

CFAI & Dept Plant Sci

Plant Virology Seminar



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**“AGO5 restricts virus vertical transmission
in plant gametes”**

Date: 10:30am-12:00am, 7 April, 2025

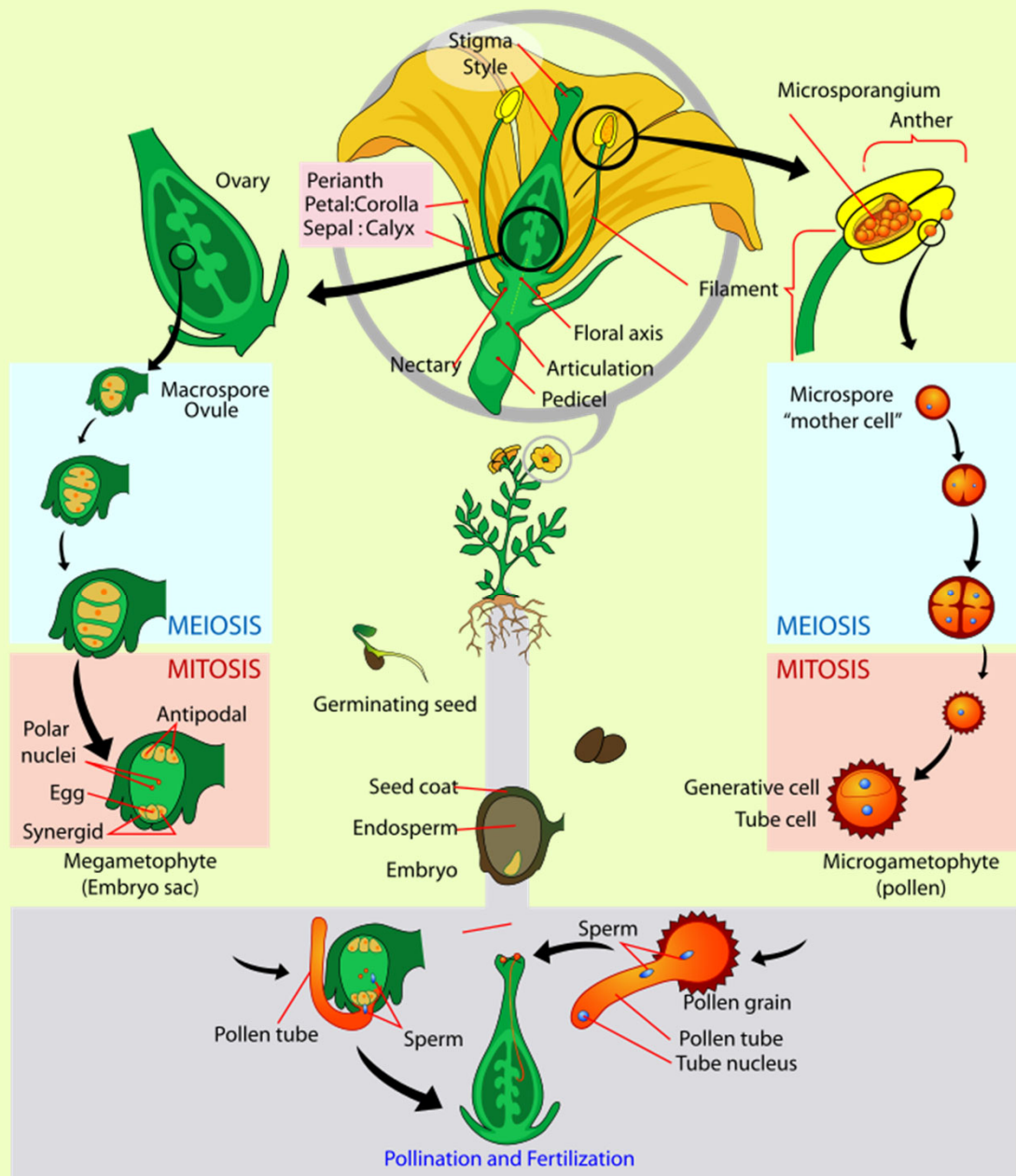
Venue: Lecture Room #1 @ Aobayama commons

Abstract

Viruses are intracellular parasites that rely on transmission to new hosts to ensure their continued existence. Vertical transmission—the passage of viral infection from parent to progeny—is a key mechanism for virus persistence across generations and geographical regions. This mode of transmission is especially significant in plants, where viruses spread both locally and globally via pollen and seeds. However, vertical transmission in plants is often inefficient or entirely absent, suggesting the existence of potent transgenerational antiviral barriers which remain unknown. In this study, we demonstrate that AGO5, an RNA interference factor specifically expressed in stem cells and gametes, plays a crucial role in restricting the vertical transmission of Turnip yellow mosaic virus (TYMV) in *Arabidopsis thaliana*. Using reciprocal crosses, we show that AGO5 suppresses viral transmission through both male and female parents. Analysis of heterozygous *ago5* knock-out mutants revealed that AGO5 restricts vertical transmission post-meiosis and pre-fertilization during host reproduction, emphasizing its gamete-specific antiviral activity while excluding involvement in the zygote or embryo. Moreover, production of virus-specific small RNAs in sperm cells significantly reduced pollen-mediated virus transmission. Similarly, sperm cell-specific expression of AGO5 in *ago5* mutants restored antiviral activity, further validating the gamete-specific function of AGO5. Collectively, our findings unveil the first known antiviral mechanism restricting RNA virus transmission from parent to progeny through gametes, a significant advance that will increase our toolkit in the management of viral diseases.

ご参考 For your reference:

“Angiosperm life cycle diagram” (from Wikipedia)



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