

GENE SWAP

Horizontal or lateral gene transfer (LGT) is a regular event among bacteria, and research over the past decade has shown that microbes can also transfer their DNA to multicellular hosts. One of the most well studied examples of LGT between microbe and animal is the transfer of DNA from an intracellular *Wolbachia* endosymbiont to its *Drosophila* host.

WOLBACHIA GENE TRANSFER

Bacterial DNA may enter the cytoplasm of the *Drosophila* cell via bacterial cell lysis **1** or a type IV secretion system **2**. Once in the cytoplasm, some or all of the bacterial genome can be integrated into the fly genome **3**. As long as the host remains colonized by its *Wolbachia* endosymbiont, LGT can continue and *Wolbachia* DNA can accumulate in the *Drosophila* genome.

MECHANISMS OF DNA INTEGRATION

Just how *Wolbachia* DNA inserts itself into the *Drosophila* genome is unclear. Three likely mechanisms include non-homologous repair of a double-strand break **A**, insertion of a fly retrotransposon into the *Wolbachia* genome followed by homologous recombination with another copy of the retrotransposon in the fly genome **B**, and/or homologous recombination with a prior nuclear *Wolbachia* transfer (nuwt) **C**.

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