

## **New Nano-based Reversible Vasectomy Operation Developed Using Ultrasound Waves to Revert Contraception**



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Experts recently developed a novel approach to reversible vasectomy. According to the research, a method can either block and unblock the ductwork in men's reproductive organs.

[Vasectomy](#) is among the most effective and widely available contraceptive solutions for men. But unlike any method, vasectomy is not reversible. This operation is permanent once completed, blocking a person from producing sperm cells for procreation.

Vasectomy involves the cutting, tying, or sealing of the long internal tube called vas deferens. This procedure stops the flow of sperm from the testes, barring a man from the ability to reproduce offspring.

Although there are a few methods that could undo vasectomy, these reversal operations are challenging to carry out. The technology we have today is not yet on par to perfectly reconnect the vas deferens, and most could inflict a patient with unwanted conditions.

Throughout the history of research on the reproductive system, scientists have been looking for the best option to revert men's breeding ability to its original state.

In recent advancements, it was demonstrated that the vas deferens could be administered with compounds instead of disconnecting the muscular tube directly. This vasectomy approach uses chemicals that have blocking effects instead of conventional surgical operations.

Lab trials show four various injections that could be relayed to a patient undergoing reversible vasectomy without disrupting the pathway for sperms. Undoing the operation would simply dissolve the blocking compounds through infrared light. Because of the invasive

approach included in the said operation, a team from [China](#) developed a better way to carry out a vasectomy.

### **Single Nanoparticle Injection Vasectomy by Harbin Medical University, Reversible Through Ultrasound**

The new reversible vasectomy operation includes just one effective injection instead of multiple shots. The process uses ultrasound waves to eliminate the blocking substances and give back to the patients their reproductive abilities, [The Economist](#) reports.

The study was made possible through the efforts of [Harbin Medical University](#). The team was led by Wanhai Xu, a specialist from the institute's NHC Key Laboratory of Molecular Probes and Targeted Diagnosis and Therapy, and Heilongjiang Key Laboratory of Scientific Research in Urology.

The reversible vasectomy that the team conceptualized includes the usage of a medically-approved polymer-based hydrogel that can thicken when administered inside the human body.

The hydrogels envelope specialized nanoparticles called thioketals that dissolve when exposed to reactive oxygen-related molecules such as titanium dioxide. These chemicals can release the thioketals when targeted with ultrasound waves.

The experiments for the technique's efficacy were tested on male mice subjects. The individuals were divided into groups according to the type of vasectomy they were given, including the newly developed method and the conventional operation. Some of the subjects were injected with saline for control.

The subjects were allowed to mate with their female counterparts. It was found that those given saline were able to produce offspring. The experimental group, on the other hand, regained their reproductive abilities after blasting ultrasound waves into their systems.

Further studies will be carried out by the authors in order to improve the process. The paper was published in the journal *ACS Nano*, titled "An Ultrasound-Induced Self-Clearance Hydrogel for Male Reversible Contraception."

Read the [original article](#) on The Science Times.