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THE UNIVERSITY OF BRITISH COLUMBIA

Dear Editor, 2nd August, 2016

Please consider the attached manuscript, "The Role of Pollen and Sperm Competition in Sex Chromosome Evolution" for publication in *PNAS*. This research was developed and written in collaboration with Sarah (Sally) P Otto, who has agreed to its submission to *PNAS*.

We believe we have developed significant results in this manuscript, particularly in providing several promising and novel predictions for evaluation in future empirical work. We develop and thoroughly analyze models for the evolution of recombination on sex chromosomes, a fundamental and well-established phase of sex chromosome evolution. Traditionally, sex differences in selection are thought to drive the suppression of recombination on sex chromosomes. However, the selective environment of male and female haploid gametes is also typically different, with pollen/sperm experiencing particularly intense competition. We include a period of selection among pollen/sperm and show that competition among pollen or sperm should also favor suppressed recombination. Consequently, we offer an expanded perspective on sex chromosome evolution that includes the degree of sex specific selection in haploids along with that in diploids. Thus, we predict that the tempo of sex chromosome evolution will depend on the degree of haploid competition, not just on selective differences between the diploid sexes; this prediction can be evaluated as diverse sex chromosome systems become available. In addition, we predict that sex chromosomes should become enriched for genes that experience haploid selection, which can be evaluated by examining the genomic location of genes identified in expression and mutant studies. We believe our results will be of general interest to the *PNAS* readership, in part because we find the surprising result that sex ratios evolve to become biased at birth due to associations between haploid-selected loci and the sex-determining region.

Thank you for your consideration of this work. Please feel free to correspond with me via e-mail (mfscott@biodiversity.ubc.ca) for any matters concerning the manuscript.

Sincerely,

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