

# Researchers discover new gene functions and possible cancer treatment target

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Virginia Commonwealth University School of Medicine researchers have recently discovered new functions for Sperm Associated Antigen 6 (SPAG6), a gene previously thought to be only important for cilia motility. Deficiencies of the gene have been associated with male infertility, though the new findings could have implications for diagnosis

and treatment for some cancers.

The study, "Sperm Associated Antigen 6 Regulates Fibroblast Cell Growth, Morphology, Migration and Ciliogenesis," was published in November by *Scientific Reports*, an online journal published by Nature Publishing Group.

"I identified a new complex [grouping of genes] that plays multiple roles, including spermatogenesis, hearing and immune synapse formation," said Zhibing Zhang, Ph.D., associate professor in the Department of Obstetrics and Gynecology in the VCU School of Medicine. "My hypothesis is that the complex is involved in many microtubule-based transport systems."

Microtubules are thick, strong spirals of protein that help define cell structure and movement in eukaryotic cells, which are our basic units of life. The gene SPAG6 appears to decorate microtubules, making them structurally stronger. In the absence of SPAG6, microtubules are weak.

Zhang was tipped off about the gene's increased function because his lab subjects, SPAG6-deficient mice, displayed characteristics not associated with reduced cilia motility. "When I started observing the mice, I realized that this mechanism can't explain all the phenotypes," Zhang said. Phenotypes are observable traits, and in comparison to their wild-type littermates, the SPAG6-deficient mice were deaf, smaller in size, and most died from hydrocephalus, a condition marked by abnormal accumulation of cerebrospinal fluid on the brain.

In addition to increased cellular function, it appears that SPAG6 expression is associated with sensitivity to paclitaxel, a microtubule-stabilizing drug used to treat lung, breast and [ovarian cancers](#), among others.

Previous studies have shown that SPAG6 expression in humans is increased in some malignancies. "We believe the overexpression of this gene is one of the reasons why some cancers are resistant to microtubule-targeting drugs, such as paclitaxel," Zhang said. He found that SPAG6-deficient mouse embryonic fibroblast cells were more sensitive to paclitaxel, and his recent studies demonstrated that reducing SPAG6 expression in [ovarian cancer cells](#) increased paclitaxel sensitivity. "These studies strongly suggest that SPAG6 is a novel treatment target for some cancers, particularly to the cancers that are resistant to drugs like paclitaxel."

**More information:** Wei Li et al. Sperm Associated Antigen 6 (SPAG6) Regulates Fibroblast Cell Growth, Morphology, Migration and Ciliogenesis, *Scientific Reports* (2015). [DOI: 10.1038/srep16506](https://doi.org/10.1038/srep16506)

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