New Technion Zebrafish Research Facility - Zebrafish as a model in Biomedical Research

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Brand-new Technion zebrafish research facility

- Currently includes wild-type zebrafish, pigment-free fish, fish expressing various Ca^{2+} indicators, fish with fluorescently labeled nuclei and more.
- For more details, advice regarding the use of zebrafish in your research, and a full list of available lines, **please contact: freifeld@bm.technion.ac.il**

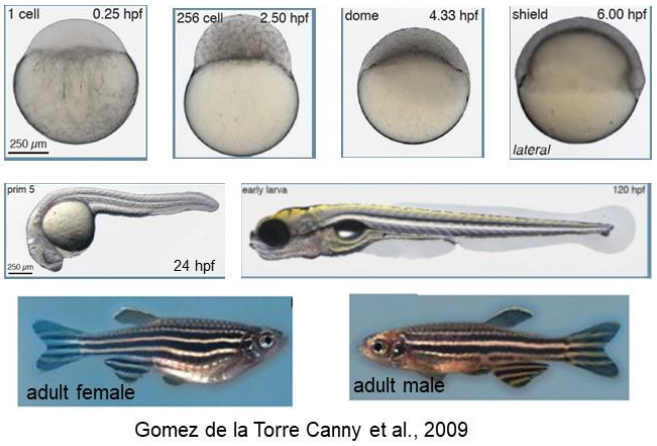
General background information

- Zebrafish (*Danio rerio*) are small 4-6 cm, freshwater fish that originate from southeast Himalaya Nepal and India. They belong to the cyprinidae family.
- They are omnivorous fish, have a life span of 2-3 years and become sexually mature within ~3 months.

Zebrafish as an alternative to a mammalian model

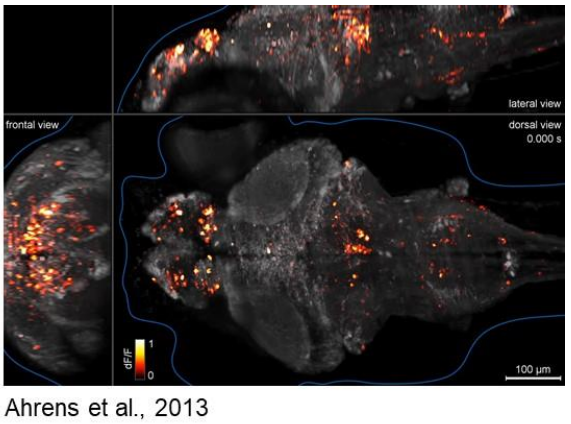
- Zebrafish are vertebrates, and share a high degree of sequence and functional homology with mammals, including humans.
- They are a genetic model organisms, can be used as disease models, or be made to express transgenes with which structure and function can be revealed.
- External fertilization has made zebrafish a popular model in **developmental biology**. Their transparency and small size make them a highly useful model in **neuroscience.** For example, activity throughout the entire brain of a larval zebrafish can be imaged non-invasively, in real-time with cellular resolution. Moreover, this can be combined with optogenetic manipulation of activity; or simultaneous behavior tracking.
- Zebrafish larvae absorb pharmacological agents placed in their media, making them a popular model for drug-screening. In addition, as a whole-organism they can provide much more information compared with cultured cells.
- Zebrafish are characterized with high fecundity. A pair of fish can produce ~200 offspring every ~10 days.
- Replacement is one of the 3R`s principles. Animal suffering is minimized by using the least sentient organism. Moreover, breeding zebrafish is relatively easy and cost effective.

Zebrafish development



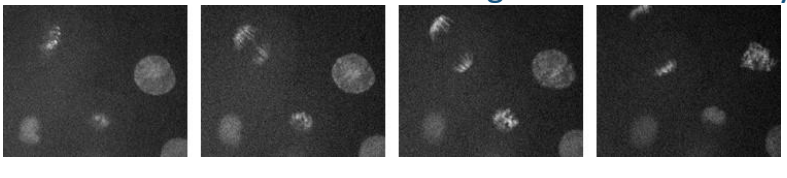
Gomez de la Torre Canny et al., 2009

Activity imaging in larval zebrafish



Ahrens et al., 2013

A mitotic cell within an *in vivo* imaged zebrafish embryo



Click here for a short movie on the use of the zebrafish model by the Neuro-engineering lab at the Technion