

# Missing hybrid incompatibility gene my help unlock Darwin's 'mystery of mysteries'

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Hybrid incompatibility – the failure of two closely related species to produce offspring capable of surviving and reproducing—has puzzled scientists from Charles Darwin, Thomas Hunt Morgan and Hermann Joseph Muller to today's geneticists and evolutionary biologists.

For Darwin, understanding the genetics of hybrid incompatibility was the key to the "mystery of mysteries": speciation, the evolutionary process by which new biological species arise.

To unlock the "mystery of mysteries," a group of seven scientists at four institutions have been trying to uncover the [genes](#) responsible for the best-studied case of hybrid incompatibility, the cross between the fruit flies *Drosophila melanogaster* and *D. simulans*. Previous studies by Dan Barbash, Ph.D., and colleagues at Cornell University implicated two genes, Hybrid male rescue (Hmr) and Lethal hybrid rescue (Lhr), but these two genes are not sufficient to cause hybrid inviability.

At the GSA *Drosophila* Research Conference, Nitin Phadnis, Ph.D., of the University of Utah and his collaborators will describe the new genomics-based approach that enabled them to identify the missing hybrid incompatibility gene in the *D. simulans* genome. They are now studying the functions of Hmr, Lhr and the missing gene to determine the biological pathways that are disrupted in [hybrid offspring](#).

**More information:** Abstract: "Genomics and the molecular basis of hybrid incompatibilities." Nitin Phadnis<sup>1</sup>, Emily Baker<sup>2</sup>, Jacob

Kitzman<sup>3</sup>, Kimberly Frizzell<sup>1</sup>, Emily Hsieh<sup>4</sup>, Jay Shendure<sup>3</sup>, Harmit Malik<sup>4,5</sup>. 1) Department of Biology, University of Utah, Salt Lake City; 2) University of Wisconsin, Madison; 3) University of Washington, Seattle; 4) Fred Hutchinson Cancer Research Center, Seattle; 5) Howard Hughes Medical Institute. Link: [abstracts.genetics-gsa.org/cgi ...  
il.pl?absno=14531760](https://abstracts.genetics-gsa.org/cgi-bin/il.pl?absno=14531760)

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