Crossover interference and the sex difference in recombination

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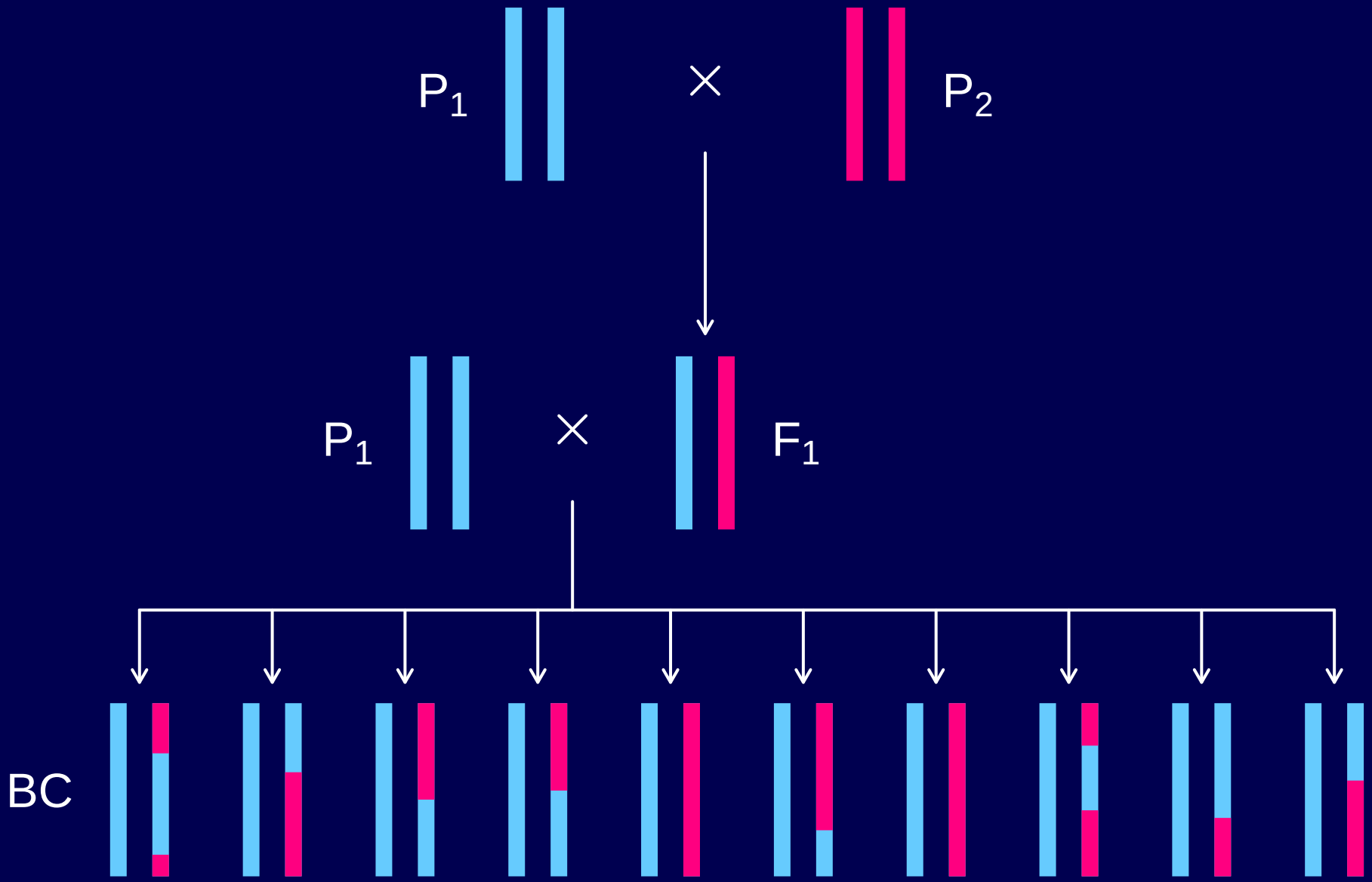
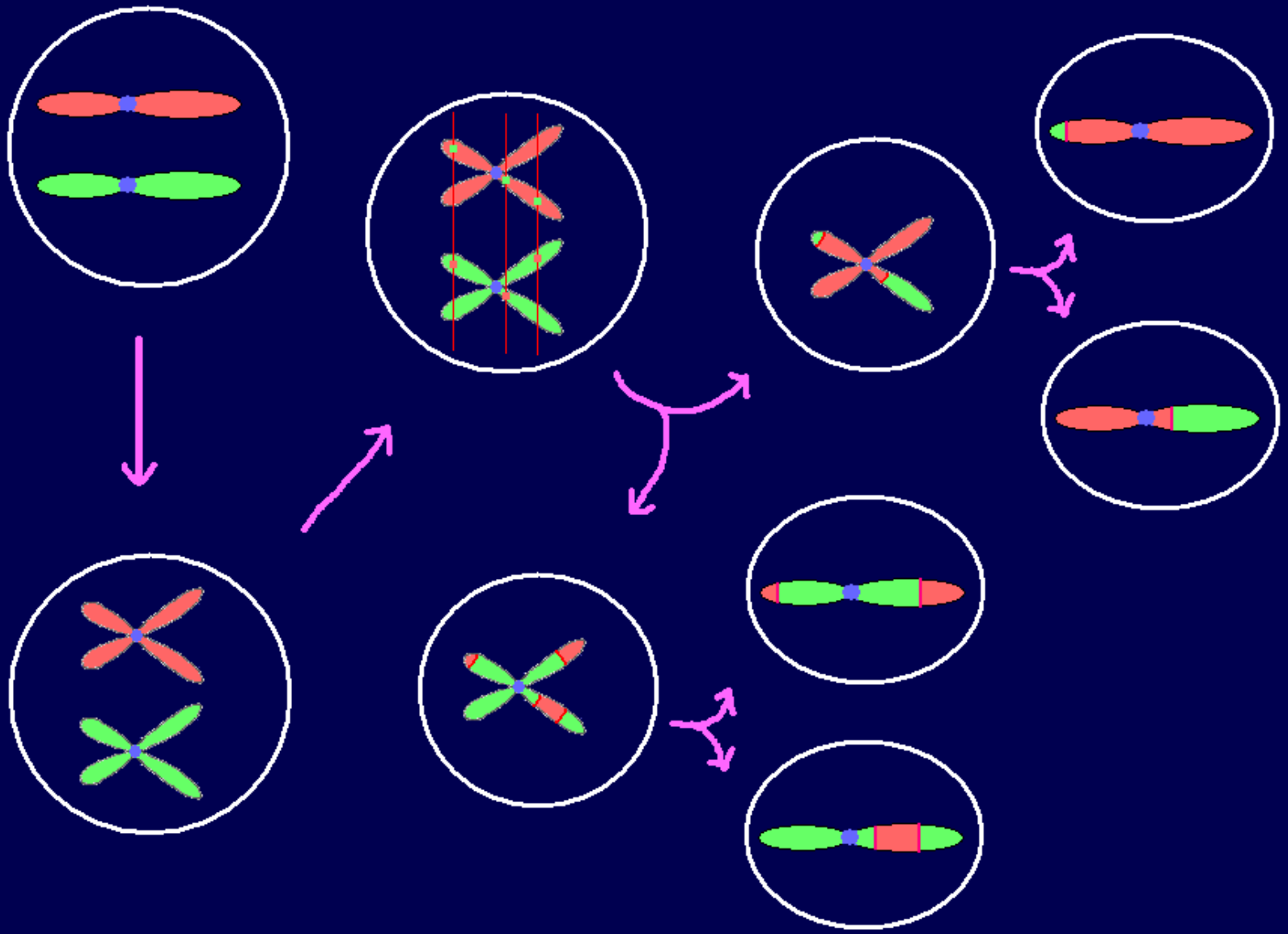
Backcross



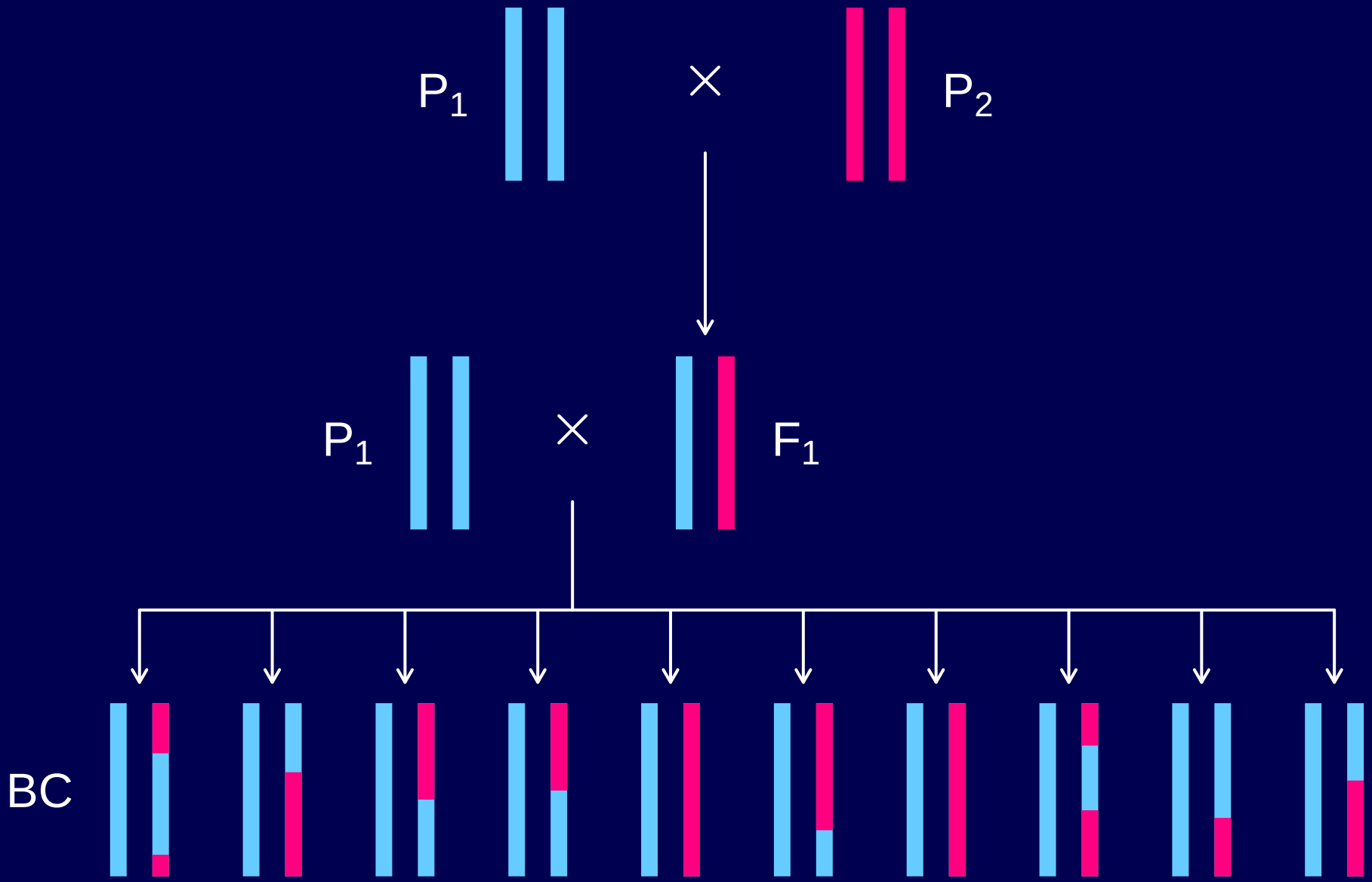
Meiosis



Learning about recombination

- MLH1 staining in spermatocytes or oocytes
- Genotype data on families / crosses
- Patterns of linkage disequilibrium

Backcross



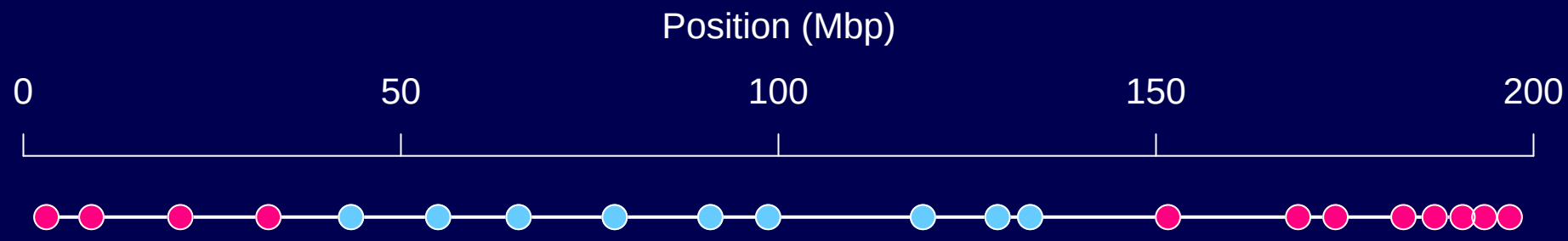
Crosses

Cross	Sample size
(B $\times$ C) $\times$ B	1466
(C $\times$ B) $\times$ B	1528
B $\times$ (B $\times$ C)	1459
B $\times$ (C $\times$ B)	1533

B = C57BL/6J
C = CAST/EiJ

Genotyping

Chr 1 only (for now), by brute force



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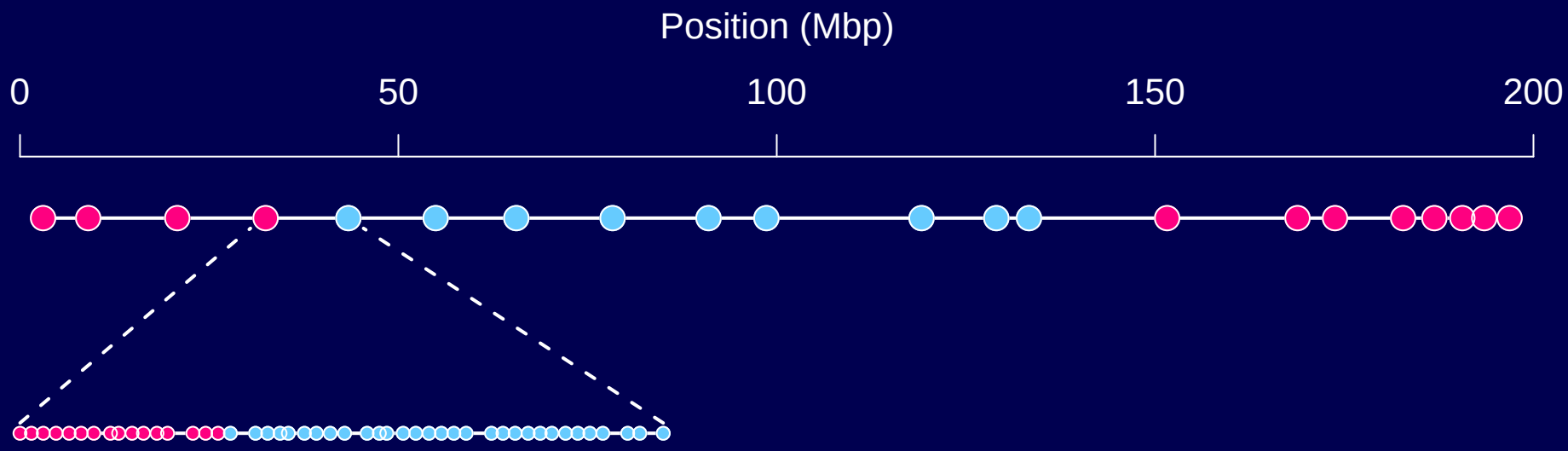

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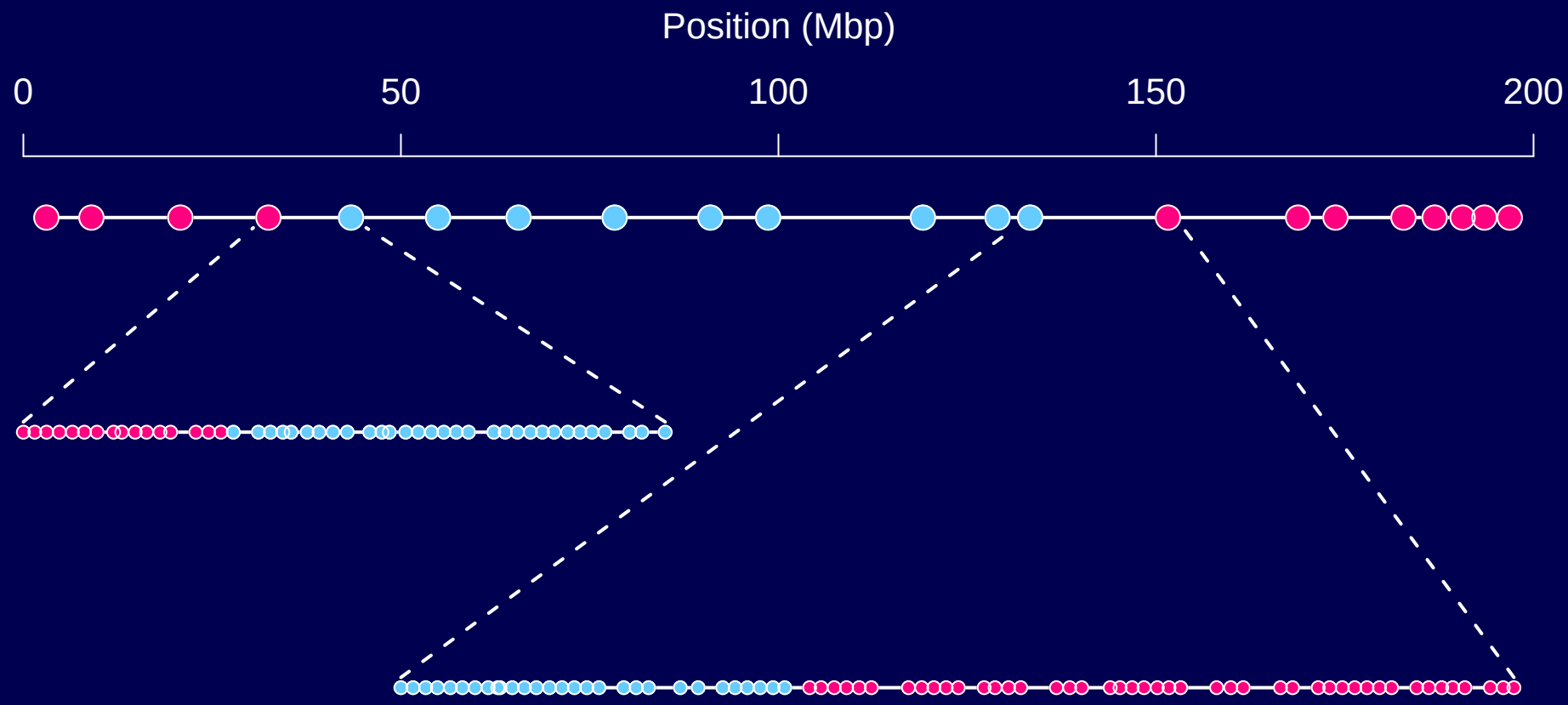
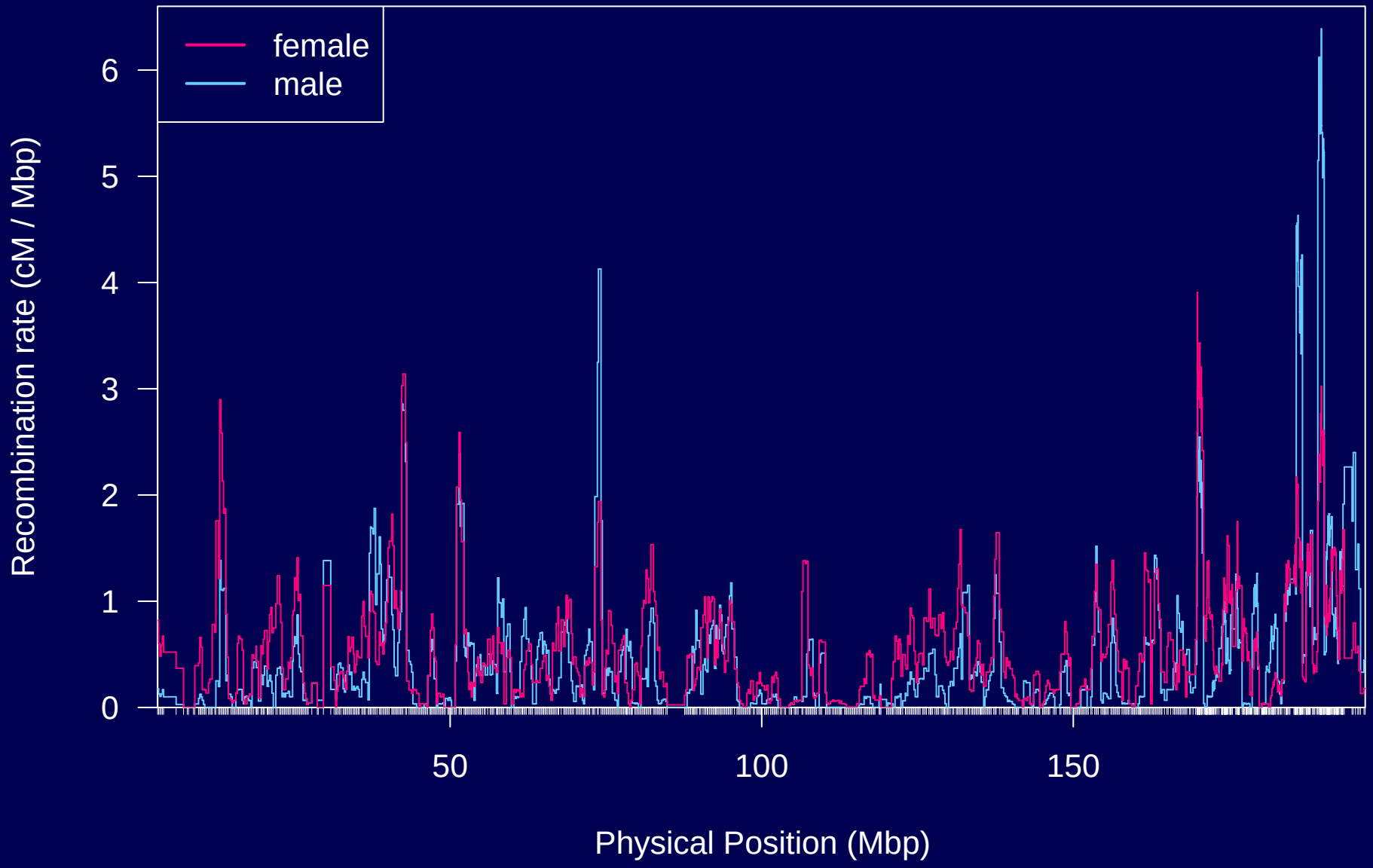


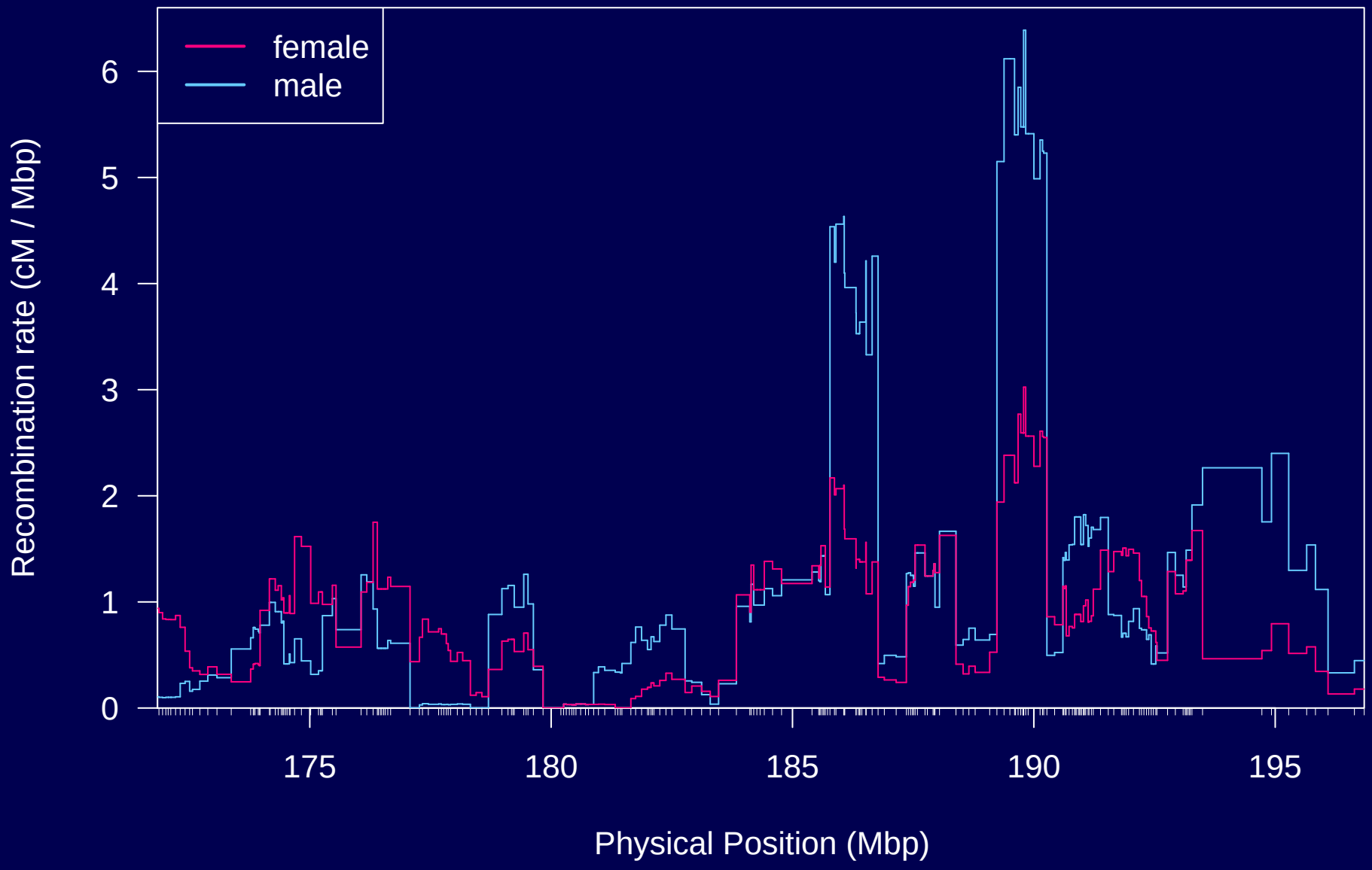
Counts

	No. crossovers					
	0	1	2	3	4	Ave.
female	25	50	23	1.6	0.1%	1.01
male	32	51	16	0.2	0.0%	0.84

Recombination rate



Distal 25 Mbp



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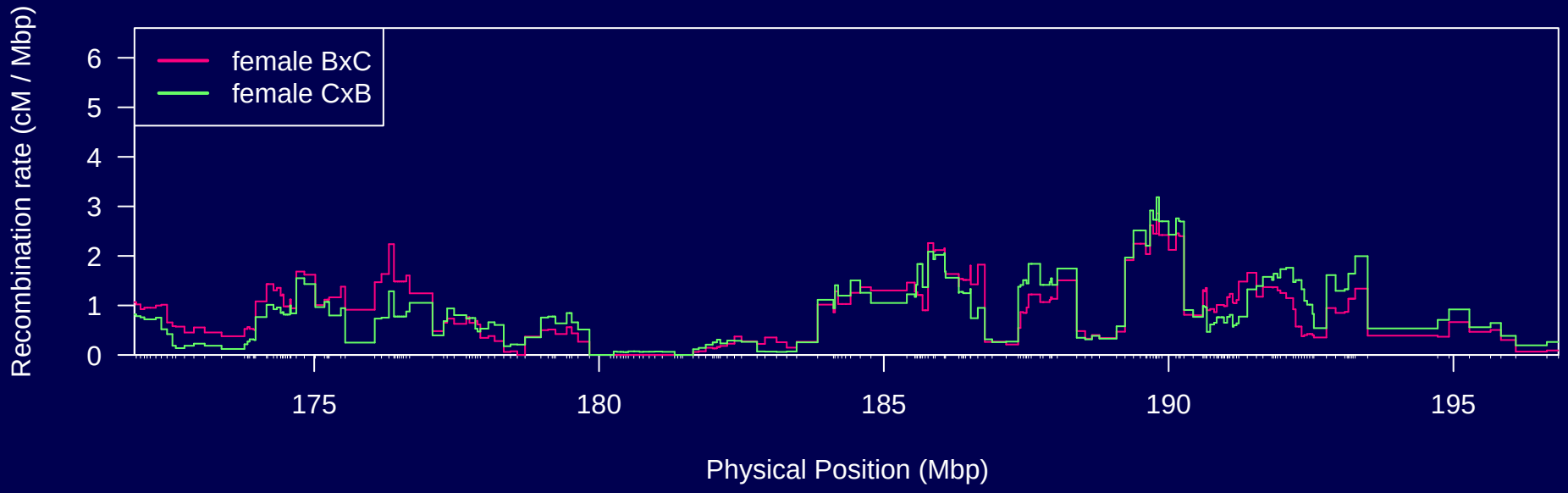
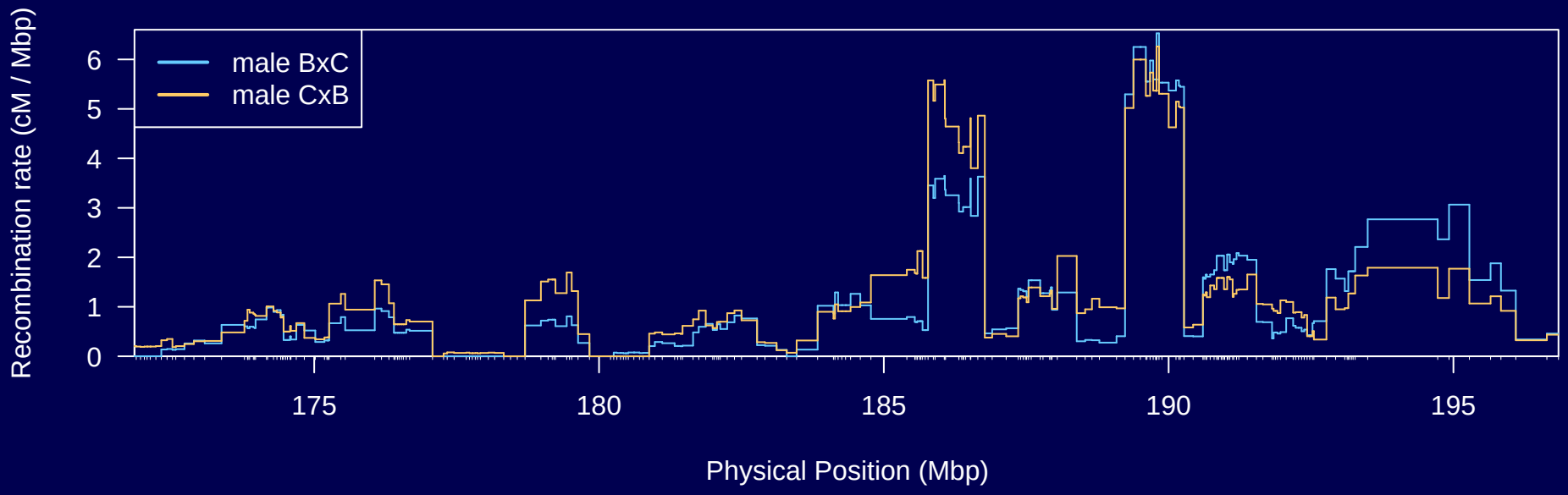
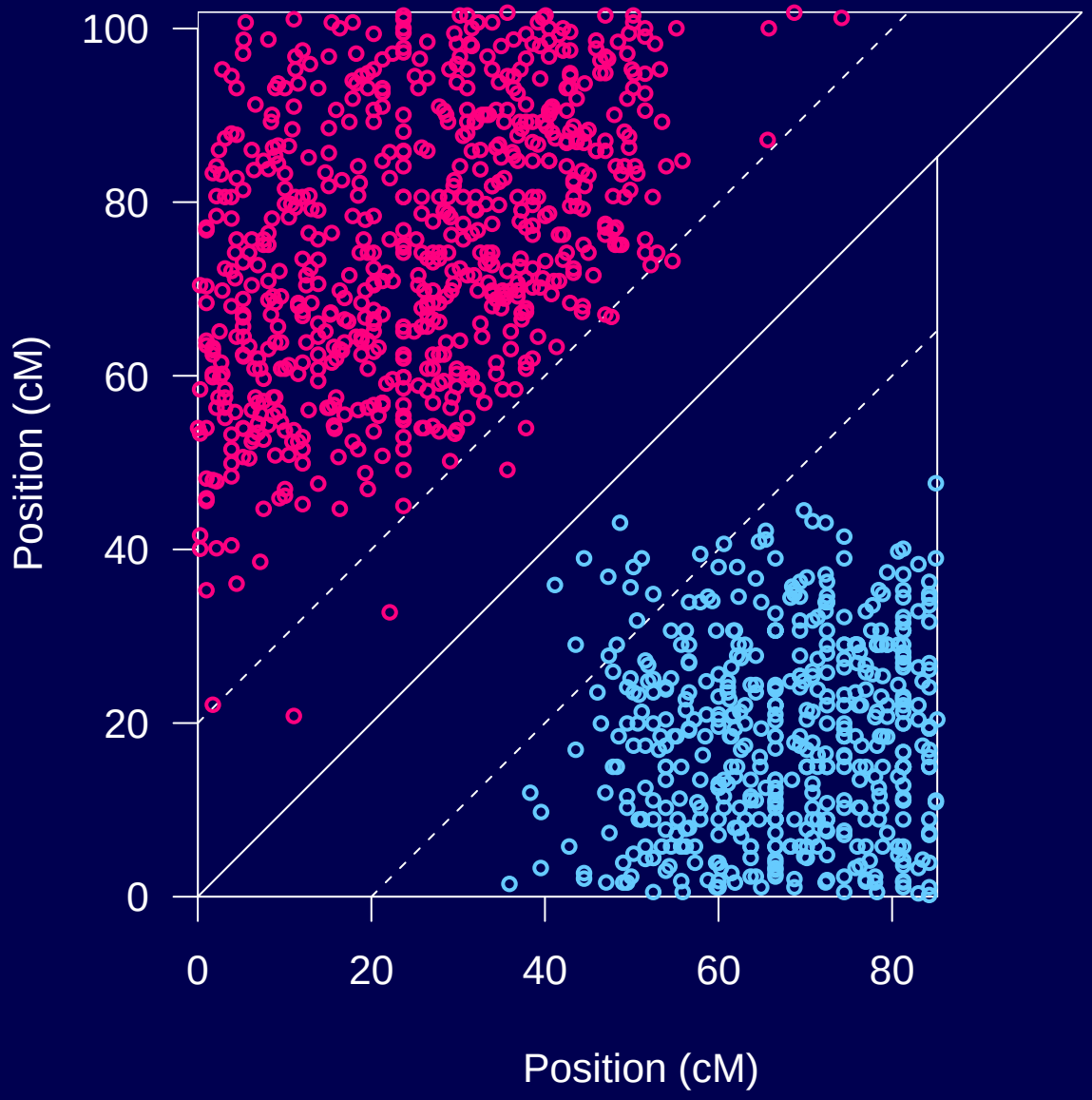




Double-XO locations



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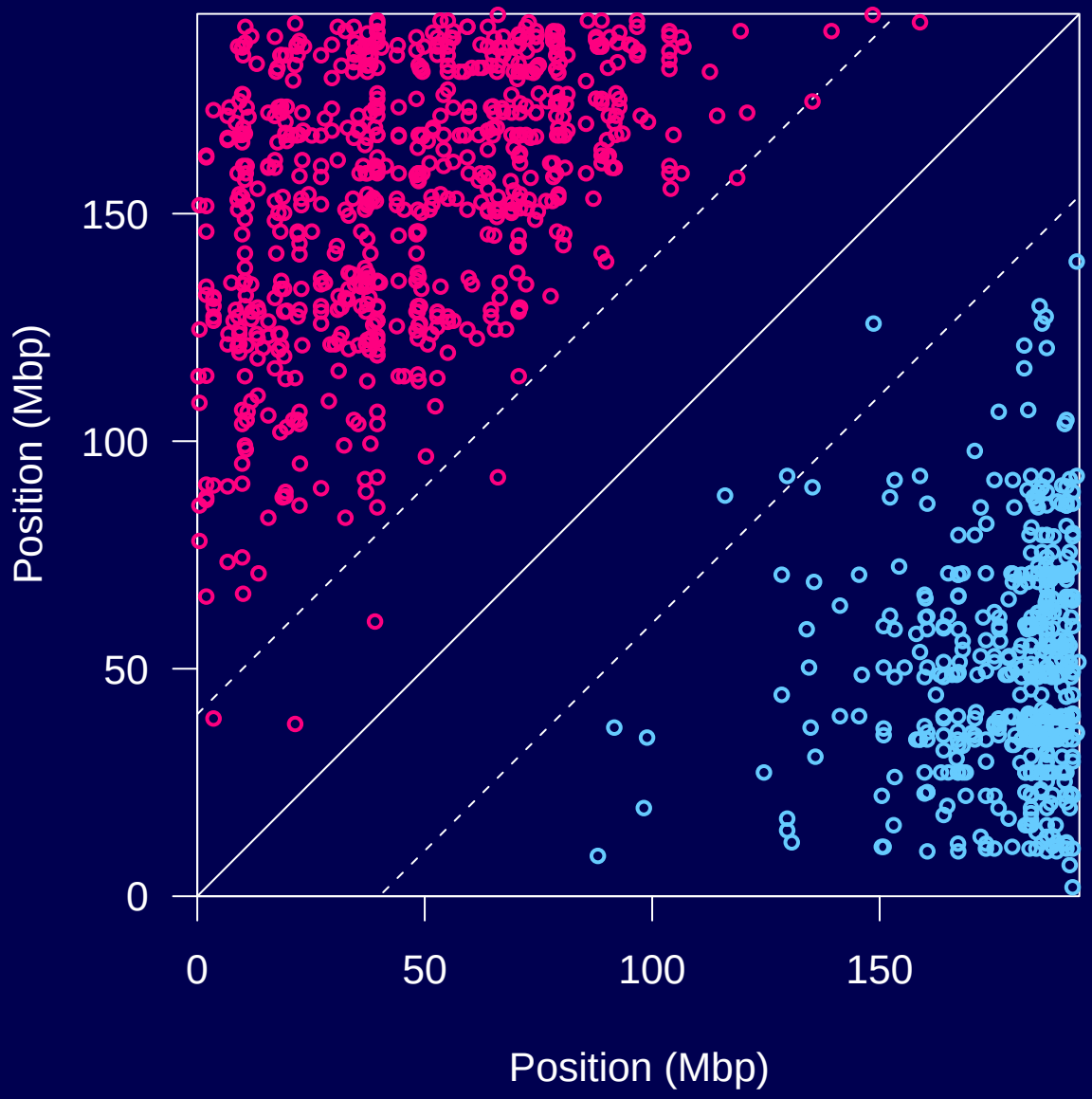
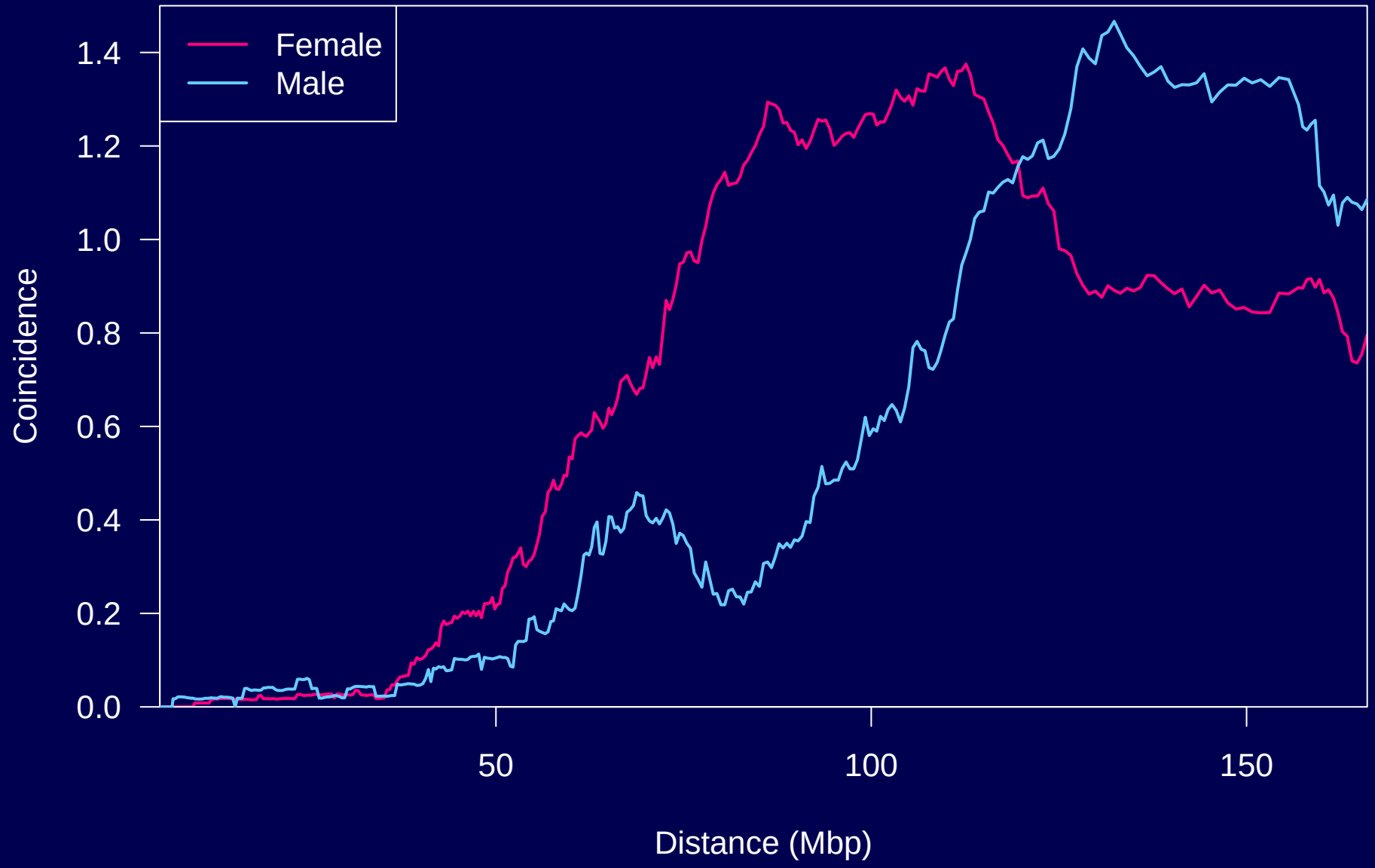


Coincidence

$$C(d) = \frac{\Pr(\text{XO in } I_2 \mid \text{XO in } I_1)}{\Pr(\text{XO in } I_2)}$$

Coincidence



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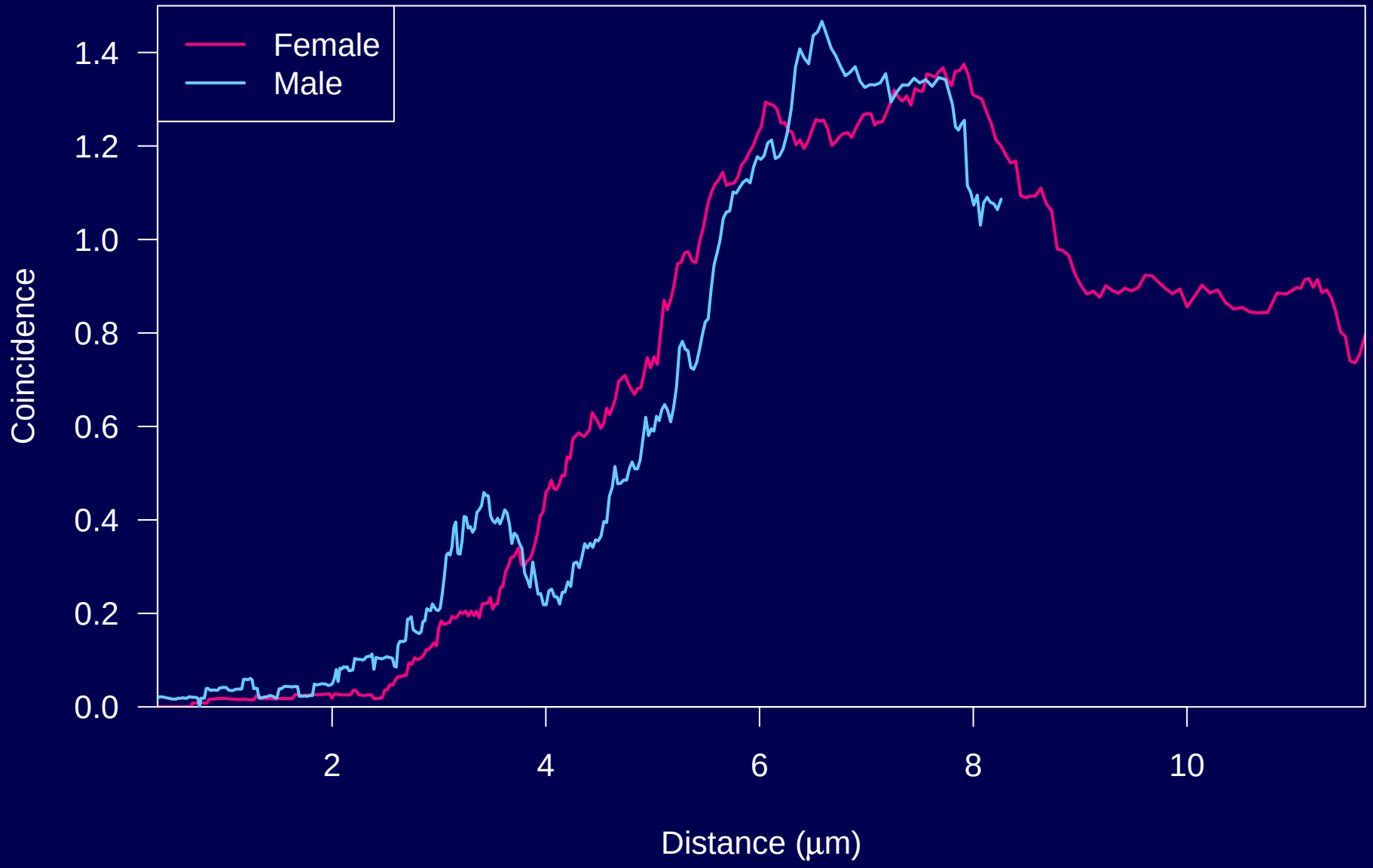

Summary

- Clear sex differences in overall recombination rate
- Differences in compaction + interference
  $\longrightarrow$ difference in recombination rate?
- Nature of local differences?
- Imprinting effects?
- There are a number of interesting statistical problems and a ton more data.

Acknowledgments

Petko Petkov, Ken Paigen, and Jin Szatkiewicz

The Jackson Laboratory