|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | **Broad Scale**  **Landscape**  Male telomere bias, Female uniform | **Within mouse variance for CO number**  Eggs more variable than sperm for crossovers | **Chromatin Organization**  Female, longer axis  Male, shorter axis | **Reverse heterochiasmy direction**  Male > Female  genome-wide recombination rate | **Positive correlation interference strength and CO number** |
| Haploid selection  (Lenormand, 2003; Lenormand and Dutheil, 2005) | ?  No prediction for broad scale recombination landscape. | Yes  Strong selection in males reduces between cell variance. | ?  No prediction for chromosome axis. | No  Generally males should evolve lower gwRR. | NA  Predictions don’t apply to single meiotic events or recombination landscape.  (better sent) – **no COI predictions** |
| Two locus modifier  (Brandvain and Coop, 2012) | Yes  Females will evolve higher RR and COs closer to centromeres to break up MI drive systems. | Yes/Maybe  More variance between oocytes to reduce effectiveness of centromere drive.  No  Females should evolve consistent manner to limit drivers. | ?  No prediction for chromosome axis. | Yes / (maybe)  Depends on the stage driver acts (MI or MII). | NA  Predictions don’t apply to single meiotic events or recombination landscape. |
| S.A.C.E.  (Sardell and Kirkpatrick, 2020) | Yes  Maintaining larger blocks of chromosomes positions crossovers to telomeres. | Yes/Maybe  Maintaining regulatory and coding regions together lowers between cell variance in males. | ?  No prediction for chromosome axis. | No  Males should evolve to be lower gwRR. | Yes/(maybe)  Stronger interference is equivalent to larger blocks of chromosomes segregation together. |
| Spindle based selection at Reduction phase  (Altendorfer et al., 2020; Dernburg, 2001; Lee, 2019; van Veen and Hawley, 2003) | Yes  Telomere position of single crossover chromosomes maximizes  sister cohesion with tension and may synchronize division of bivalents. | Yes  Relaxed selection on SAC would increases variance across oocytes relative to spermatocytes. | ?  No prediction for chromosome axis. | Yes  More effective checkpoint (SAC) will cause faster evolution in males relative to females. | Yes  Unknown mechanism, but amount of sister cohesion could:  i) stabilize tetrads for SAC to detect tension  or  ii) regulate the timing of entry into anaphase (reduction separation) via modulating the rate of degradation of the sister cohesion. |
| Pairing based selection,  C.O.M.  (Hultén, 2011) | Yes / (maybe)  Difference of interference in sexes is due to axis length differences. | ?  No prediction for between gamete variance. | Yes  Longer female axis driven by larger cell volume. | No  No evolution predictions. | No  No prediction for reduction phase. |

**References:**

Altendorfer, E., Láscarez-Lagunas, L.I., Nadarajan, S., Mathieson, I., and Colaiácovo, M.P. (2020). Crossover Position Drives Chromosome Remodeling for Accurate Meiotic Chromosome Segregation. Curr. Biol.

Brandvain, Y., and Coop, G. (2012). Scrambling eggs: meiotic drive and the evolution of female recombination rates. Genetics *190*, 709–723.

Dernburg, A.F. (2001). Here, there, and everywhere: kinetochore function on holocentric chromosomes. J. Cell Biol. *153*, F33–F38.

Hultén, M.A. (2011). On the origin of crossover interference: A chromosome oscillatory movement (COM) model. Mol. Cytogenet. *4*, 10.

Lee, J. (2019). Is age-related increase of chromosome segregation errors in mammalian oocytes caused by cohesin deterioration? Reprod. Med. Biol.

Lenormand, T. (2003). The evolution of sex dimorphism in recombination. Genetics *163*, 811–822.

Lenormand, T., and Dutheil, J. (2005). Recombination difference between sexes: a role for haploid selection. PLoS Biol. *3*, e63.

Sardell, J.M., and Kirkpatrick, M. (2020). Sex Differences in the Recombination Landscape. Am. Nat. *195*, 361–379.

van Veen, J.E., and Hawley, R.S. (2003). Meiosis: when even two is a crowd. Curr. Biol. *13*, R831–R833.