

Turn to vegetable protein. Replacing a serving of meat each day with beans, peas, soybeans or tofu, or nuts can improve fertility.

Choose slow carbs, not no carbs. Choosing slowly digested carbohydrates that are rich in fiber, like whole grains, vegetables, whole fruits, and beans, instead of rapidly digested carbs can improve fertility by controlling blood sugar and insulin levels.

Make it whole milk. Skim milk appears to promote infertility. If you drink milk, choose whole milk while trying to get pregnant, or have a small dish of ice cream or full-fat yogurt every day.

Take a multi-vitamin. Getting extra folic acid (400 micrograms a day) before you get pregnant could actually help you start eating for two.

Get plenty of iron from plants. Extra iron from plants, including whole-grain cereals, spinach, beans, pumpkin, tomatoes, and beets, appears to promote fertility.

Drink to your health. The best beverage for keeping your body hydrated is water. Coffee, tea, and alcohol are okay in moderation. But skip sugared sodas—they appear to promote ovulatory infertility.

Head toward the fertility zone for weight. Weighing too much or too little can interrupt normal menstrual cycles, throw off ovulation or stop it altogether. The best range for fertility is a body-mass index (BMI) of 20 to 24. Working to move your BMI in that direction by gaining or losing some weight is almost as good.

Move to the fertility zone for activity. If you don't get much physical activity and are above the fertility zone for weight, daily exercise can help improve fertility. But don't overdo it: too much exercise, especially if you are quite lean, can interfere with ovulation.

Information contained in this booklet is meant for informational purposes only and should not substitute the visit to your doctor nor his/her advice for your health care.

April 2017



**MANSOOR
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Male Factor Infertility Introduction



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Male Factor Infertility

Introduction

Infertility is the failure of a couple to become pregnant after one year of regular, unprotected intercourse. About a third of infertility problems are due to female infertility, and another third are due to male infertility. In the remaining cases, infertility affects both partners or the cause is unclear.

Male fertility depends on the proper function of a complex system of organs and hormones:

- The process begins in the area of the brain called the *hypothalamus-pituitary axis*, a system of glands, hormones, and chemical messengers called neurotransmitters, all of which are critical for reproduction.
- The first step in fertility is the production of *gonadotropin-releasing hormone (GnRH)* in the hypothalamus, which prompts the pituitary gland to manufacture *follicle-stimulating hormone (FSH)* and *luteinizing hormone (LH)*.
- FSH maintains sperm production, and LH stimulates the production of the male hormone *testosterone*.

Both sperm and testosterone production occurs in the two testicles, or testes, which are contained in the scrotal sac (the scrotum).

(This sac develops on the outside of the body because normal body temperature is too high to allow sperm production.)

Sperm

Sperm Development. The life cycle of sperm takes about 74 days:

- Sperm begin partially embedded in nurturing Sertoli cells, which are located in the lower parts of the seminiferous tubules.
- As they mature and move along, they are stored in the upper part of the tubules. Young sperm cells are known as spermatids.
- When the sperm has completed the development of its head and tail, it is released from the cell into the *epididymis*. This C-shaped tube is 1/300 of an inch in diameter and about 20 feet long. It loops back and forth on itself within a space that is only about one and a half inches long. The sperm's journey through the epididymis takes about 3 weeks.
- The fluid in which the sperm is transported contains sugar in the form of *fructose*, which provides energy as the sperm matures. In the early stages of its passage, the sperm cannot swim in a forward direction and can only vibrate its

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tail weakly. By the time the sperm reaches the end of the epididymis, however, it is mature and looks like a microscopic squirming tadpole.

- At maturity, each healthy sperm consists of a head that contains the man's genetic material, his DNA, and a tail that lashes back and forth at great speed to propel the head forward at about four times its own length every second. *The ability of a sperm to move forward rapidly and straight is probably the most significant determinant of male fertility.*

Ejaculation. When a man experiences sexual excitement, nerves stimulate the muscles in the epididymis to contract, which forces the sperm out through the penis:

- After being produced in the testicle, the sperm first pass through the epididymis and then into one of two rigid and wire-like muscular channels, called the *vasa deferentia*. (A single channel is called a *vas deferens*.)
- Muscle contractions in the vas deferens from sexual activity propel the sperm along past the *seminal vesicles*. These are clusters of tissue that contribute fluid, called *seminal fluid*, to the sperm. The vas deferens also collects fluid from the nearby *prostate gland*. This mixture of various fluids and

sperm is the *semen*.

- Each vas deferens then joins together to form the *ejaculatory duct*. This duct, which now contains the sperm-containing semen, passes down through the *urethra*. (The urethra is the same channel in the penis through which a man urinates, but during orgasm, muscles close off the bladder so that urine cannot enter the urethra.)
- The semen is forced through the urethra during *ejaculation*, the final stage of orgasm when the sperm is literally shot out of the penis.

Semen. In addition to providing the fluid that transports the sperm, semen also has other benefits:

- It provides a very short-lived alkaline environment to protect sperm from the harsh acidity of the female vagina. (If the sperm do not reach the woman's cervix within several hours, the semen itself becomes toxic to sperm and they die.)
- It contains a gelatin-like substance that prevents it from draining from the vagina too quickly.
- It contains sugar in the form of fructose to provide instant energy for sperm locomotion.

The Path to the Egg. The sperm's passage to the egg is a difficult journey.

- Usually about 100 - 300 million sperm are delivered into the ejaculate at any given time. Even under normal conditions, however only about 15% of these millions of sperm are sound enough to fertilize an egg.
- To compound the problem, after the stress of ejaculation, only about 400 sperm survive the orgasm to complete the journey.
- Out of this number, a mere 40 or so sperm survive the toxicity of the semen and the hostile environment of the vagina to reach the vicinity of the egg. Normally, the cervical mucus forms an impenetrable barrier to sperm. However, when a woman ovulates (releases her egg, *the oocyte*), the mucus lining thins to allow sperm penetration.
- Sperm that manage to reach the mucus lining in the woman's cervix (the lower part of her uterus) must survive about two more days to reach the woman's fallopian tubes. (Here, the egg is positioned for fertilization for only 12 hours each month.)
- The few remaining sperm that penetrate the cervical mucus and are able to reach the fallopian tubes become *capacitated*.
- Capacitation is a one-time explosion of energy that completes the sperm's journey. It boosts the motion of the sperm and triggers the actions of the *acrosome*, a membrane that covers the head of the

sperm and resembles a warhead. The acrosome is dissolved, and enzymes contained within it are released to allow the sperm to drill a hole through the tough outer coating of the egg.

In the end, only one sperm gets through to fertilize the egg.

Infertility and Diet

The recommendations that follow are aimed at preventing and reversing ovulatory infertility, which accounts for one quarter or more of all cases of infertility. They won't work for infertility due to physical impediments like blocked fallopian tubes.

Avoid trans fats. These artery-clogging fats threaten fertility as well harm the heart and blood vessels. Go trans free.

Use more unsaturated vegetable oils. Monounsaturated and polyunsaturated fats help improve the body's sensitivity to insulin and cool inflammation, two trends that are good for fertility. Add in more vegetable oils, nuts, seeds, and cold water fish such as salmon and sardines. Cut back on saturated fat.

