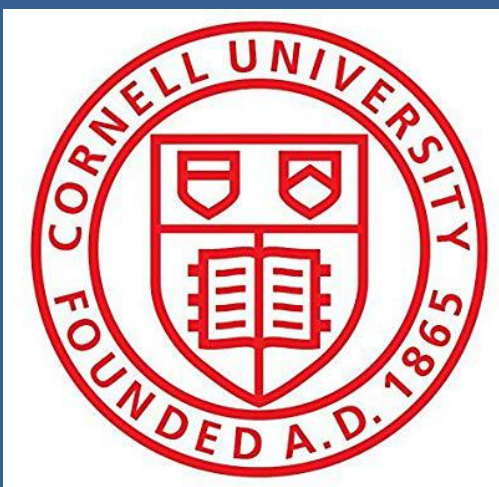


Sex peptide can associate with rival as well self sperm and function with both in polyandrous females

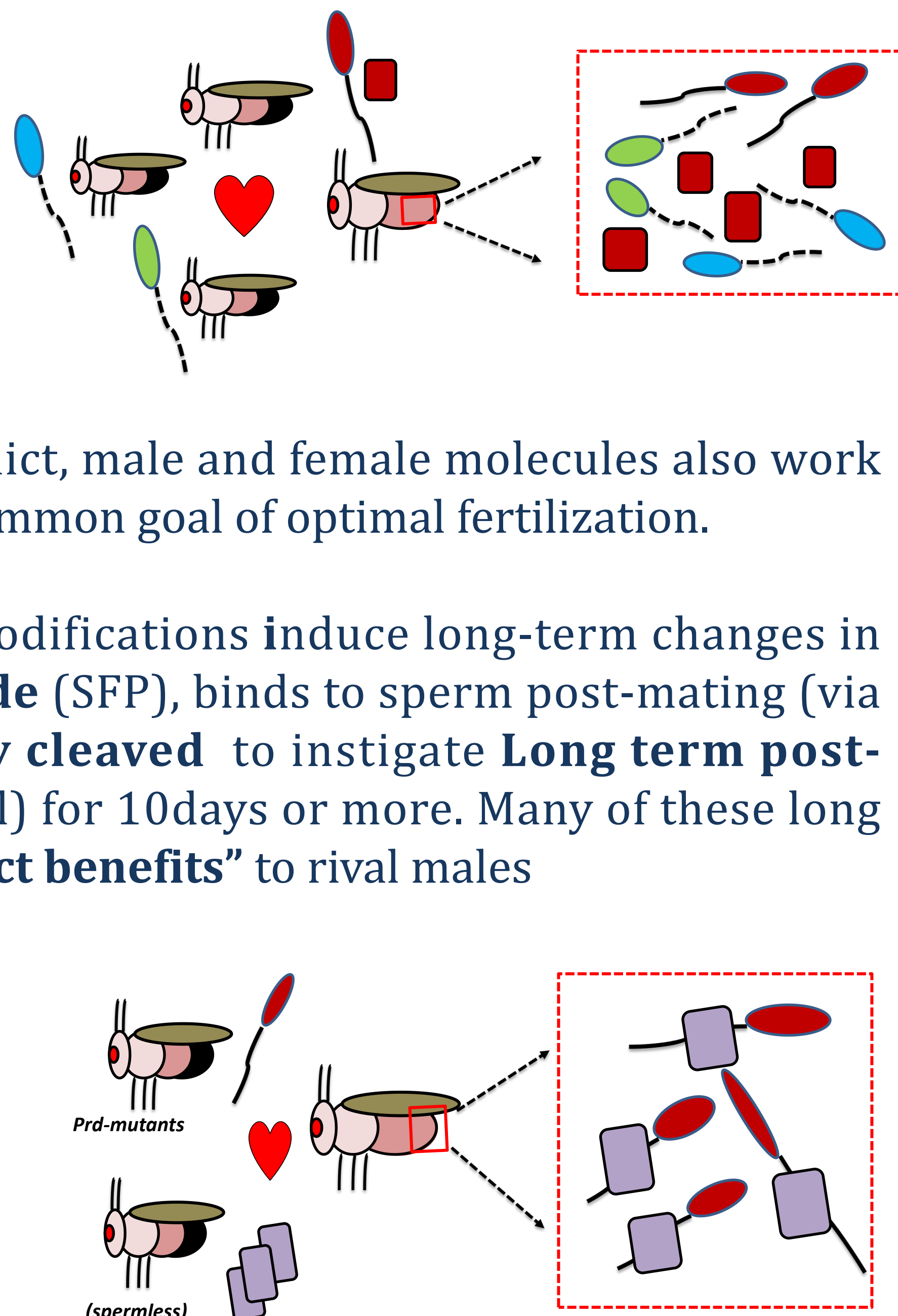
Snigdha Misra, Mariana F. Wolfner



Department of Molecular Biology and Genetics, Cornell University, Ithaca NY 14853

Introduction

- ✓ Polyandrous females experience **sperm competition** and **cryptic female choice** that can trigger biases in sperm use, influencing males' paternity share outcome of the mating.
- ✓ Against the backdrop of this conflict, male and female molecules also work **interdependently** towards the common goal of optimal fertilization.
- ✓ Some of these interdependent modifications induce long-term changes in female physiology, e.g. **sex peptide** (SFP), binds to sperm post-mating (via its N-terminal) and is **gradually cleaved** to instigate **Long term post-mating response** (via C-terminal) for 10days or more. Many of these long term modifications confer "**Indirect benefits**" to rival males
- ✓ This study explores the possibility of **direct benefits** that a previously stored sperm can receive from a rival's ejaculate. An idea of "**copulation complementation**", proposed by Xue and Noll, 2000.



Objectives

1. Does an SFP (SP) from a second male's ejaculate bind to sperm previously stored in a mated female ?
2. If so, does the second male's SP affect the reproductive success of the first male?
3. Is there a possibility of "copulation complementation in nature?"

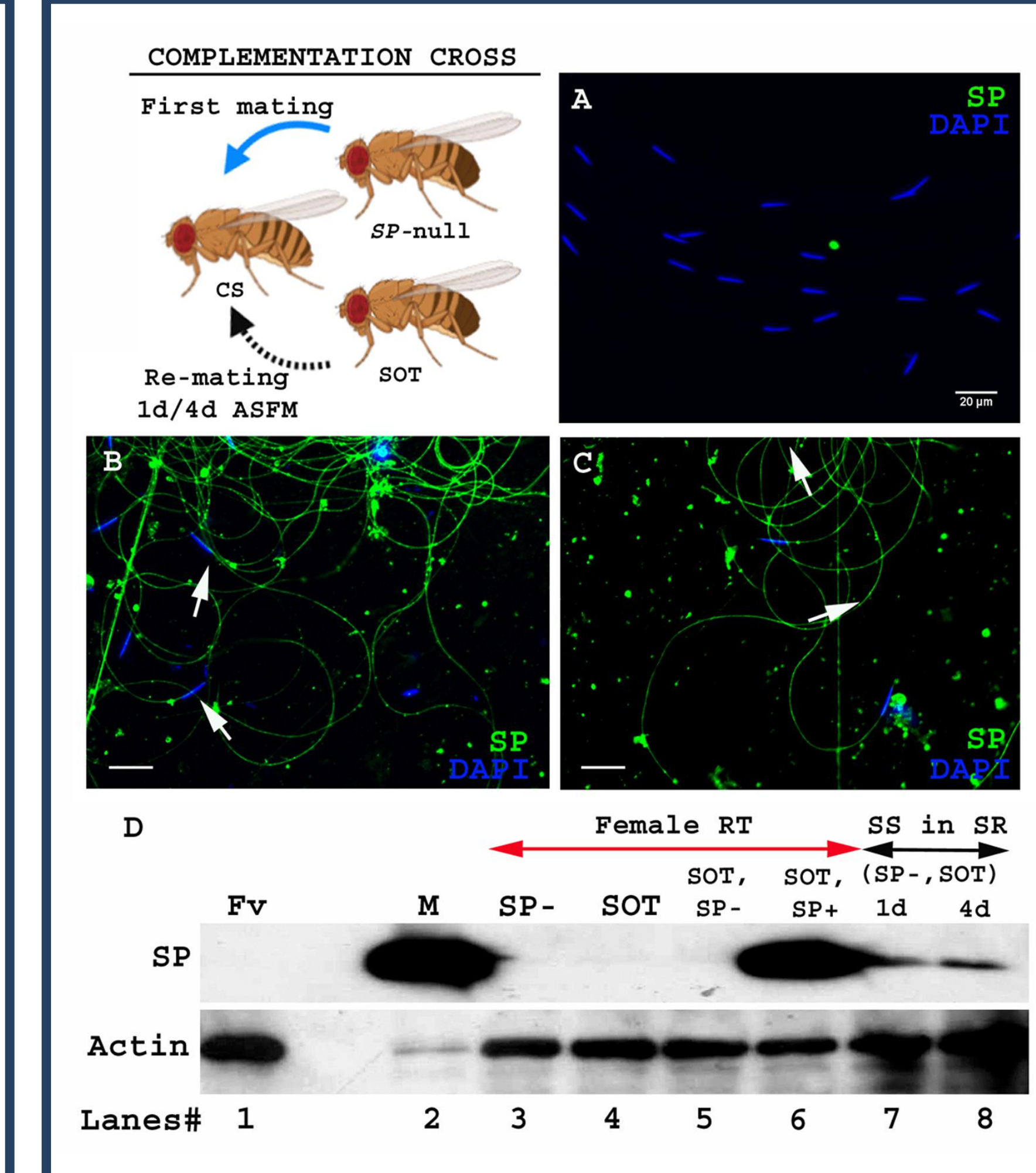
Conclusion

- ✓ A seminal fluid protein from an ejaculate of one male can confer direct benefit to sperm of a rival.
- ✓ Sex Peptide (SP) that a female receives from one male can bind to sperm from a prior mate, and can rescue the phenotypic effects of lack of SP in sperm received from the prior male.
- ✓ SP from one male can directly benefit another. As such, SP is a key molecular component in the process of copulation complementation.

Results

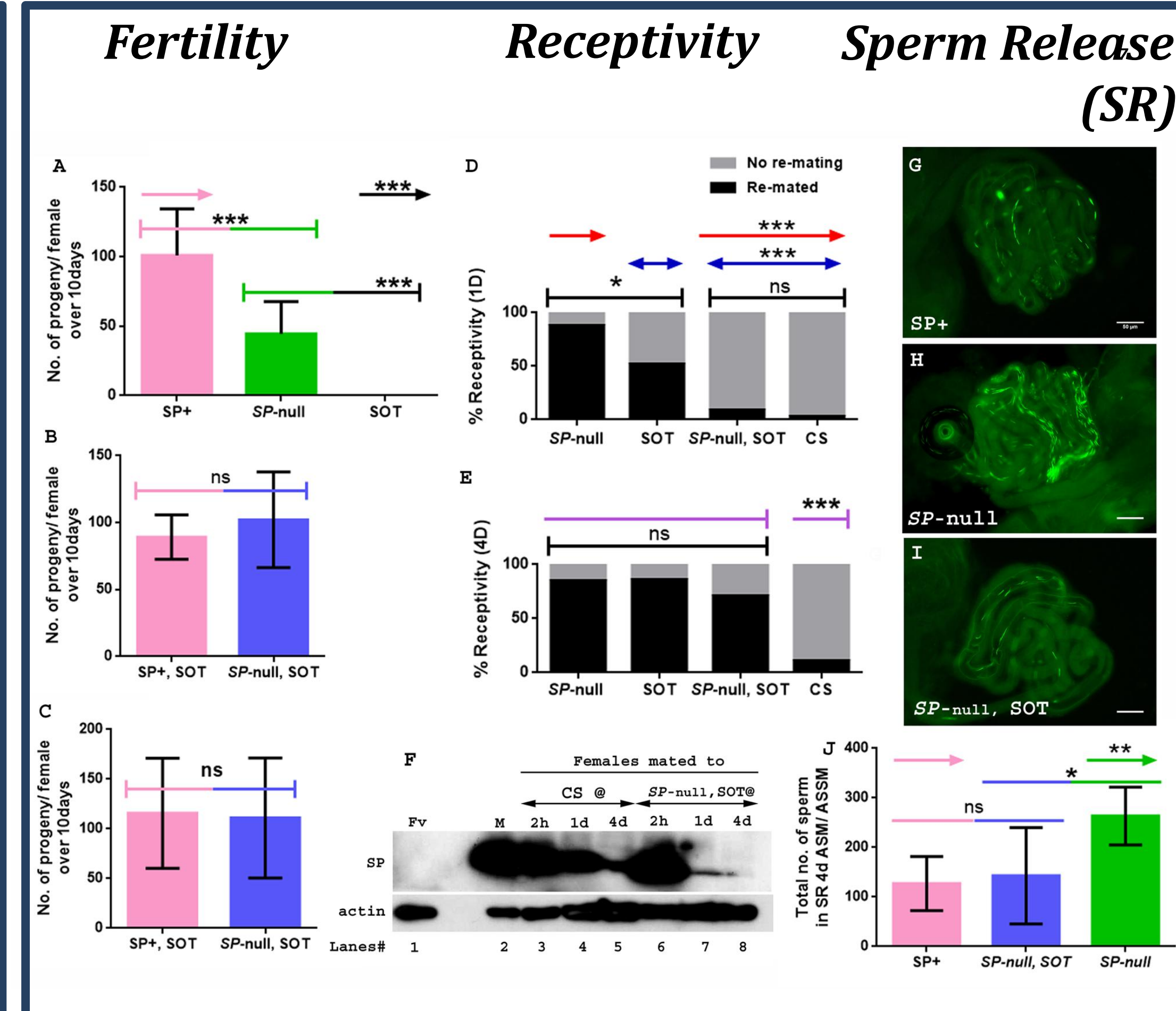
Complementation Cross:

- ✓ Females mated to SP-null males lack SP, and hence give no SP signal on sperm stored in their seminal receptacle (A).
- ✓ Such mated females, when subsequently remated to spermless (sons of tudor or SOT) males (@1d, (B) or 4d (C), after the start of first mating, show SP (green) bound to previously stored (SP-deficient) sperm. Western blots of proteins associated with stored sperm confirmed these results.
- ✓ **Inference:** Sex peptide received from a rival's ejaculate (spermless male) can bind to previously stored, SP-deficient sperm received from first male (SP-null male). We show **direct interaction of rival male-male components** (i.e SFP and sperm) within the RT of a doubly mated or "**complemented**" female.



Remating with rival, spermless males restore "lack of SP, defects" associated with previously stored SP-deficient sperm

- ✓ Females mated to **SP-deficient** males show characteristic phenotypes of **reduced fertility**, **increased receptivity to remate** and **reduced efficiency to release stored sperm from sperm storage organ in female, i.e seminal receptacle (SR)**.
- ✓ The rival SP-sperm binding, observed in **complemented females** can restore the fertility, reluctance to remate and sperm release levels of SP-deficient sperm from SR, at levels parallel to **control**.
(P.S: Please relate the colors to the bars in figure)

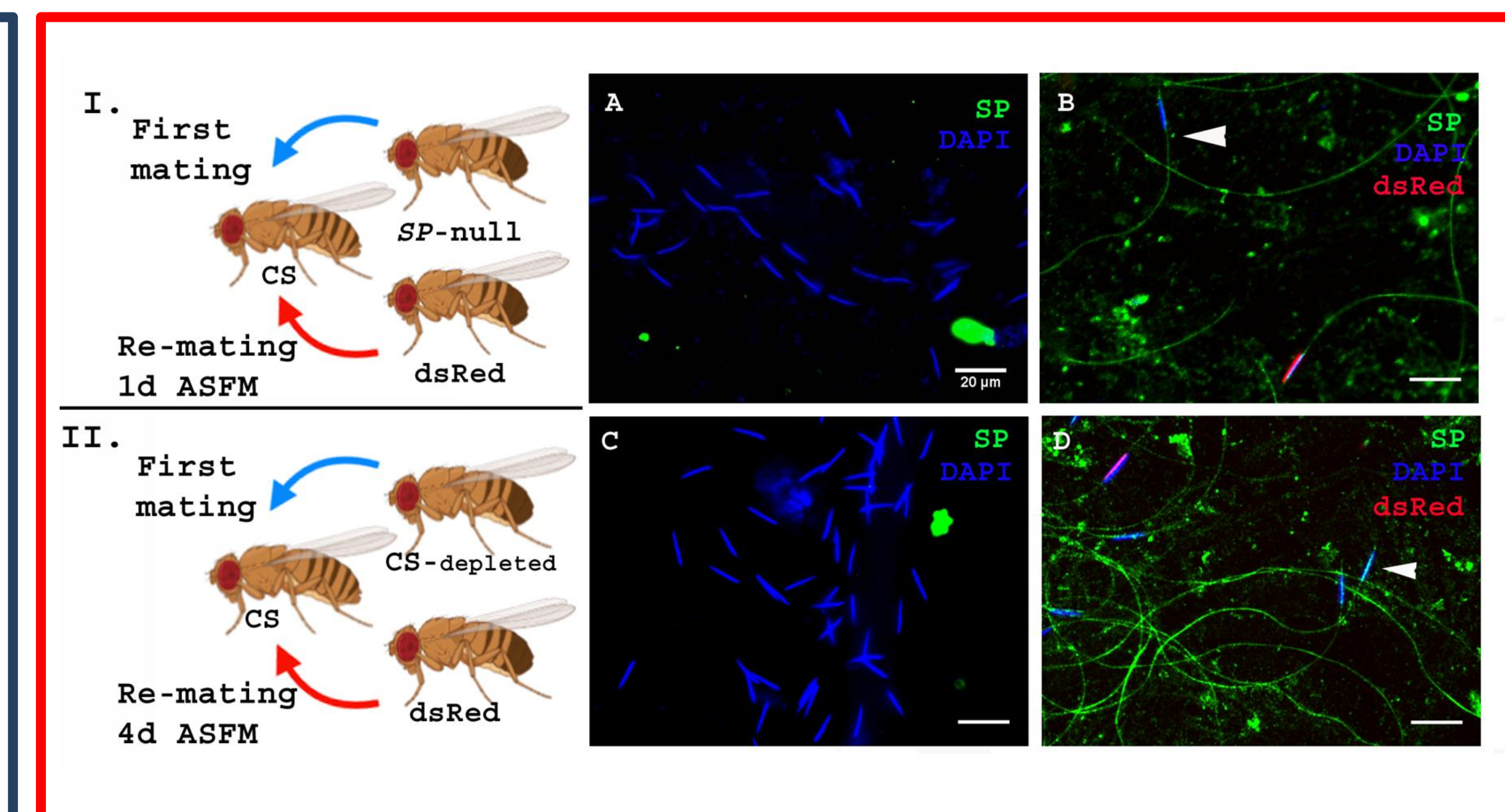


SP from a male who also provides sperm can bind to SP-deficient sperm as well as to the donor's sperm

To bring the complementation scheme closer to naturally relevant circumstances:

(I). We replaced the spermless male with control (second, dsRed) males. The SP-deficient (first male's) sperm showed rival SP binding or "complementation".

(II). To mimic SP-null male levels in nature, we exhausted the seminal reserves of control (CS) males through multiple matings (6 consecutive matings for 2 days) and used these CS-depleted males as first mates (in place of SP-null). On remating these mated females with control (second, dsRed) males. The SP-depleted (first male's) sperm showed rival SP binding or "complementation".



References

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