



W1068: Unleashing Meiotic Recombination in Plants

Monday, January 15, 2018

04:40 PM - 05:00 PM

📍 Pacific Salon 2

Meiotic crossovers shuffle parental genetic information, providing novel combinations of alleles on which natural or artificial selection can act. However, crossover events are relatively rare, typically one to three exchange points per chromosome pair. Recent work has identified three pathways limiting meiotic crossovers in *Arabidopsis thaliana* that rely on the activity of FANCM [Crismani W, et al. (2012) *Science* 336:1588-1590], RECQ4 [Séguéla-Arnaud M, et al. (2015) *Proc Natl Acad Sci USA* 112:4713-4718], and FIGL1 [Girard C, et al. (2015) *PLoS Genet* 11:e1005369]. We analyzed recombination in *Arabidopsis* plants in which one, two, or all three of these pathways were disrupted in both pure line and hybrid contexts. The greatest effect was observed when combining *recq4* and *figl1* mutations, which increased the hybrid genetic map length from 389 to 3,037 cM. This corresponds to an unprecedented 7.8-fold increase in crossover frequency. We then showed that recombination can be massively increased in crop species. These results open the possibility of manipulating recombination to enhance plant breeding efficiency.

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