



# Getting into zebrafish



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ARRP Animal Ethics Seminar

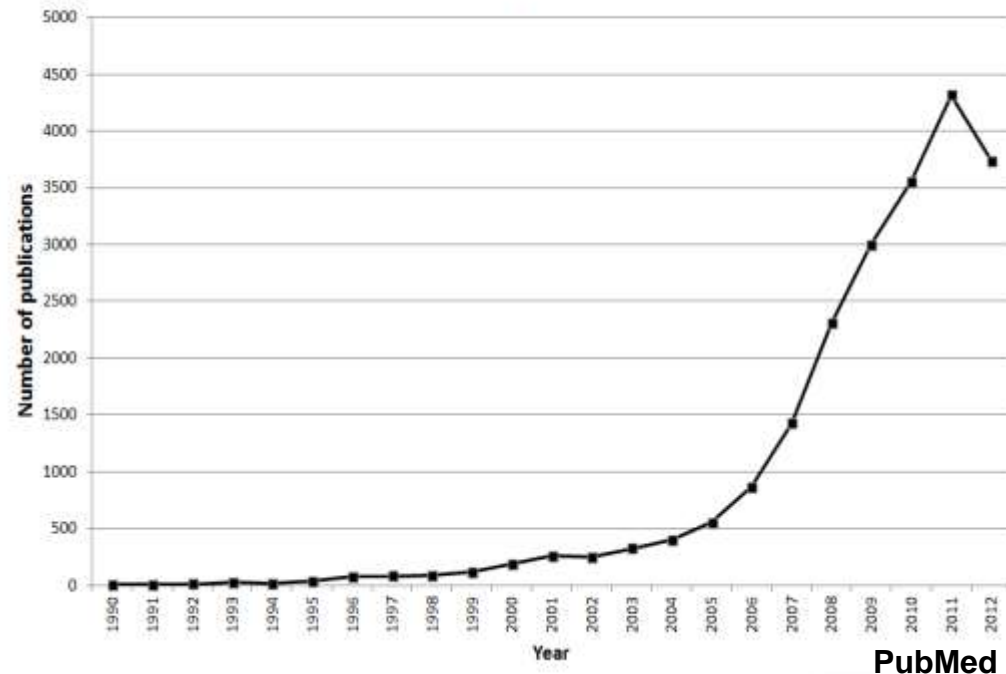
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# History of zebrafish research

- Originated from India and surrounding areas
- First used for research in 1951
- Steadily increased in the 1980s at the University of Oregon
- Boomed post-1996 after the rise of genetic screens and transgenics

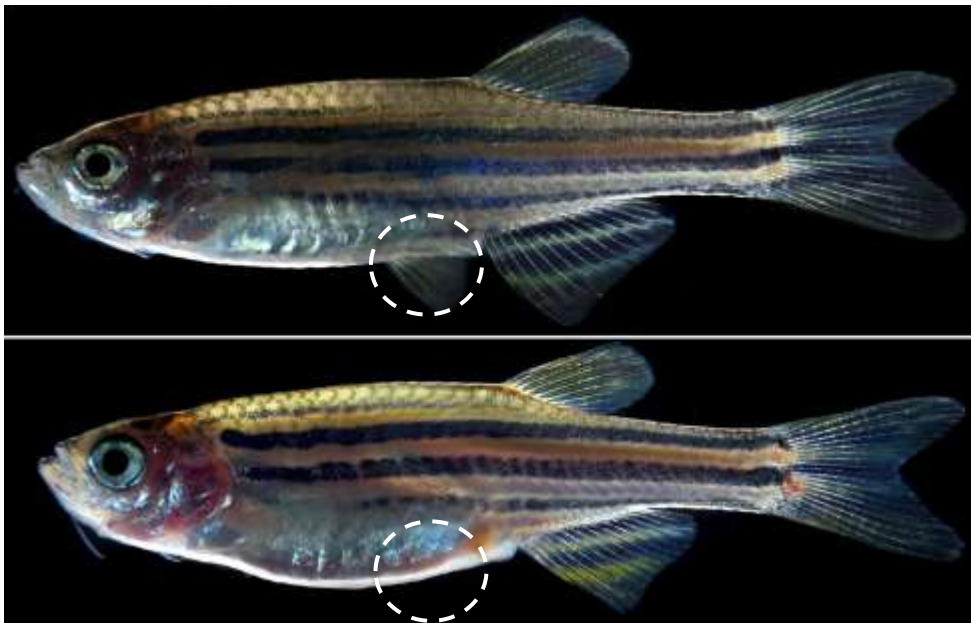


Publications utilising zebrafish for developmental studies



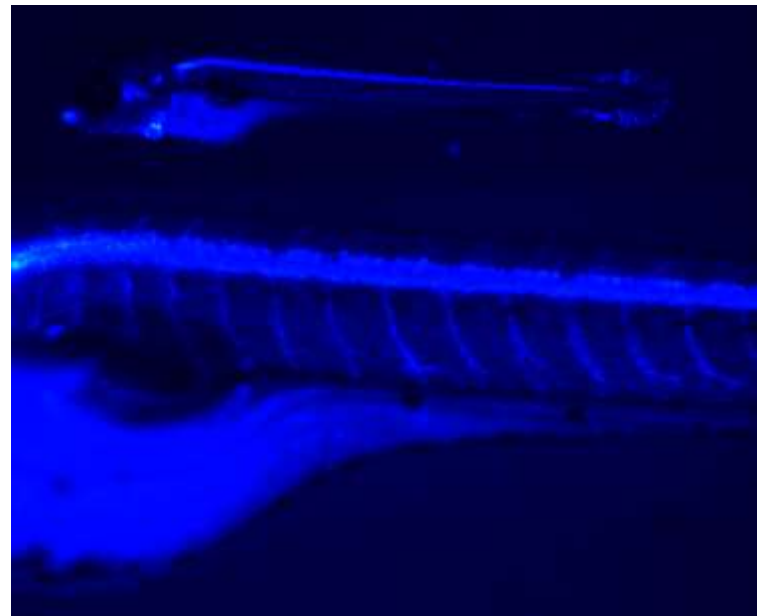
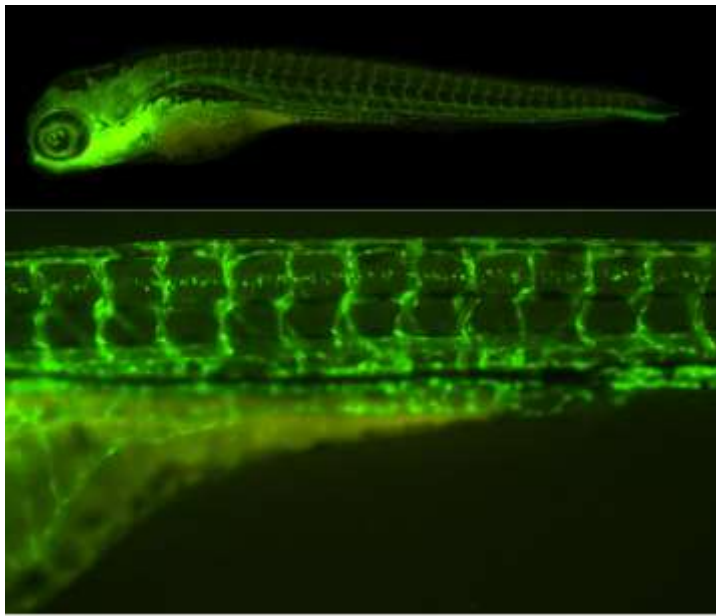
# Types of research

- Developmental studies
- Genetics research
- Toxicology studies
- Models of human disease (cancer, neurodegenerative disorders)



# Replacement

- Zebrafish can be a replacement where non animal models are not feasible
- Embryos are considered a replacement to adult animals
  - based on nervous system development and free-feeding behaviours
  - similar guidelines in UK and USA
- Fully sequenced genome
- Similar organ systems and structures to mammals



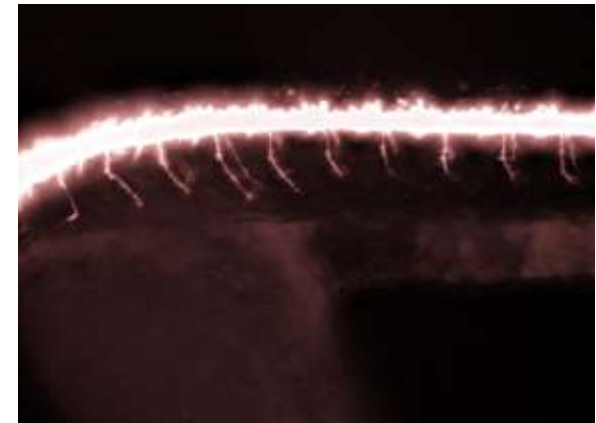
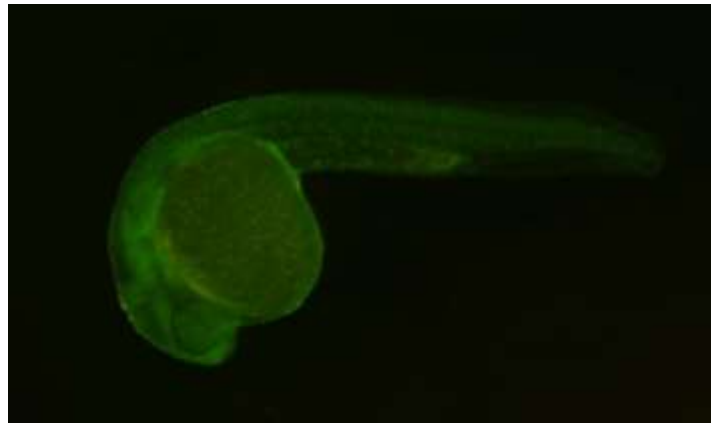
# Reduction

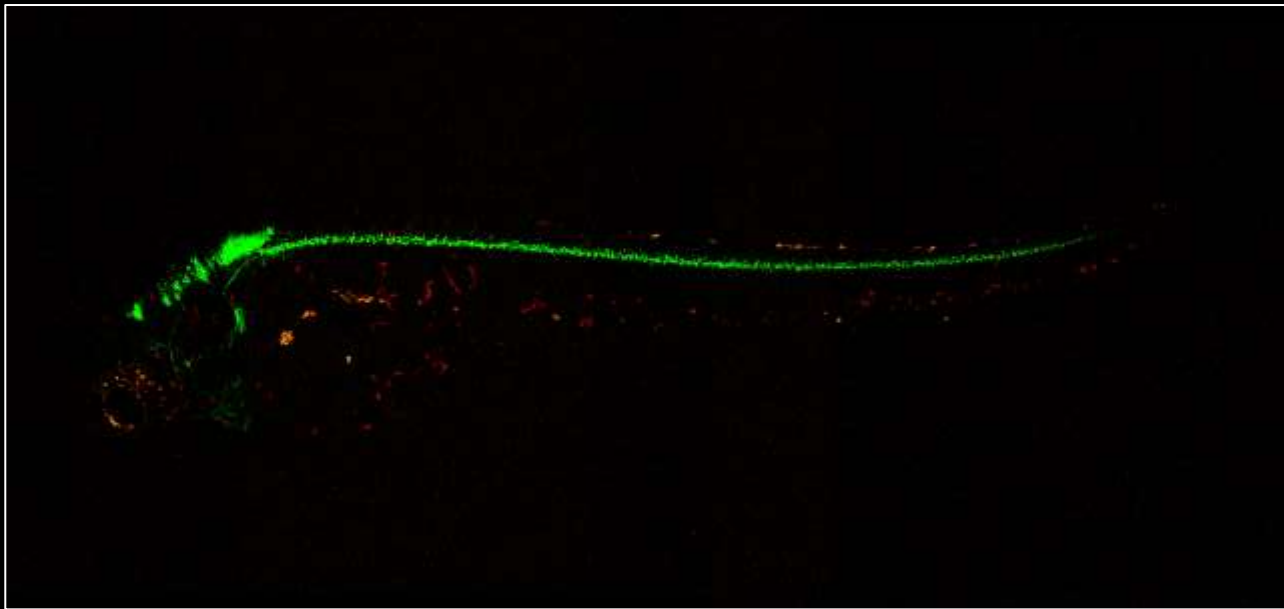
- Use of zebrafish for reduction of research animals used
- Adults can produce 200-300 embryos in a clutch
  - reduced turnover of adult animals
  - early screening and sampling of embryonic fish reduces fish stock waste



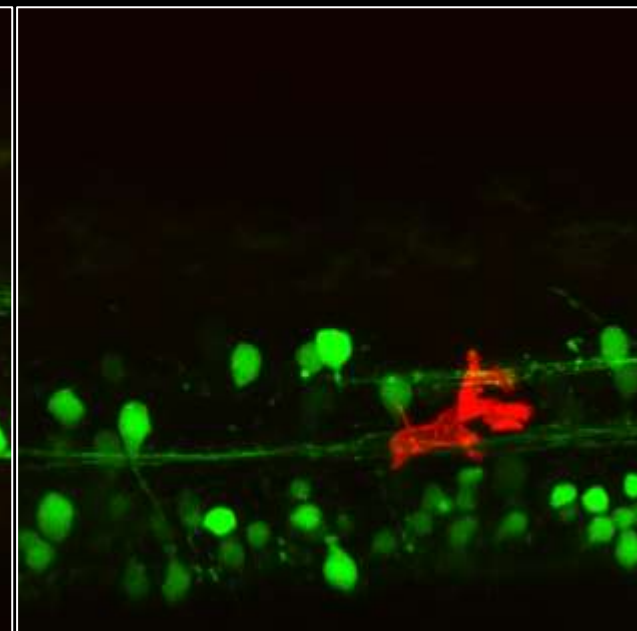
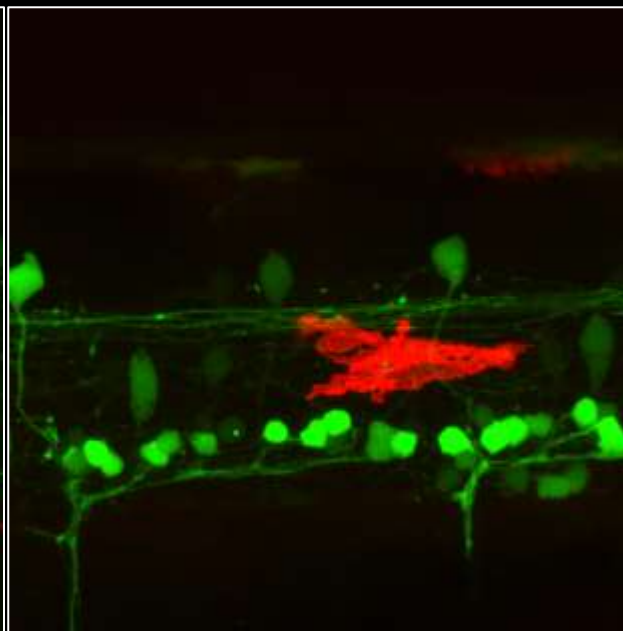
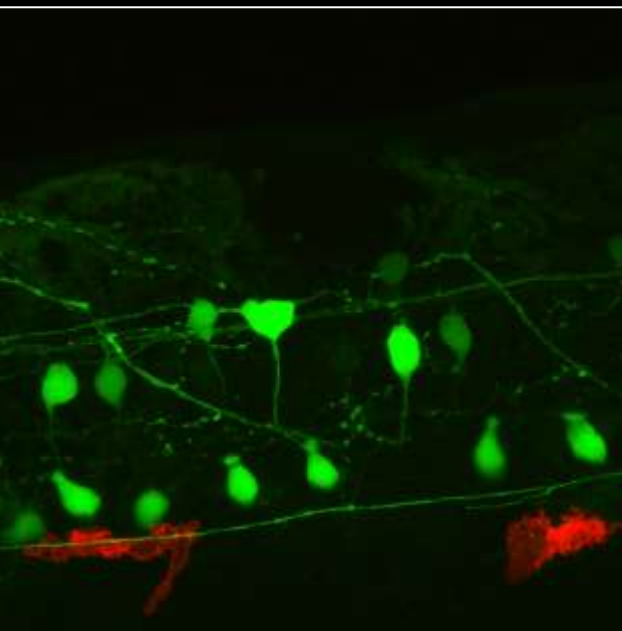
# Refinement

- Refinement is any decrease in the incidence or severity of 'inhumane' procedures applied to those animals that still have to be used
- Most procedures in embryonic zebrafish are non-invasive and only require light anaesthesia





motor neurons/ microglia



# Points to be aware of

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- Constraints on the use of zebrafish
  - looks like high number of animals
  - majority are embryos/larvae under 5 days post-fertilisation (dpf)
- Issues arising from using zebrafish as research models
  - fish under 5 dpf are still developing
  - check the conservation of your organ, structure, tissue, gene
- Impact of research protocols
  - protocols involving fish older than 5dpf (keeping records, use of adults)
  - experimental end points
  - age of adult fish
  - investigators should be aware of signs of disease,
  - housing of adult fish in appropriate tanks with free flowing water
- **An open conversation between investigators and the AEC**



# Acknowledgments and Questions

Nicholas Cole  
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Robyn Gentle  
The zebrafish