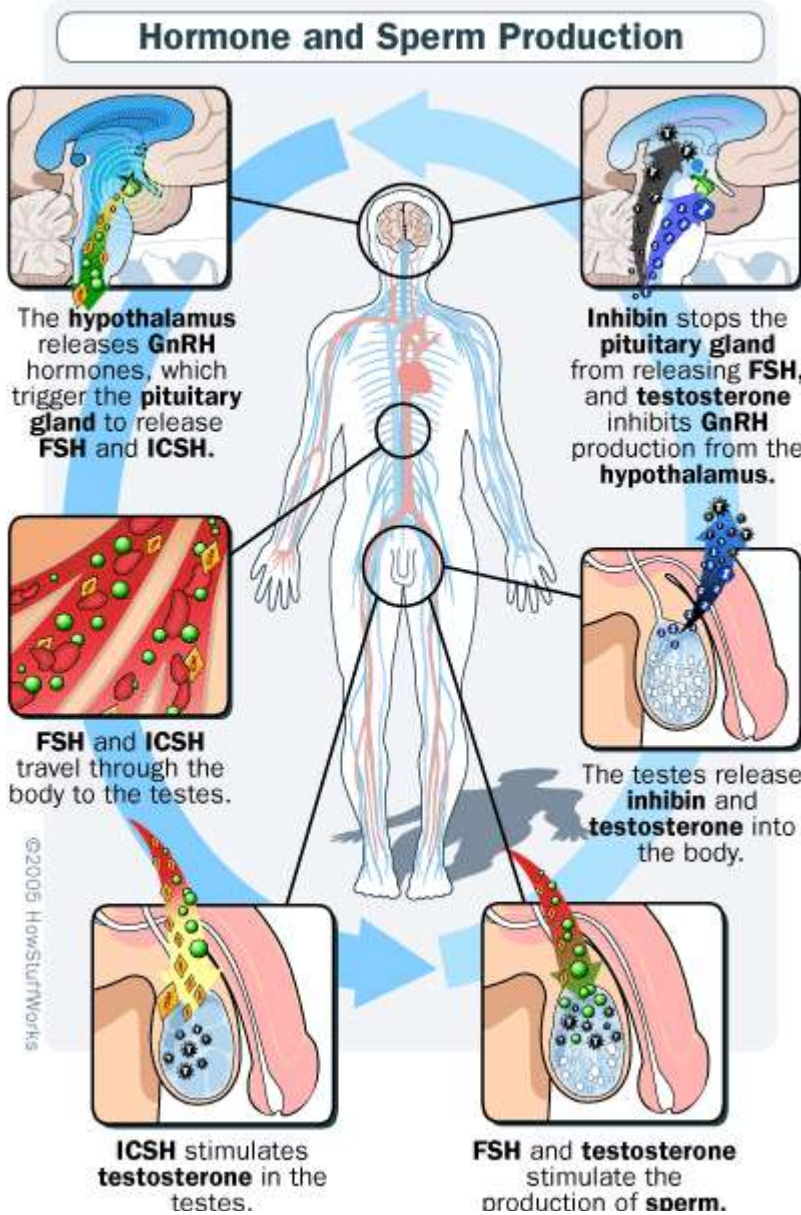
11 million women [source:[Guttmacher Institute](#)].

While the birth control family has grown over the years -- branching off with patches, rings, IUDs and other iterations, both hormonal and non-hormonal -- about half of all pregnancies in the United States are still unintended, indicating that female birth control isn't a contraceptive panacea [source: [Centers for Disease Control and Prevention](#)]. And despite the wide-ranging birth control methods available on the market today, there's still one option that's noticeably missing: male birth control. Pharmaceutical companies and medical researchers have investigated long-term, reversible forms of birth control designed for men, and all have fallen short.

Certainly, men aren't completely at a loss for contraception; according to Planned Parenthood, they can choose from five non-medicinal options: abstinence, [condoms](#), outercourse, vasectomy and withdrawal [source: [Planned Parenthood](#)]. Yet some men complain that none of those options allow them to fully enjoy sex, as condoms may reduce penile sensation, for instance, and [vasectomies](#) require an additional surgery to reverse.

Though it wouldn't eliminate the risk of contracting sexually transmitted diseases, male birth control could provide an attractive contraception alternative for many reasons. For one, it would allow men and women to share contraception responsibility more equally. Additionally, it could alleviate women's concerns over female birth control's long-term impact on fertility. Since female birth control also tinkers with some women's libidos, a male birth control option could offer a more stimulating form of contraception for both partners.

But how could a medication stop the 120 million sperm released during male orgasm from finding an egg?



Hormone and Sperm Production

The 120 Million Sperm Challenge: The Biology of Male Birth Control

The female birth-control pill contains synthetic forms of the hormones estrogen and progesterone, which prevent the ovaries from releasing a monthly egg for fertilization during a regular process of ovulation (see [How Menstruation Works](#) to learn more). When male birth control research first got underway, pharmaceutical companies likewise focused on a hormone-based approach to curtailing sperm production.

Testosterone is responsible for the development of sexual characteristics, including muscle mass and facial hair growth, in men. It's also responsible for stimulating the testes to manufacture sperm. The illustration demonstrates how the normal process works.

Normally, at the start of the sperm-production cycle, the hypothalamus in the [brain](#) releases gonadotropin-releasing hormone (**GnRH**), which triggers the release of fertility hormones called gonadotropins (**FSH** and **ICSH**) from the pituitary gland. ICSH signals the testes to produce **testosterone**, and FSH and testosterone tell the testes to produce sperm. When sperm production is complete, the testes release testosterone and a hormone called **inhibin** into the body, which tells the brain that there's enough sperm. This stops the release

of sperm-producing hormones, until the testes require a refill, and the hypothalamus starts the cycle anew.

Since testosterone provides that signal that sperm production is complete, giving a man extra testosterone can serve the same purpose. But if there are always high doses of testosterone in the male [bloodstream](#), they continually tell the brain that the testes are producing enough sperm, which turns off the release of GnRH indefinitely. Male birth control researchers discovered that this testosterone-pumping, GnRH-thwarting approach also comes with a host of physical side effects, including acne, weight gain, prostate-gland growth and abnormal liver function.

To solve the testosterone problem, researchers in the mid-2000s introduced progesterone, another synthetic sex hormone also found in female birth control, into the mix. The resulting male birth control method combined testosterone implants to inhibit sperm production and regular progesterone injections to counteract the unwanted side effects in 80 to 90 percent of male trial participants [source: [Amory, Page and Bremner](#)]. But since pharmaceutical companies doubted men would go to such lengths for birth control, they pulled the plug on funding [source: [Goodman](#)].

These days, male birth control researchers have largely given up on finding a hormonal sperm blocker in favor of non-hormonal options.

Non-hormonal Male Birth Control Concepts



One of the first non-hormonal male birth control breakthroughs came from researchers at the University of Massachusetts in 2005 [source: [Smith](#)]. Rather than shutting down sperm production via testosterone, the medical school scientists sought to disable sperm instead. When sperm form in the testes, their tails are extant but immobile. Not until the sperm pass through the **epididymis** (the long, coiled tube that connects the testis to the vas deferens) are they able to swim. The University of Massachusetts team hypothesized that blocking the **Cs protein**, which "turns on" the sperm's tails on their journey through the epididymis, could permanently incapacitate sperm.

The Cs protein concept wasn't the only non-hormonal idea floating around the medical community at the time. Researchers around the world were working on other non-hormonal male birth control projects, based off of ideas such as turning off a protein that triggers sperm maturation, and research into a cancer medication, **lonidamine**, which inadvertently terminates sperm production. Despite promising lab testing, the FDA has yet to green light either.

In 2011, non-hormonal male birth control made the rounds in science news headlines again. Columbia University genetics professor Debra Wolgemuth ran across a compound, BMS-189453, technically classified as a "testicular toxin," that rendered male mice infertile without affecting their testosterone levels or sex drive [source: [Rochman](#)]. The compound prevents the body from breaking down vitamin A, which provides a key protein for regulating sperm production. Specifically, it inhibits the metabolism of vitamin A into retinoic acid that then forms a protein linked to spermatogenesis. Wolgemuth and her team determined that a similar vitamin A-blocking compound derived for men could act as a reversible, non-hormonal birth control. On the down side, the method also has raised red flags for some in the medical community, who worry that messing with the body's vitamin A uptake could result in [immune system](#) deficiencies and other negative side effects [source: [Perry](#)].

Around the same time that BMS-189453 snagged media attention, another non-hormonal male birth control treatment with a similarly unwieldy name also awaited at the pharmaceutical gates.

One of the most long-lasting, promising male birth control methods in development is a gel injection.

RISUG, Male Birth Control's Rising Star

Not that long ago, people in the medical community and the general public expected male birth control to mimic the landmark female birth control and hit the market in pill form. In actuality, the farther male birth control advances, the less likely it appears that a pill will fit the bill. Here's just a sampling of the many male birth control options that have been floated in the past decade:

- Radio controlled implant to block sperm flow with a click of a button.
- Plugs that form sperm blockades in the vas deferens.
- Testicular [ultrasounds](#) to zap sperm production for six months.
- Heat treatments to induce temporary sterilization.
- Rods filled with the hormone etonogestrel implanted into the arm.

One of the most promising male birth control options under investigation doesn't involve popping pills, fiddling with remote controls or toting around bulging implants in one's forearm. Attracting widespread media coverage since 2010, **Reversible Inhibition of Sperm Under Guidance (RISUG)** is a one-time gel injection that acts almost instantly to incite infertility in men. Developed 30 years

ago by Indian scientist Sujoy Guha, RISUG, also known as **VasalGel**, sterilizes men for 10 to 15 years and also is completely reversible with a follow-up injection that dissolves the gel, according to human trials to date [source: [Gifford](#)].

The “gel” in VasalGel consists of a nontoxic polymer -- powdered styrene maleic anhydride combined with dimethyl sulfoxide, to be scientifically specific -- that coats the interior of the vas deferens and immobilizes sperm on their mass exodus out of the penis [source: [Male Contraception Information Project](#)]. The gel barrier not only makes it more difficult for sperm to squeeze through the confined tubing, but its chemical charge also fatally damages sperm membranes. So far, Indian men who have undergone a RISUG treatment have encountered no unintended [pregnancies](#) and experienced no secondary physical or sexual side effects [source: [Gifford](#)].

Why aren't sexually active men everywhere lining up for a RISUG shot? As of this writing, the treatment is still in the clinical testing phases, but the scant attention it has received from pharmaceutical companies portends an uncertain future for male birth control.



Can men be trusted to take responsibility for long-term birth control?

The Future of Male Birth Control

The foundation funding RISUG (aka VasalGel) development hopes for this long-term, reversible male birth control option to be on the U.S. market by 2015 [source: [Male Contraception Information Project](#)]. However, without financial assistance from a pharmaceutical company, that might be a tough goal to meet. To make matters worse, despite the 100 percent reported

success rate of RISUG gel, it might not look like such a shimmering prospect from a pharmaceutical manufacturer's perspective, precisely because it works so well. Unlike the female birth control pill that [women](#) must take every day, a one-time, long-term male birth control treatment doesn't promise a significant profit margin [source: [Gifford](#)]. Perhaps that's why from 2006 to 2008 international pharmaceutical corporations Wyeth, Schering and Organon all dropped their male birth control development programs [source: [Goodman](#)].

But imagining that pharmaceutical companies finally pony up, and the FDA approves a male birth control pill, gel, implant or injection for the medical market, two big questions still surround its possible use:

- Will [men](#) take it?
- Will women trust them to take it?

Surveys so far indicate that the answers to both questions lean toward "yes." In a 1997 survey by the Kaiser Family Foundation, two-thirds of American men said they would be willing to try the new pill [source: [Kaiser Family Foundation](#)]. And in an international survey of 4,000 men and women in 2000, more than two-thirds of male respondents said they would use a birth-control pill if it were available, and 75 percent of the women said they would trust their partner to handle the birth control [source: [BBC News](#)].

More recent surveys, however, suggest interest has dwindled. Although a majority of adults see contraception as a joint responsibility, not as many men are hyped about male birth control. In 2005, 55 percent of 9,000 male survey respondents said they were interested in a “new male fertility control” [source: [Goodman](#)]. For a different survey in 2008, 36 percent of men said they would take a hormonal birth control, possibly indicating that men are growing weary of the wait-and-see for male birth control options [source: [Medical News Today](#)].

At this point in the decades-long pursuit of an effective, reversible male birth control with minimal side effects, a more relevant survey might focus on the odds of a successful contraceptive treatment ever hitting the market at all.

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