Quality control mechanism tags defective sperm cells inside the body

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Defective sperm cells do not pass through the body unnoticed. A new University of Missouri study provides evidence that the body recognizes and tags defective sperm cells while they undergo maturation in the epididymis, a sperm storage gland attached to the testis. According to researchers, only the best sperm that have the highest chance of succeeding in fertilization will survive the production process without a "tag."

A small protein called ubiquitin marks abnormal sperm cells, including cells that have two heads, two tails or are otherwise misshaped. This "recycling tag" on the sperm cell tells the body which cells need to be broken back down into amino acids. This provides evidence that there is an active removal process or marking of defective sperm during the epididymal passage.

"Fertilization is, in a way, a numbers game," said Peter Sutovsky, associate professor of animal sciences, clinical obstetrics and gynecology in the MU College of Agriculture, Food and Natural Resources. "You need a certain number of normal sperm cells to reach the egg. If too many are tagged with ubiquitin, there may be not enough to fertilize an egg."

This study suggests that the male reproductive system must be able to evaluate and control the quality of the sperm to insure an optimal chance of fertilization. High levels of ubiquitin in the sperm can indicate low-sperm count or infertility. This process of quality control has been found

in both humans and other mammals including bulls, boars and rats.

“In many cases, the cells that are tagged with ubiquitin are obviously abnormal with two tails or two heads, but many of them look like they don’t have defects,” Sutovsky said. “Oftentimes, these cells may look normal but lack proteins that are important to fertility.”

Once sperm cells are tagged as defective, it is unlikely that the process can be reversed. Sutovsky stresses the importance of a healthy lifestyle to reduce the likelihood of abnormal sperm cells. He suggests avoiding exposure to toxic chemicals, abstaining from smoking and maintaining a healthy diet. He suggests people who work with toxins on a daily basis should minimize their exposure by wearing protective clothing and respirators.

Source: University of Missouri-Columbia