Sex-Specific Evolution of the Meiotic Recombination Rate

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Abstract Please provide an abstract of no more than 150 words. Your abstract should explain the main contributions of your article, and should not contain any material that is not included in the main text.

Introduction (Level 1 heading)

Thanks for using Overleaf to write your article. Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started.

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Results (Level 1 heading)

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Level 2 Heading

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Table 1. Mouse Strains used in this Study.

Species	Official Name	abbreviation for this paper	Geographic Origin	Source
M. m. domesticus		G	Gough Island,	Paysuer Lab
	LEWES/EiJ	LEW	Lewes, Delaware	Jackson Laboratory
	PERC/EiJ	PERC	Peru	Jackson Laboratory
	WSB/EiJ	WSB	Eastern Shore, Maryland	Jackson Laboratory
M. m. musculus	Ast/TUA	AST	Astrakhan Russia	BRC RIKEN
	CZECHII/EiJ	CZECH	Slovakia	Jackson Laboratory
	KAZ/TUA	KAZ	Alma-Ata, Kazakhstan	BRC RIKEN
	PWD/PhJ	PWD	Prague, Czech Republic	Jackson Laboratory
	SKIVE/EiJ	SKIVE	Skive, Denmark	Jackson Laboratory
	TOM/TUA	TOM	Tomsk, Russia	BRC RIKEN
M. m. molossinus	MOLF/EiJ	MOLF	Kyushu, Japan	Jackson Laboratory
	MSM/MsJ	MSM	Mishima, Japan	Jackson Laboratory
M. m. castaneus	CAST/EiJ	CAST	Thailand	Jackson Laboratory
	HMI/Ms	HMI	Hemei, Taiwan	BRC RIKEN
Mus spertus	SPRET/EiJ	SPRET	Cadiz, Spain	Jackson Laboratory
Mus spicilegus	SPI/TUA	SPI	Mt. Caocasus, Bulgaria	BRC RIKEN
Mus caroli	Car	CAROLI	Thailand	BRC RIKEN

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Level 3 Heading

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Table 2. Basic set up of models

Model	Data-sets	Dependent Variables	Coefficients fixed	Coefficients random
M1 Linear Model	females and males from 8 strains	mouse average	subspecies sex subspecies*sex	strain
M2 Linear Model	females and males from 8 strains	mouse average	subspecies sex strain subspecies*sex subspecies*strain sex*strain	
M3 Linear Model	females and males from 8 strains	mouse average	sex strain sex*strain	
M4 Linear Model	females from 8 strains	female mouse average	subspecies strain subspecies * strain	
M5 Linear Model	males from 12 strains	male mouse average	strain	
	females from 8 strains	female mouse average		
	males from 12 strains	male mouse average		

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Table 3. Summary Statistics for MLH1 counts

Species	Subspecies	Strain	Sex	Number of Mice	Number of Cells	Mean MLH1 Count	se	
M. musculus	*M. m. domesticus*	WSB	female	14	184	24.701	0.267	14.6382
			male	11	222	23.383	0.18	11.4799
		G	female	12	318	28.211	0.235	14.8359
			male	18	355	23.161	0.14	11.353
		LEW	female	9	147	26.585	0.398	18.161
			male	10	253	24.162	0.195	12.837
		PERC	male	1	26	21.808	0.41	
	M. m. musculus	PWD	female	15	222	25.977	0.251	14.410
			male	8	161	28.671	0.246	10.8962
		SKIVE	female	1	32	25.938	0.553	12.0708
			male	3	86	26.081	0.293	10.4086
		KAZ	female	9	184	25.625	0.295	15.628
			male	13	264	22.989	0.186	13.1596
		CZECH	male	3	62	22.3	0.32	
		AST	male	3	63	24.41	0.33	
		TOM	male	2	10	23.7	1.18	
	M. m. castaneus	CAST	female	1	1	26	NA	
			male	2	44	22	0.34	
		HMI	male	4	44	24	0.41	
	M. m. molossinus	MSM	female	14	300	28.123	0.254	15.642
			male	7	166	30.367	0.242	10.2626
		MOLF	female	1	21	27.619	0.924	15.338
			male	6	119	23.42	0.232	10.800
Mus spertus		SPRET	female	2	2	26	2	10.8785
			male	5	103	24.427	0.246	10.2321
Mus spicilegus		SPIC	female	6	97	28.237	0.448	15.6283
			male	4	133	25.774	0.241	10.7810
Mus caroli		CAROLI	male	2	57	27	0.4	

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Table 4. Summary Statistics for DMC1 counts

		Early Zygotene			Late Zygotene		
Rec Group	Strain	Number of Cells	Mean DMC1 Foci per Cell	MLH1:DMC1 ratio	Number of Cells	Mean DMC1 Foci per Cell	MLH1:DMC1 ratio
Low	*domesticus*^{WSB}	21	177.76	0.137	20	144.25	0.170
	domesticus^{G}	19	158.16	0.153	9	131.78	0.184
	musculus^{KAZ}	1	159	0.152	11	167.36	0.145
High	*musculus*^{PWD}	18	180.22	0.163	18	140.78	0.208
	molossinus^{MSM}	17	231	0.135	17	164.41	0.190

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Level 4 Heading

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Discussion

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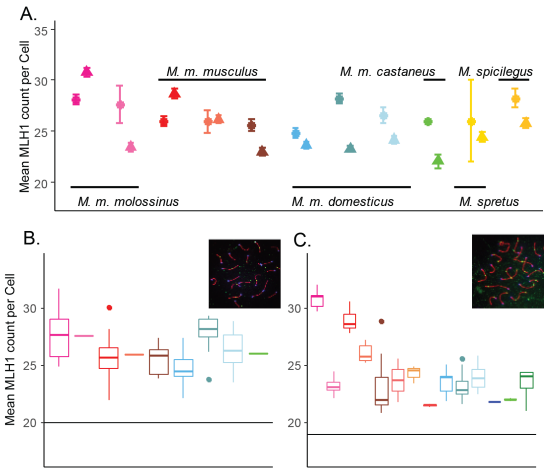

Figure 1. MLH1 Counts. A) Strain mean MLH1 counts (+ 2 standard errors) in both sexes. Females = circles; males = triangles. B) Boxplots of female MLH1 counts for strains of house mice. Inset: example oocyte, SYCP3 stained in red, CREST (centromeres) stained in blue and MLH1 foci stained in green. Horizontal line at 20 indicates the expected minimum number of foci per cell. C) Boxplots of male MLH1 counts for strains of house mice. Inset: example spermatocyte. Additional strains with only male observations are included with the values from Table 2.

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Methods and Materials

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Some LaTeX Examples

Use `\section` and `\subsection` commands to organize your document. LaTeX handles all the formatting automatically. Use `\label` and `\nameref` commands for cross-referencing sectional headings: the usual `\ref` will not work, as this template uses unnumbered sectional headings.

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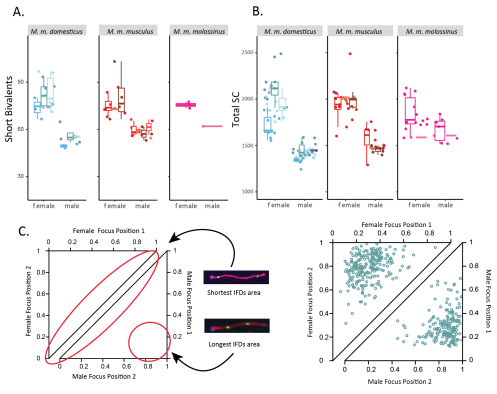

Figure 3. Sex Differences in Synaptonemal Complex (SC) Length and MLH1 Foci Positions. A) Mouse average length of short bivalents. Whiskers indicate ??. B) Mouse average length of total SC. C) Example of sex differences in inter-focal distances and foci locations on bivalents with two foci. Female observations shown in top triangle; male observations shown in bottom triangle. Data from domesticusG.

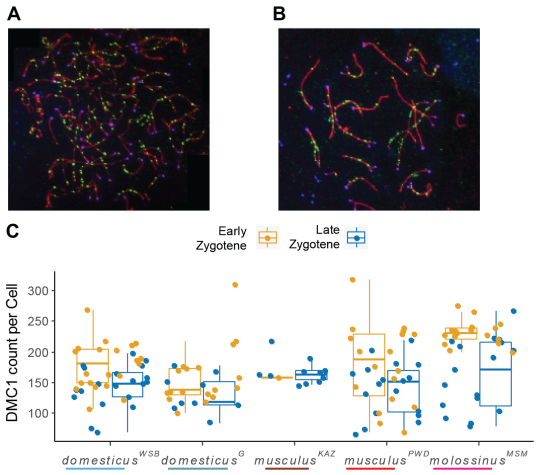

Figure 2. DMC1 Counts in Males. A) Example early zygotene spermatocyte spread. SYCP3 stained in red, CREST (centromeres) stained in blue and DMC1 stained in green. B) Example late zygotene spermatocyte spread. C) Boxplots of DMC1 counts for strains of house mice. Whiskers indicate -/+ 2 SE.

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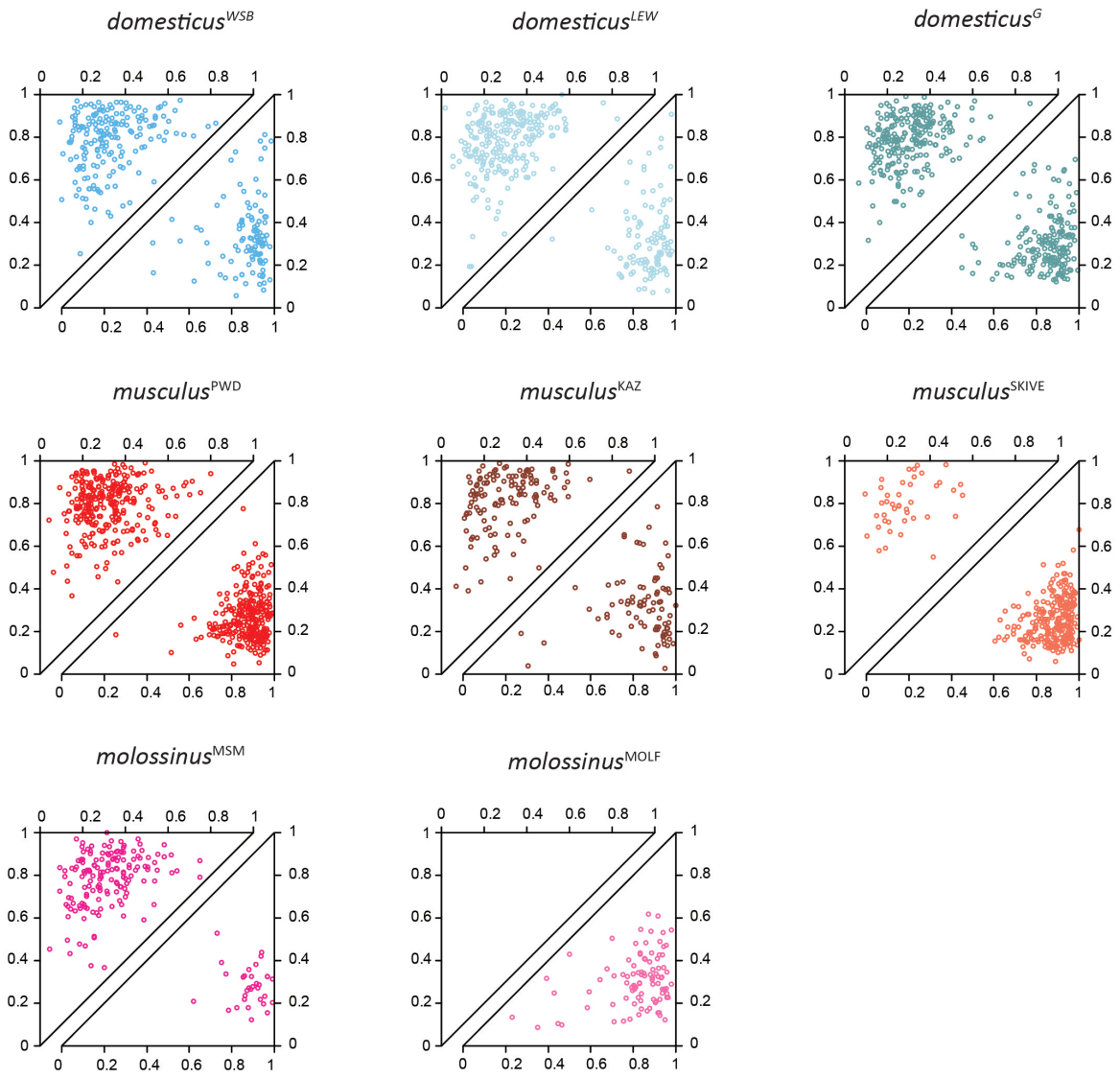

Figure 4. new improved Inter-focal Distances on Bivalents with Two MLH1 Foci. Each point shows the positions of both foci, normalized by bivalent SC length. Observations are separated by sex (females=top triangles; males=bottom triangles).

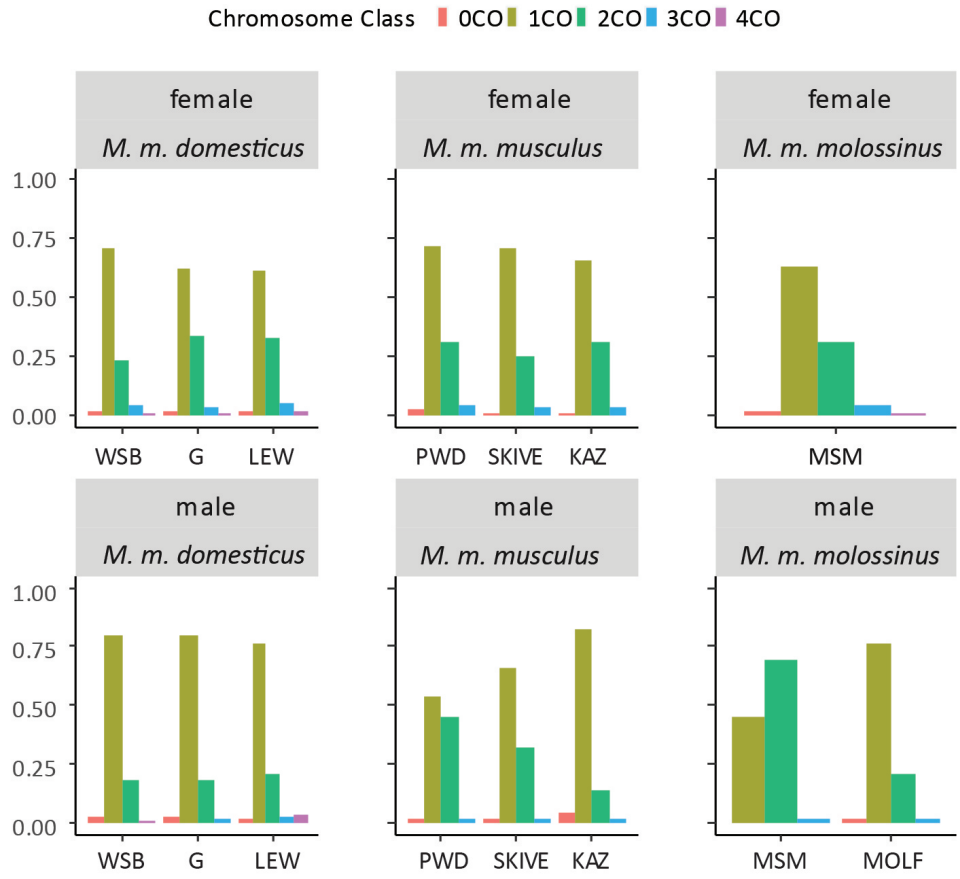

Figure 5. Chromosome Proportions, names were kept abbreviated for space.

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Citations

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Table 5. Automobile Land Speed Records (GR 5-10).

Speed (mph)	Driver	Car	Engine	Date
407.447	Craig Breedlove	Spirit of America	GE J47	8/5/63
413.199	Tom Green	Wingfoot Express	WE J46	10/2/64
434.22	Art Arfons	Green Monster	GE J79	10/5/64
468.719	Craig Breedlove	Spirit of America	GE J79	10/13/64
526.277	Craig Breedlove	Spirit of America	GE J79	10/15/65
536.712	Art Arfons	Green Monster	GE J79	10/27/65
555.127	Craig Breedlove	Spirit of America, Sonic 1	GE J79	11/2/65
576.553	Art Arfons	Green Monster	GE J79	11/7/65
600.601	Craig Breedlove	Spirit of America, Sonic 1	GE J79	11/15/65
622.407	Gary Gabelich	Blue Flame	Rocket	10/23/70
633.468	Richard Noble	Thrust 2	RR RG 146	10/4/83
763.035	Andy Green	Thrust SSC	RR Spey	10/15/97

Source: https://www.sedl.org/afterschool/toolkits/science/pdf/ast_sci_data_tables_sample.pdf

Table 5–source data 1. This is a description of a data source.

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Acknowledgments

Additional information can be given in the template, such as to not include funder information in the acknowledgments section.

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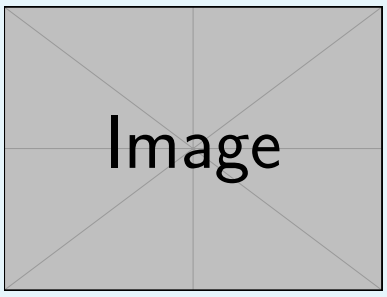
Box 1. This is an example feature box

This is a feature box. It floats!



Box 1 Figure 1. 'Figure' and 'table' captions in feature boxes should be entered with `\featurefig` and `\featuretable`. They're not really floats.

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Brettar I, Christen R, Höfle MG. Belliella baltica gen. nov., sp. nov., a novel marine bacterium of the Cytophaga–Flavobacterium–Bacteroides group isolated from surface water of the central Baltic Sea. International Journal of Systematic and Evolutionary Microbiology. 2004; 54(1):65–70. http://ijs.microbiologyresearch.org/content/journal/ijsem/10.1099/ijs.0.02752-0.

McQuilton P, St Pierre SE, Thurmond J, the FlyBase Consortium. FlyBase 101 – the basics of navigating FlyBase. Nucleic Acids Research. 2012; 40(D1):D706–D714. http://nar.oxfordjournals.org/content/40/D1/D706.abstract, doi: http://dx.doi.org/10.1093/nar/gkr1030.

Figures and Tables

Use the table and tabular commands for basic tables — see ***Table 5***, for example.

You can upload a figure (JPEG, PNG or PDF) using the project menu. To include it in your document, use the `\includegraphics` command as in the code for **??**.

For a half-width figure or table with text wrapping around it, use

```
\begin{wrapfigure}{l}{.46\textwidth}
  \includegraphics[width=\hsize]{...}
  \caption{...}\label{...}
\end{wrapfigure}
```

Figure 6. A half-columnwidth image using wrapfigure, to be used sparingly. Note that using a wrapfigure before a sectional heading, near other floats or page boundaries is not recommended, as it may cause interesting layout issues. Use the optional argument to wrapfigure to control how many lines of text should be set half-width alongside it.

Appendix 1

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Appendix 1 Figure 1. This is a figure in the appendix

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Appendix 1 Figure 2. This is a figure in the appendix

Appendix 2

Appendix 2 Figure 1. This is a figure in the appendix