

National Animal Ethics Advisory Committee
**Opinion on the use of Zebrafish
in research, testing and teaching**

National Animal Ethics Advisory Committee
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Background

Zebrafish are a commonly used experimental model in genetic and developmental research. Features such as a short interval between generations, easily manipulable reproductive cycle, and a transparent body in their early life stages make them an ideal animal model. It has been estimated that more than five million zebrafish are used in research worldwide each year.

Scientifically, anything within the taxonomic kingdom Animalia is an animal. However, the Animal Welfare Act 1999 (the Act) contains a legal definition of “animal” for its purposes. It is only animals that meet this definition that the Act applies to. Fish are defined as animals in the Act, hence any research on them must be in accordance with Part 6 of the Act, which covers research, teaching, and testing. However, section 2(d)(ii) of the Act excludes any animal in the pre-natal, pre-hatched, larval, or other such developmental stage (apart from any mammalian foetus, or any avian or reptilian pre-hatched young, that is in the last half of its period of gestation or development; and any marsupial pouch young) from the definition of animal. That means that treatment of these animals would not be subject to legal regulation by the Act.

A larva is the juvenile form of an animal that must go through metamorphosis to become an adult. By widely accepted international convention, fish are referred to as larvae while they undergo early development, which is considered to be biologically complete once they have achieved their adult fin configuration. Therefore, under the Act, a fish does not meet the definition of an animal until it has its full complement of adult fins. This conformational change, which occurs in zebrafish at about 30 days of age, has the advantage that it is visually distinctive so can be recognised easily and reliably.

Zebrafish are predominantly used during the larval stages. This means that the majority of zebrafish used in research in New Zealand are without the protection of any part of the Act.

A purpose of the Act (Title at (i)) is to recognise that animals are sentient.

Defining an animal

The National Animal Ethics Advisory Committee (NAEAC) believes that the best moment to recognise an organism as an animal for the purposes of the Act, is the point at which it becomes sentient. NAEAC considers this is supported by the Act’s purpose of recognising that animals are sentient.

Based on consultation with international experts in aquaculture and fish welfare, NAEAC has found persuasive evidence to suggest that fish become sentient well before the transition from larvae to adult.

The evidence indicates that once zebrafish pass from the yolk-sac larval stage at 4-5 days of age, they commence active behaviours including:

- responding to their surroundings;
- feeding independently;
- predator avoidance;
- associative learning; and
- responding to pain relief (the implication being that they can feel pain).

These active behaviours are widely considered to be indicators of sentience.

NAEAC considers that there is an obligation to protect sentient animals under animal welfare legislation. Although NAEAC has identified this legislative anomaly due to the growing use of zebrafish in research, testing and teaching, the committee believes that any resulting action should address all similar fish species, and not be restricted to zebrafish.

In accordance with its functions as described in Part 4 s63(a) of the Act, NAEAC has provided advice to the Minister responsible for animal welfare, on matters relating to animal use in research, testing and teaching.

NAEAC has recommended that fish be declared to be animals, for the purposes of the Act, at the end of the yolk-sac larval stage; noting that live-bearing (viviparous) fish are covered by the Act from the point of birth.