

Secret of sperm quality control revealed

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Yale researchers have discovered how the "guardian of the genome" oversees quality control in the production of sperm — and perhaps in many other cells as well.

The research published online Feb. 16 in the journal [Current Biology](#) opens up the potential of developing new forms of birth control and fertility treatment — and even new ways to combat many forms of cancer.

Sperm and other cells go through a sort of inspection process triggered by a key regulatory gene, p53, which orders the destruction of cells with damaged DNA. This ability has earned it the title of "guardian of the [genome](#)," and damage to p53 has been implicated in many forms of cancer.

By studying [sperm production](#) in mice, "we have identified p53's new boss, which controls p53 in a way that had been hypothesized before but had not been shown in any animal," said Haifan Lin, professor of cell biology and of genetics, director of the Yale Stem Cell Center, and senior author of the paper.

The Yale team found among more than 1,500 micro-RNA molecules involved in many cellular processes, a regulator called Pumilo 1 controls eight that interact with p53 in sperm production. When Pumilo 1 is deleted in mice, sperm production and fertility are reduced because p53 becomes over active and orders the destruction of too many sperm. The mechanism may play a key role in male fertility, but it could also be

implicated in many biological processes because protection of DNA is so fundamental to life, Lin noted.

"This is a crucial gate-keeping mechanism which allows bad cells, but not good [cells](#), to be killed," Lin said. "This same process may be at play in other tissues, such as cancer."

Provided by Yale University

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