The Fly
(*Drosophila melanogaster*)

"Why

***Drosophila melanogaster*, the diminutive and ubiquitous fruit fly, is the classic organism for the study of animal genetics. It was introduced to the lab early in the 20th century by Thomas Hunt Morgan, for good practical reasons: short life cycle, ease of culture, and high fecundity. Mutant flies, with defects in any of several thousand genes, are now used for the study of genetics, development, behavior, and other topics.**

'Omics

Genome size: 180 Mb

Chromosomes: 3 autosomes, plus X and Y

Number of genes: 13,639 predicted

Average gene: 3 kb, 4 exons per gene

Proteins: 23% have no match with other organisms

Web Sites

***Drosophila* Virtual Library:** www.ceolas.org/fly/index.html

FlyBase: flybase.bio.indiana.edu

***Drosophila* DNA Microarray Homepage:** cmgm.stanford.edu/~kpwhite/index.html

1911
Morgan proposes that genes for white eyes, yellow body, and miniature wings are linked on X chromosome

1913
Alfred Sturtevant demonstrates linkage and produces first genetic map

1917–1923
Calvin Bridges discovers first chromosome deficiency, duplication, and translocations

1927
Hermann Muller induces mutation with X-rays

1930s
George Beadle describes crossing over

1933
Emile Heitz and H. Bauer describe salivary polytene chromosomes

1935
Biochemical genetics of eye pigment synthesis elucidated

has not man a microscopic eye?
For this plain reason—man is not a fly."
—Alexander Pope (1688–1744)

Stats

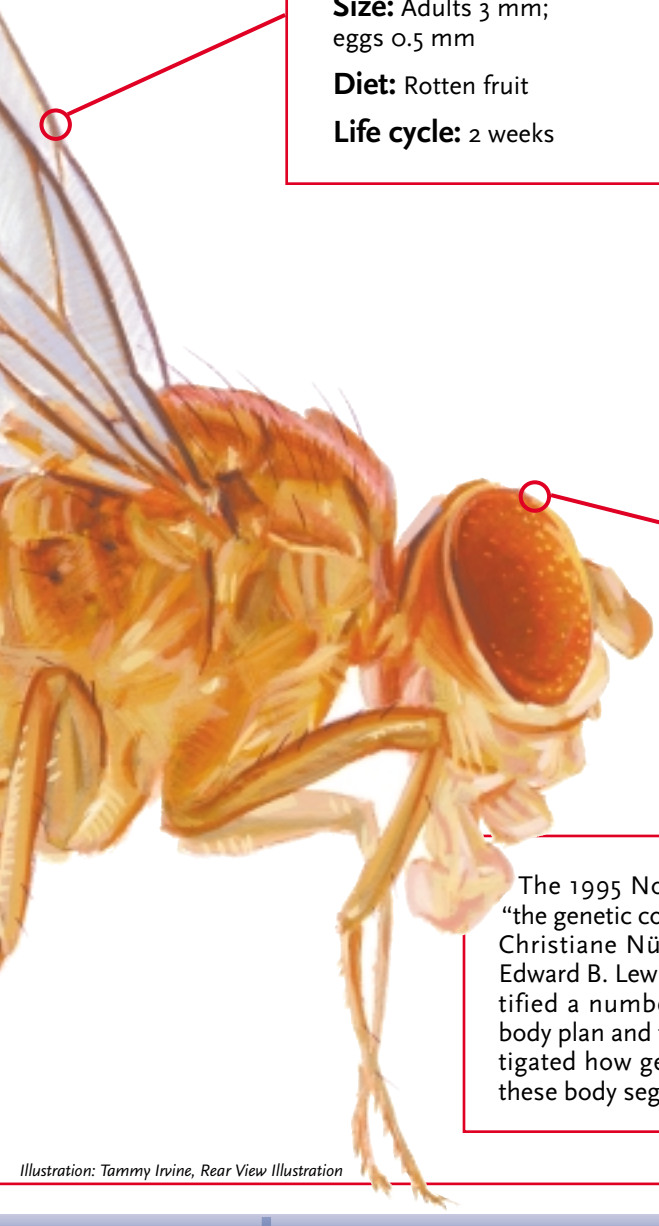
Size: Adults 3 mm; eggs 0.5 mm

Diet: Rotten fruit

Life cycle: 2 weeks

Reproduction: Females can lay up to 100 eggs in one day

Development: 9 days from fertilization to adult



Feature Technology

P-transposable Elements: A massive gene disruption project aims to induce mutagenesis through the use of P-transposable elements. So far, 85 known and eight novel families of "jumping genes" have been identified. A total of 1,572 full and partial transposable elements have been mapped, comprising 3.86% of the sequence. Only 436 of those transposable elements are contained within the 61.4 Mb of sequence that contains genes.

Nobel Moment

The 1995 Nobel Prize in medicine was awarded for "the genetic control of early embryonic development" to Christiane Nüsslein-Volhard, Eric F. Wieschaus, and Edward B. Lewis. Nüsslein-Volhard and Wieschaus identified a number of *Drosophila* genes that control the body plan and formation of body segments. Lewis investigated how genes control the further development of these body segments into specialized organs.

Illustration: Tammy Irvine, Rear View Illustration

1940
Conrad Waddington determines genes responsible for wing development

1970
Dan Lindsley et al. discern gross structure of fly genome

1974
David Hogness maps cloned DNA segment to specific chromosome

1979
First positional cloning of *ultrabithorax* gene

1980
Christiane Nüsslein-Volhard and Eric Wieschaus perform first genome-wide mutational screen

1981
Allan Spradling and Gerald Rubin develop transposable elements to make transgenic flies

1993
Andrea Brand and Norbert Perrimon develop two-component systems to control gene expression

2000
Genome sequencing complete