



# Health monitoring of fish used in research



Gardermoen, Norway 23. May 2005

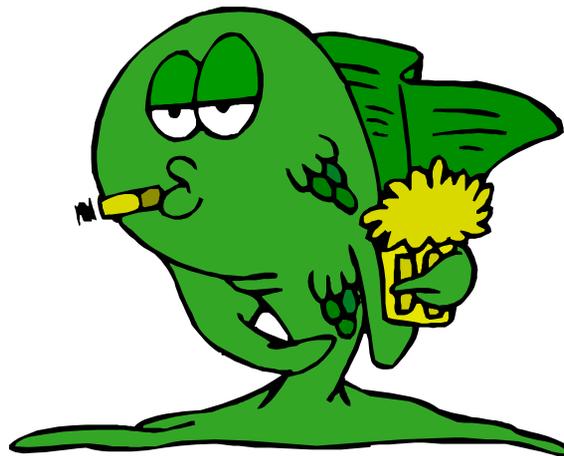
Renate Johansen

Norwegian School of Veterinary Science

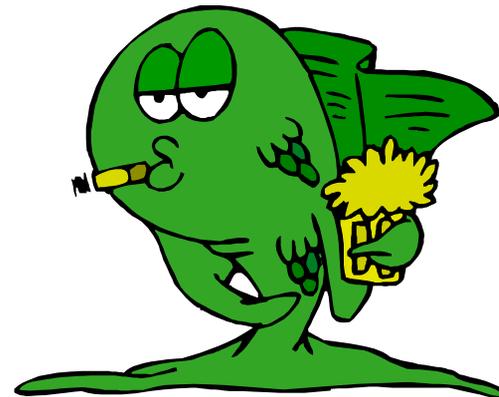
# Health monitoring of fish used in research

What's the point?

We use only healthy fish in our research,  
don't we?



1. What do we know of the health status of the fish that we use in research?
2. What should we know of the health status of the fish that we use in research?
3. Why is it so important to know the health status of the fish that we use in research?



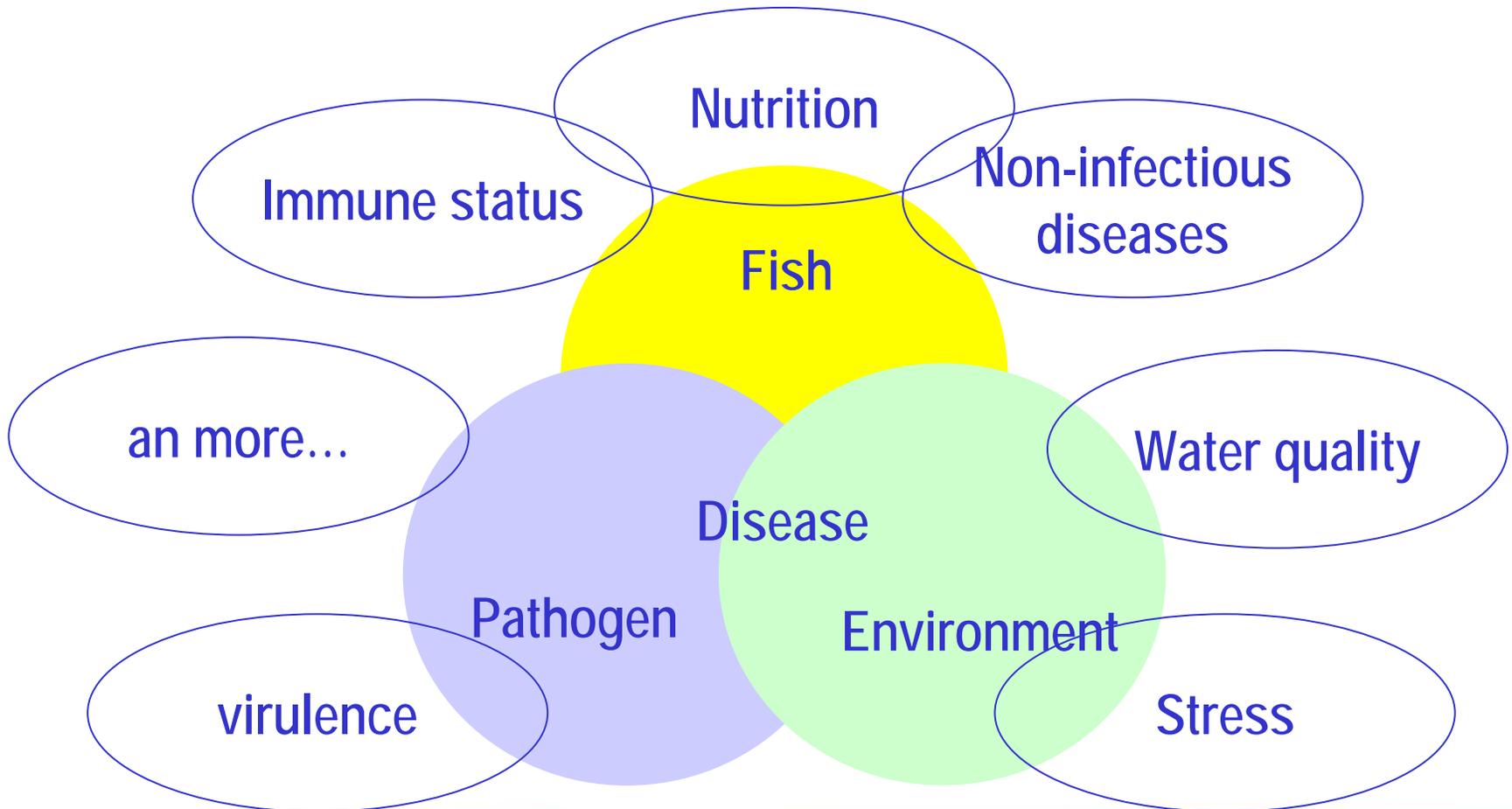


# Main aims of health monitoring

- **Avoid sick (clinically diseased) fish**
  - Before the start of the research
  - At the start of the research
  - During our research
- **Knowledge of the health status of the fish**
  - Fish showing no signs of disease are not necessarily “healthy”
  - The health status of the fish has a major effect on our research results



# Health monitoring





## What is the problem with health monitoring of fish?

- **Detection methods**
  - Pathogens
  - Infectious diseases
  - Non-infectious diseases
- **Knowledge of infectious agents**
  - Sources of infection
- **Knowledge of the pathogenesis of diseases**
  - May not be possible to obtain fish without diseases
  - How do the disease effect our research?
- **We need guidelines!**

# How do we monitor fish health

- Behaviour / clinical signs / appetite
- Mortality rate
- External examination
- Age / Size / Growth rate
- Detection of pathogens
- Detection of diseases
- Immune status
- Rarely used examinations:
  - Faeces, blood samples, skin mucus, etc.



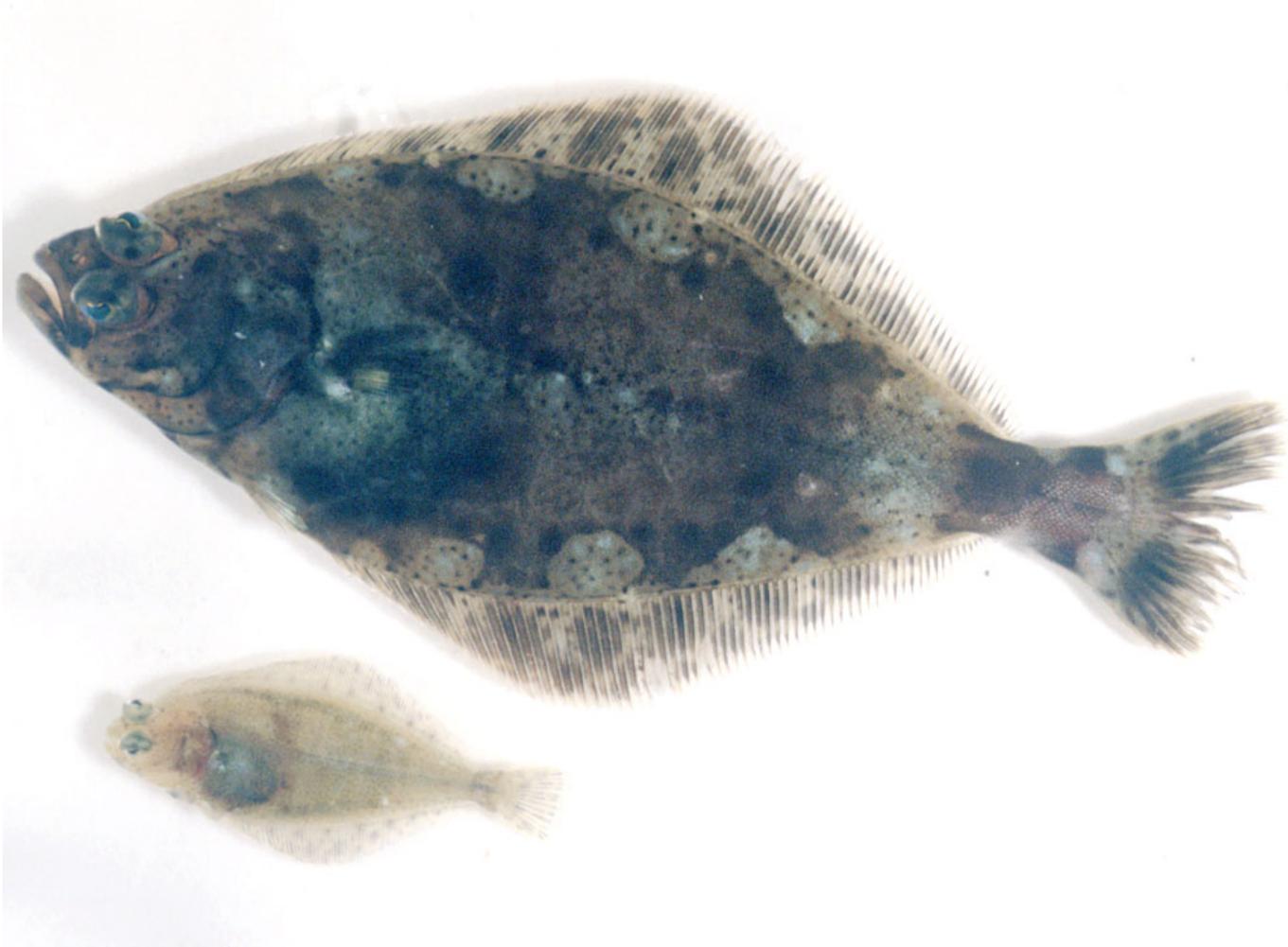
## Selection of healthy fish

- Selection of fish species
- Selection of fish farm
- Selection of fish group
- Selection of fish size and age
- Selection of clinically healthy fish
- Selection of pathogen free fish
- Selection of fish without diseases

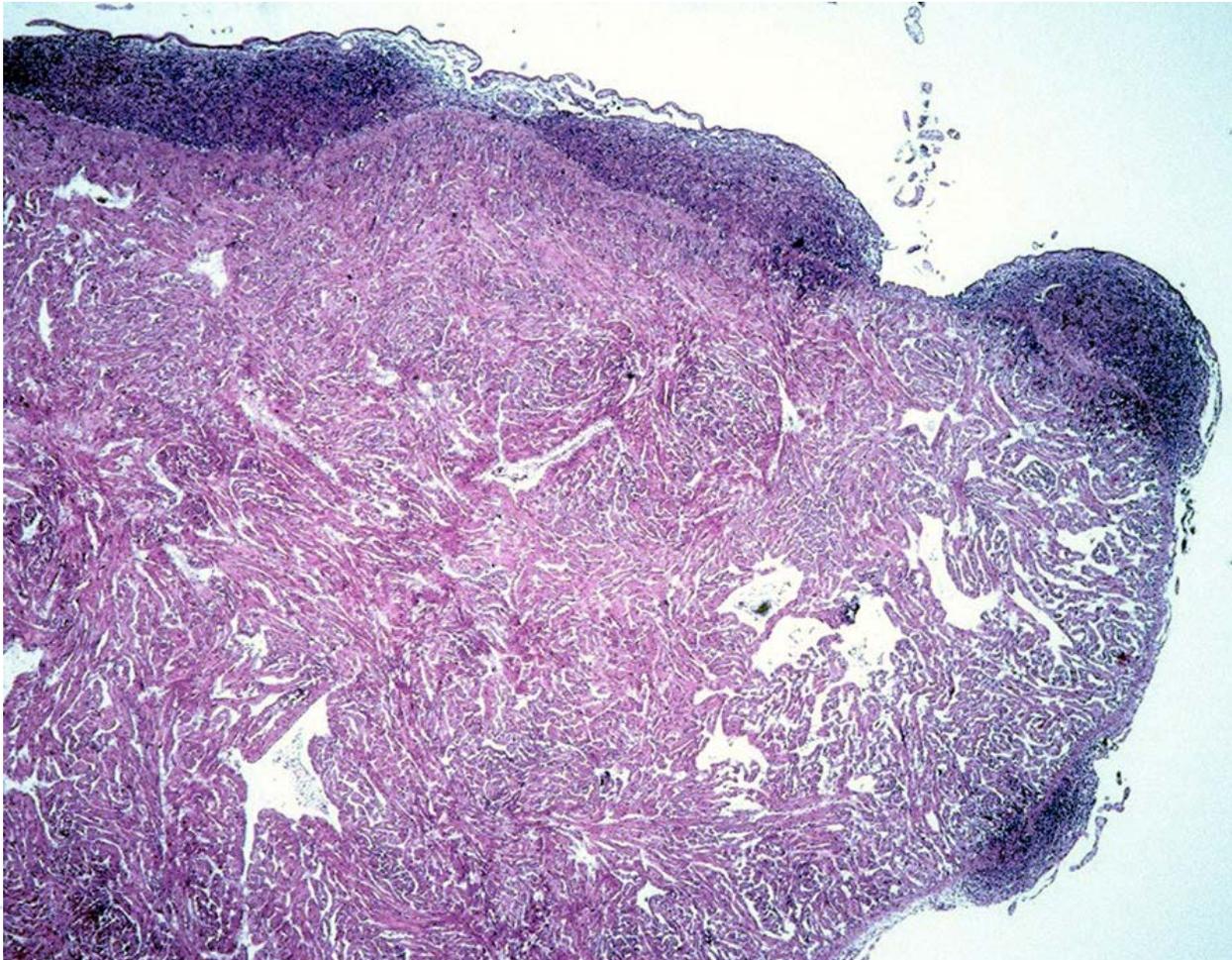


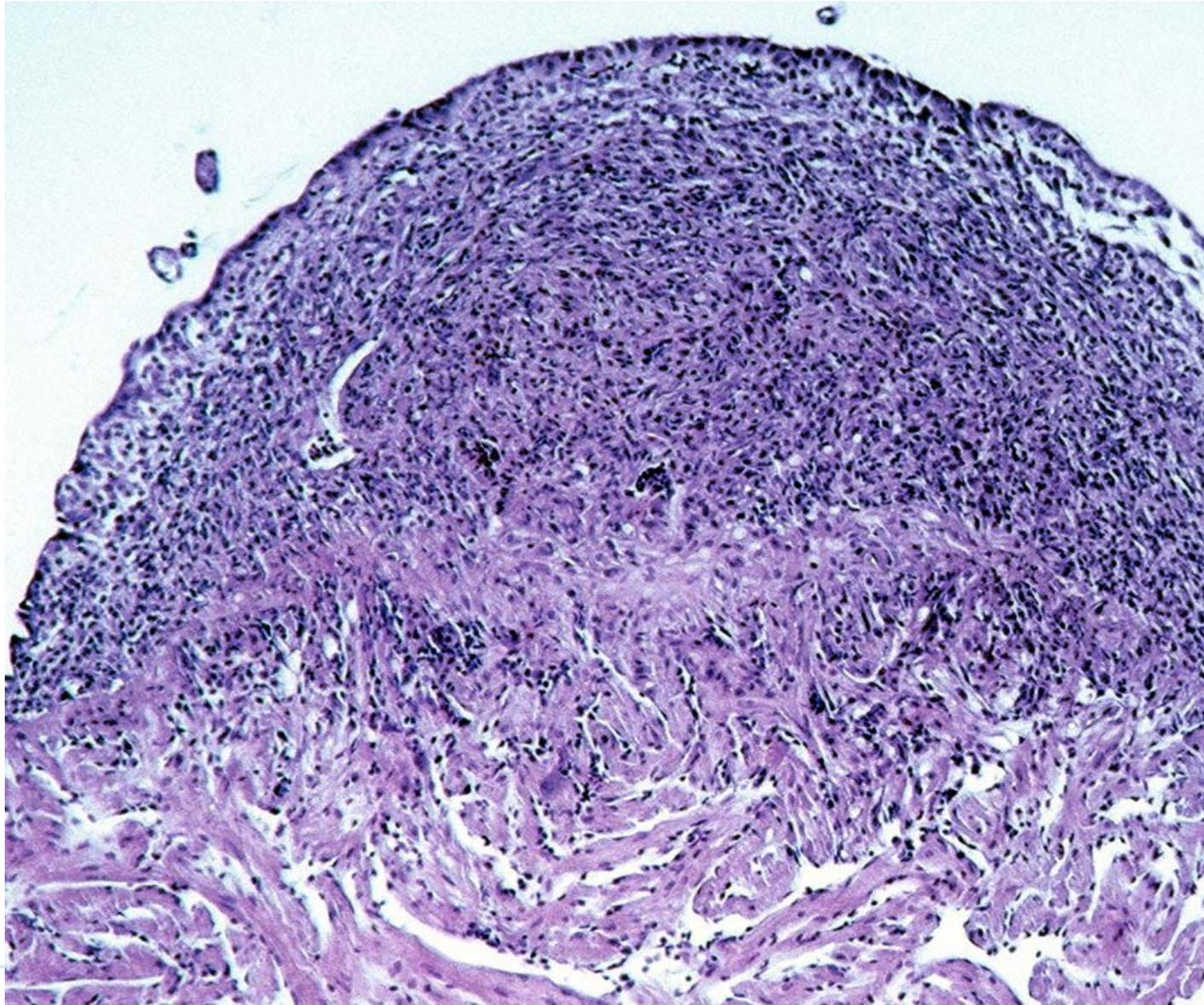
....healthy fish were randomly sampled  
at a commercial fish farm...

# Selection of fish size



# Epicarditis and myocarditis in farmed Atlantic halibut







## Two studies of heart inflammation (epicarditis) in **clinically healthy** farmed halibut

Halibut	Epicarditis Farm I	Epicarditis Farm II
Low growth rate	4% (1/23)	10% (1/10)
High growth rate	45% (25/55)	90% (18/20)

Farm I: Johansen et al. (2004)

Farm II: Johansen and Poppe (2002)

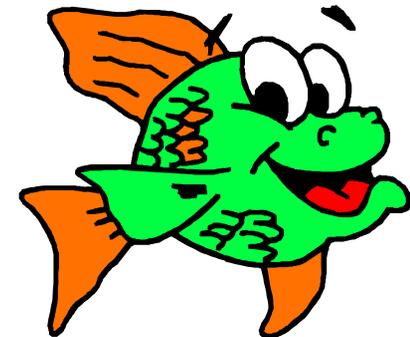


## Selection of fish size and age

- Fish of same age may have different size
- Fish of same size may have different age
- Sampling of fish of only ONE size in a fish group of the same age, may not provide a representative selection of the fish group
- **Selection criteria need to be thought through and documented**

## Selection of pathogen free fish

- Pathogens are often easy to detect in clinically disease fish
- Pathogens are often difficult to detect in **subclinically infected fish**
  - Limitation of detection methods
    - New molecular methods
  - Prevalence may be low
    - May have to examine all fish
  - Stress test
    - May change the subclinical stage into an acute stage where the pathogen can be detected





## Why do we need to avoid fish with subclinical infections?

- A subclinical infection may develop into an acute disease outbreak
- A subclinical infection may either have a positive or a negative effect on the general health status
  - One infection may provide protection against a secondary infection or *visa versa*
- **May not be possible to avoid, but it is of major importance that these infections are documented**

# Selection of fish without diseases

- We do not use clinically diseased fish
  - What about fish that has survived disease outbreaks?
  - How has earlier diseases affected the general health status of the fish
- **“Sub-clinical”** diseases may be difficult to detect
  - Subclinical infections
  - Inflammations
  - Deformities and “abnormalities”
  - Other



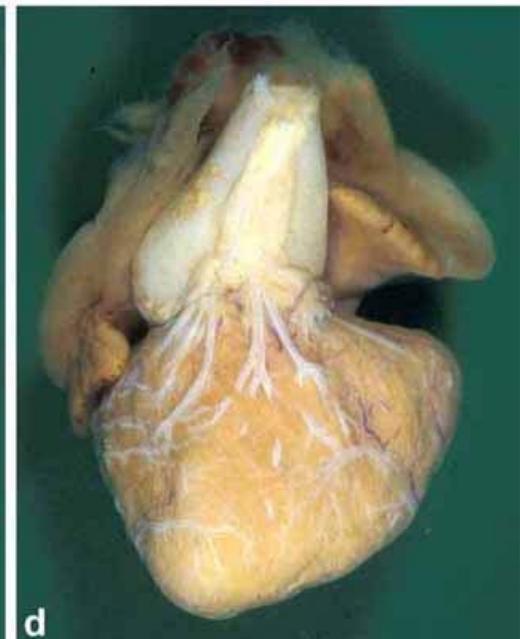
## “Normal” hearts from “healthy” farmed salmonids



## Wild Rainbow trout



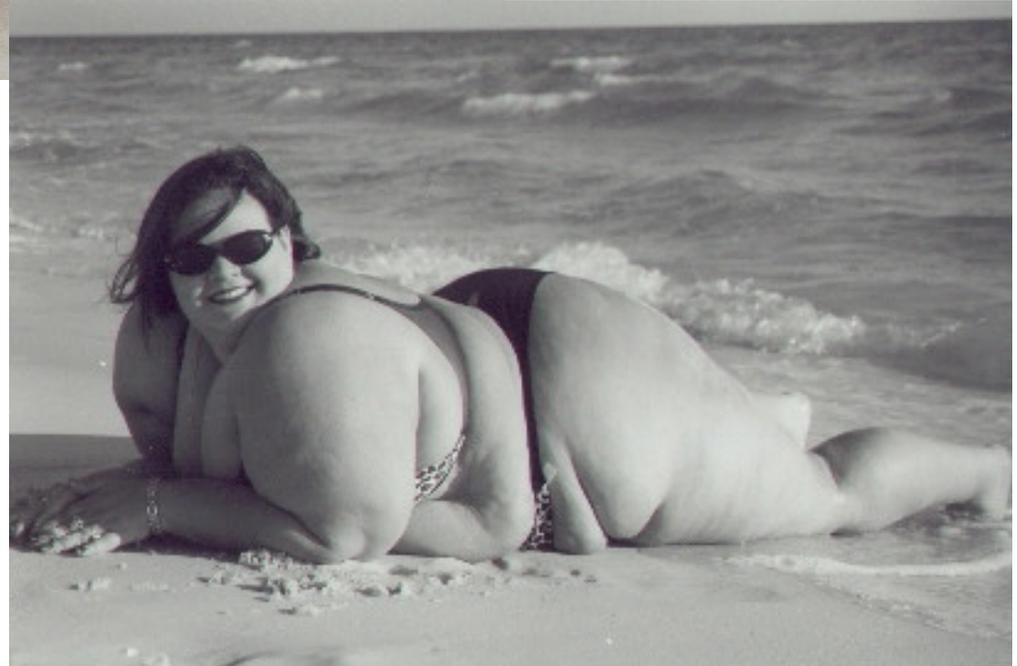
## Farmed Rainbow trout





Overweight?

What is normal?

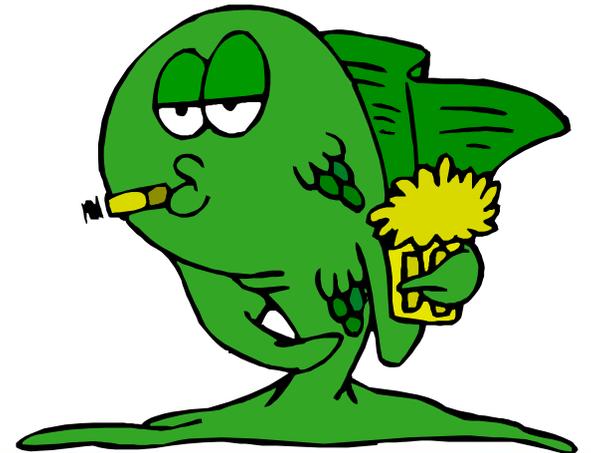


## Summary:

Commercial farmed fish are not pathogen-free and there is a large variation in the health status of the fish



How do we live with this situation?



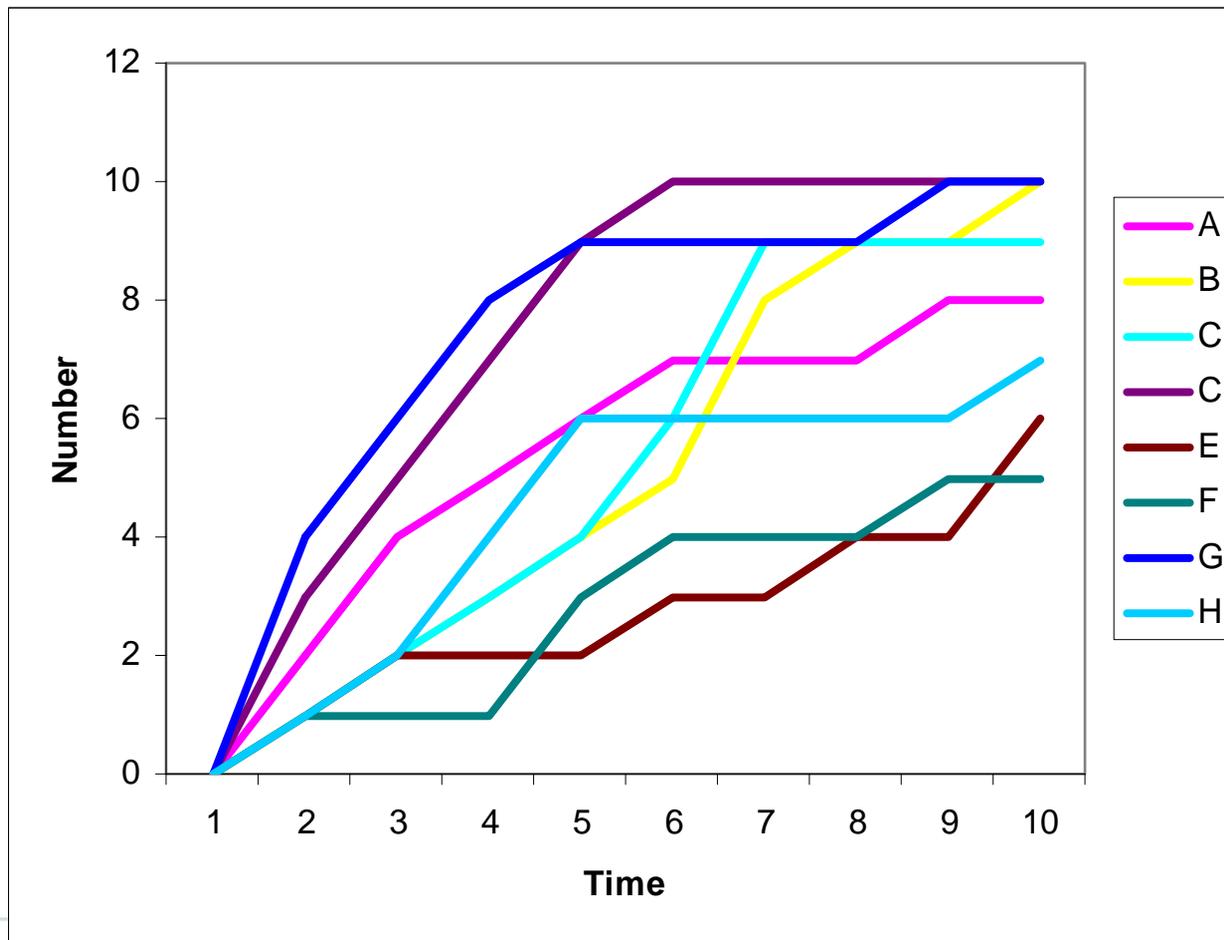


If you get the results that you want  
don't repeat the trial or test because  
you will most likely get a different result

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# Large fish trials where all factors are tested on the same fish group at the same time





## Goals for the future

- **Standardisation of the fish that we use in research**
  - Genotype
- **More information on the fish that we use**
  - Background information
  - Health status
- **Standardisation of fish models**
  - Challenge models



# Reporting the health status

- **Selection criteria**
  - Which fish were included or excluded etc.
- **Data on how the health has been monitored before and during the research period**
  - Number of inspections, what test were used, validation of the test is important
- **Results of the health monitoring**
  - Detection of pathogens, water quality etc.
- **Discussion**
  - Any possible effects on the results of the research



## The need for health monitoring may vary in different types of research

- Different fish species need different monitoring
- Different research models need different monitoring
  - In challenge trials freedom from pathogens may be important
  - When testing vaccines it is of major importance that the fish are not infected with the pathogen that the vaccine is aimed at
  - When investigating feed components, an intact pancreas may be of importance
  - In toxicological tests normal gills may be of major importance



## Conclusion:

We need guidelines for health monitoring  
of each fish species  
in each type of research

Two papers in preparation:

“Health and welfare monitoring of fish used in research”

“Disease monitoring of Atlantic salmon (*Salmo salar*) used  
in research related to aquaculture”

A lot more papers are needed on this subject!



The aim should be to obtain as much  
information as possible  
from each fish used in research

Harmonisation on health monitoring  
of the fish that we use in research is  
**ONE** of several necessary steps

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Thank you for your attention!

