The Fish
(Danio rerio)

Small, tropical zebrafish, native to southeast Asia, have been recruited relatively recently from the pet shop and into the lab. They are easy to look after and breed prodigiously. External fertilization allows easy genetic manipulation and analysis, and the embryo is optically transparent. In addition, the availability of a vast storehouse of mutations means that this model will provide insights into developmental processes for years to come.

Stats
- **Size:** 3 cm long
- **Diet:** Brine shrimp and algae
- **Life span:** ~5 years
- **Reproduction:** Eggs fertilized externally
- **Development:** Transparent embryos develop to adults in 3 months
  - **Average clutch size:** 200

Web Sites
- Zebradish Information Network: zfin.org
- Danio rerio Sequencing Project: www.sanger.ac.uk/Projects/D_rerio
- Trans-NIH Zebrafish Initiative: www.nih.gov/science/models/zebrafish

Illustration: Tammy Irvine, Rear View Illustration
stories where the people know you; particularly, don’t tell them where they know the fish.”
—Mark Twain (1835–1910)

**Genome size:** 1,700 Mb

**Chromosomes:** 25 diploid (unlike many other fish)

**Number of genes:** Currently being sequenced

**Feature Technology**

GFP: Green fluorescent protein (GFP) spontaneously fluoresces. It can be linked, via either the N- or C-terminus, to a broad range of proteins that retain their functions, and it can be expressed as a transgene. This terrific flexibility makes GFP an ideal noninvasive marker in living cells. In zebrafish, GFP can follow internal development because they are translucent. Recently a photoactivatable variant that provides a 100-fold increase in signal intensity has been developed, providing still greater utility.

**Nobel Moment**

No fish tales here—research has yet to snag the big catch; it lies somewhere in the future.

- **1993** Christiane Nüsslein-Volhard, Mark Fishman, Wolfgang Driever begin “Big Screen,” the systematic production of embryonic lethal mutations
- **1994** *no tail* is first mutation identified molecularly
- **1996** “Big Screen” completed
- **1997** Trans-NIH Zebrafish Initiative launched
- **1998** *one-eyed pinhead* is first mutation positionally cloned
- **2000** Genome sequencing project announced
- **2000** Morpholinos used to knock down gene expression
- **2002** Wellcome Trust Sanger Institute posts first draft of genome online