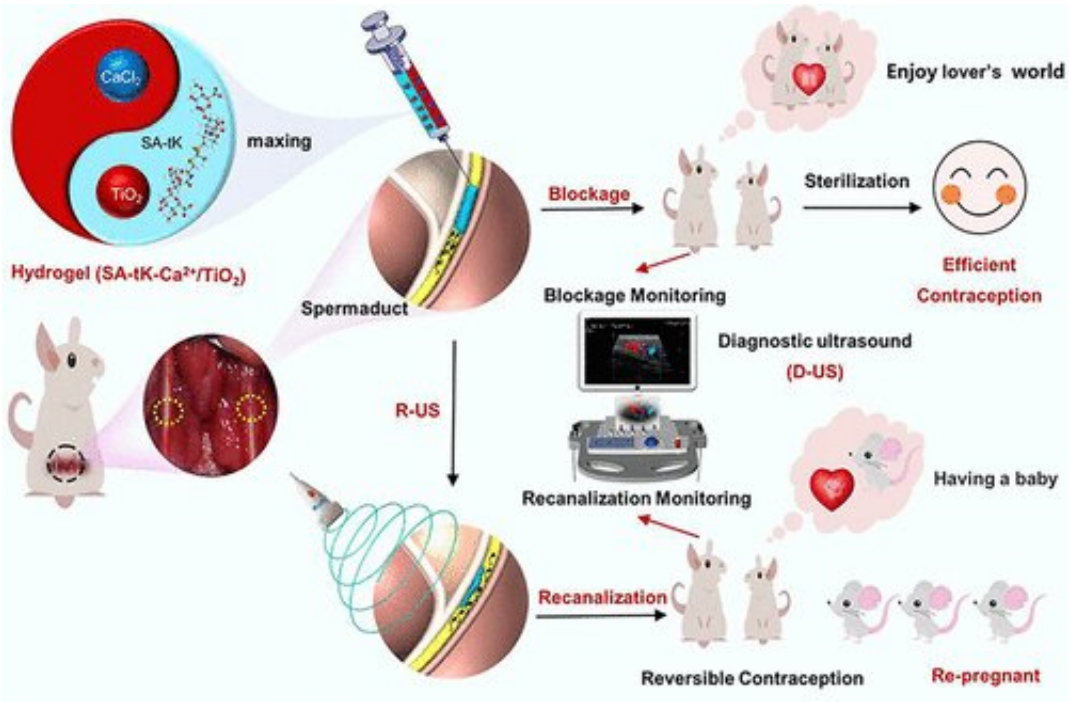
An easily reversed hydrogel male contraceptive

April 26 2022, by Bob Yirka



Graphical abstract. Credit: *ACS Nano* (2022). DOI: 10.1021/acsnano.1c09959

A team of researchers working at China's Fourth Hospital of Harbin Medical University has developed a new kind of male contraceptive that is easily reversed. In their paper published in the journal *ACS Nano,* the group describes their approach, the elements that went into making their contraceptive and how well it worked when tested on rats.

As the researchers note, approximately half of all pregnancies worldwide

each year are unintended. Many occur due to inadequate precautions taken prior to sexual intercourse. They note also that currently, males have just two forms of contraception, condoms and vasectomy. Both types tend to be undesirable from the male perspective. So the researchers have developed an entirely new kind of contraception—a hydrogel block placed in the vas deferens that can be removed by a single blast of ultrasound.

The hydrogel has already been approved for use in the body for other purposes, and has been deemed safe. The researchers added thioketals to the gel, which prior research has shown become disassociated when exposed to molecules containing oxygen. They also added a small amount of titanium dioxide, which releases oxygen when blasted with ultrasound. In practice, the hydrogel is injected into the vas deferens, which are the tubes that carry sperm from the testicles to the penis during ejaculation. Blocking them blocks the sperm, preventing them from being mixed with semen, and thus preventing the ability of the patient to impregnate a woman. Removing the hydrogel is done by blasting the area with a small amount of ultrasound. This releases the oxygen in the titanium dioxide, which in turn breaks down the gel, allowing it to be washed out via the penis.

The researchers tested their hydrogel with male lab rats. Some were given the hydrogel; others got a vasectomy, and others yet got saline. After they healed, the rats were allowed to mate with females. Only those that were given the saline produced offspring. The researchers also removed the gel from the test rats using an ordinary ultrasound device and found that it fully restored their ability to reproduce. More testing is required to ensure its safety before trials can begin in humans.

More information: Zi-Qi Wang et al, An Ultrasound-Induced Self-Clearance Hydrogel for Male Reversible Contraception, *ACS Nano*

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