

Focus on Fish

February 2021

Summary report

In February 2021, the RSPCA hosted 'Focus on Fish', a one-day online conference on practical refinements for fishes in research and testing, which was attended by nearly 650 delegates from 46 countries.

The use of fishes in research and testing is rapidly increasing globally, and there is now widening recognition of the need to minimise harms and improve welfare. This meeting brought together experts from academia and industry to share the latest knowledge and approaches to refining fish use, enhancing both animal welfare and translatability. The meeting programme was split into three themes: fish welfare, practical refinements, and welfare assessment and humane endpoints.

The day opened with a welcome and introduction from the RSPCA. This was followed by talks on **what it is like to be a zebrafish** in the wild compared to in the laboratory; the **social and cultural factors which influence the use of fishes** in science and our consideration of their welfare; and the current state of knowledge and important questions which need to be answered about **pain perception and analgesia in fishes**. Discussion following these talks addressed whether fishes in laboratories have a good 'quality of life', with most agreeing that it could be improved, as well as the importance of considering the natural environment, ecology and behaviour of different species in the wild when trying to provide the best welfare. There was also discussion of the results of a poll put to the audience, which suggested that those using zebrafish still provide relatively little environmental enrichment other than live food, despite growing evidence that enrichment can be beneficial.

In the afternoon session, talks covered: how procedural practices in large fish facilities can be refined to achieve better fish welfare; the use of **skin-swabbing as a refined method of collecting DNA** for genotyping; the use of **morphine as an analgesic after heart cryoinjury** in zebrafish; the development of a training system to help laboratory staff **better identify poor health** in zebrafish; how implementation of **humane endpoints** can reduce suffering in fishes used in regulatory testing and some of the challenges associated with this; and finally, how shortening the test duration from 96h to 24h in the Organisation for Economic Co-operation and Development (OECD) **fish acute toxicity test (TG203)** is a potential avenue for refining this test. Further discussions then addressed topics such as whether participants

were regularly using pain relief when conducting invasive procedures, and the need for further identification of humane endpoints for fishes. A final discussion point addressed who has ultimate responsibility for the welfare of the fishes used in research - in a UK research setting, this legally lies with the 'personal licence holder' (PIL), but speakers emphasised the important other roles, including animal technologists, who are particularly well-placed to identify and address suffering and welfare issues at an early stage.

Action Points

The presentations and discussions raised a number of themes and practical approaches to reducing suffering and improving welfare. These included:

Understanding your animals

- There are over 33,000 species of fish, with huge variation in their biology, ecology and behaviour. Consideration of species-specific needs for housing, husbandry and welfare is essential when considering how to improve welfare, and when interpreting welfare measures.
- Every establishment has its own Culture of Care, and it is important to understand this when initiating discussions about progressing fish welfare and the 3Rs. It may be helpful to approach the local ethics committee or equivalent body. Cultural, social and organisational issues, whatever they are, need to be fully recognised and considered in any discussion on the progress and future of fish welfare and the 3Rs.

Practical refinements

- Skin-swabbing can be used to collect DNA for genotyping from fish and has been shown to cause less stress than fin-clipping. Skin swabbing is therefore a refined technique and is preferred over fin-clipping.
- An image of gravel placed underneath a zebrafish tank is a simple, cheap and low-maintenance form of environmental enrichment which has been shown to be preferred by zebrafish - is there any clear justification for not implementing this in your facility?

Analgesia

- A range of analgesics are known to be effective in some fish species commonly used in research, including zebrafish and rainbow trout; analgesia should therefore be used when conducting invasive procedures, including fin clipping, and there must be clear and compelling justification for not using analgesia.
- Morphine is an effective analgesic and does not impede heart regeneration after cryoinjury in zebrafish; it is recommended for use up to 6 hours after cryoinjury.

- More research is needed to identify effective analgesics for other fish species, to better understand the pharmacokinetics of different analgesics, and to understand when it is best to re-administer analgesics.

Welfare assessment and humane endpoints

- Multiple different welfare measures (including behavioural, physiological) should be used to more accurately assess and interpret welfare.
- Proper training, assessment of competency in conducting procedures, and transparency of reporting are essential to protect fish welfare, including for users who do not have a legal requirement to undergo training (e.g. those carrying out non-regulated work).
- When training staff to identify ill-health in fish, good techniques for effective training include using visual aids, clearly-defined categories of clinical signs, and interactive and engaging practical assessment.
- Better standardisation of clinical signs used to identify humane endpoints, and more agreement between those using these clinical signs (e.g. scientists, vets, regulators) can help to reduce suffering in severe procedures.
- There is potential to improve the welfare and reduce the suffering of fishes exposed to severe procedures (such as some acute toxicity tests) through application of humane endpoints, and it may be possible to identify particular early clinical signs which predict mortality. Suffering may also be reduced by reducing the duration of experiments.

The conference **abstract booklet** can be requested by emailing animalsinscience@rspca.org.uk, and the **presentations** are available to view at www.focusonfish.co.uk

The RSPCA would like to thank all of the speakers at the meeting.

This summary report has been produced by the RSPCA Animals in Science Department.

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