FACULTY OF VETERINARY MEDICINE
accredited by EAEVE

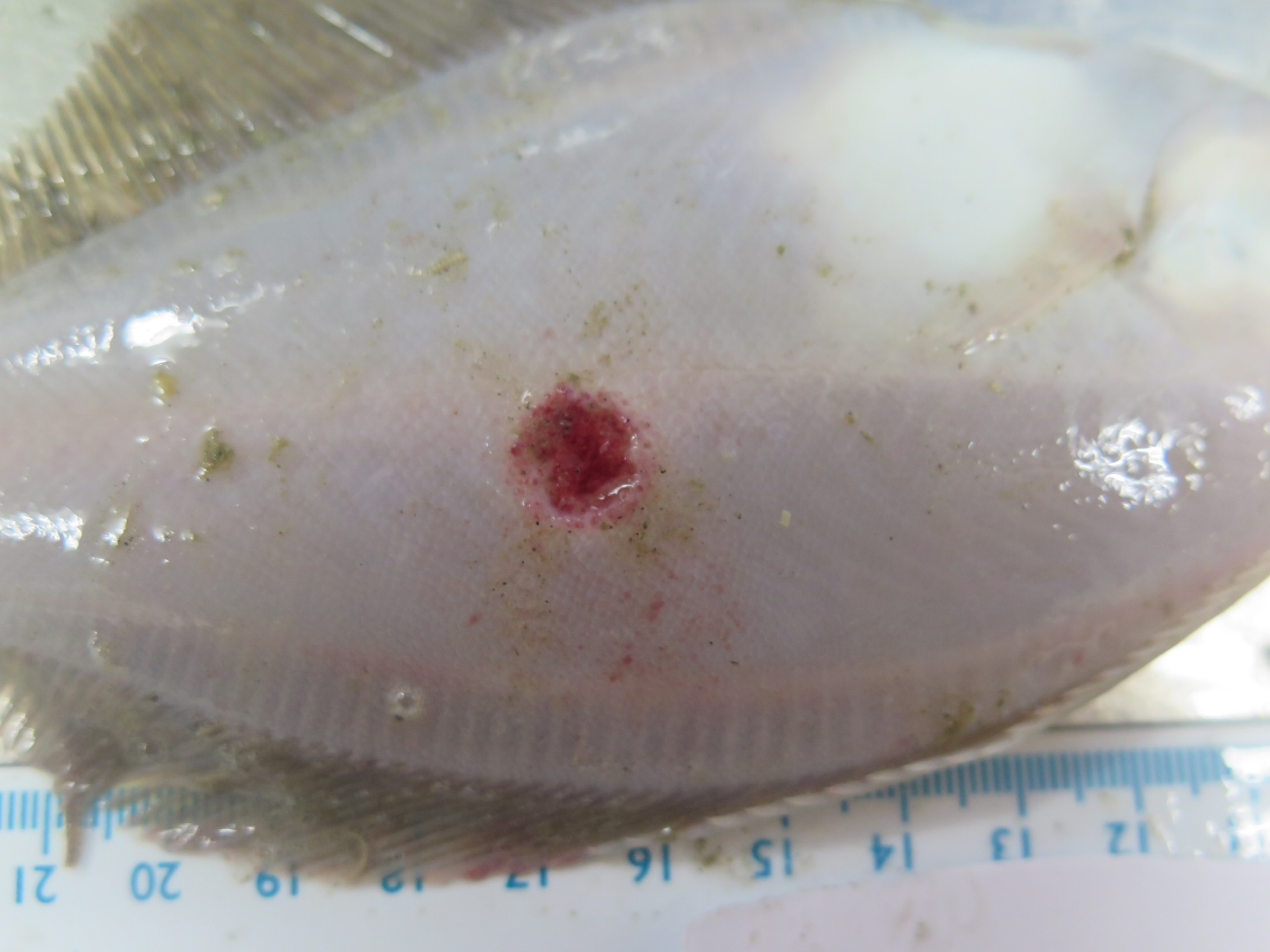
Department of Pathology, Bacteriology and Avian Diseases

# WORKING WITH WILD-CAUGHT FLATFISH

GHENT UNIVERSITY

Fish Welfare Mini Symposium – 29/11/2019

Common dab – *Limanda limanda*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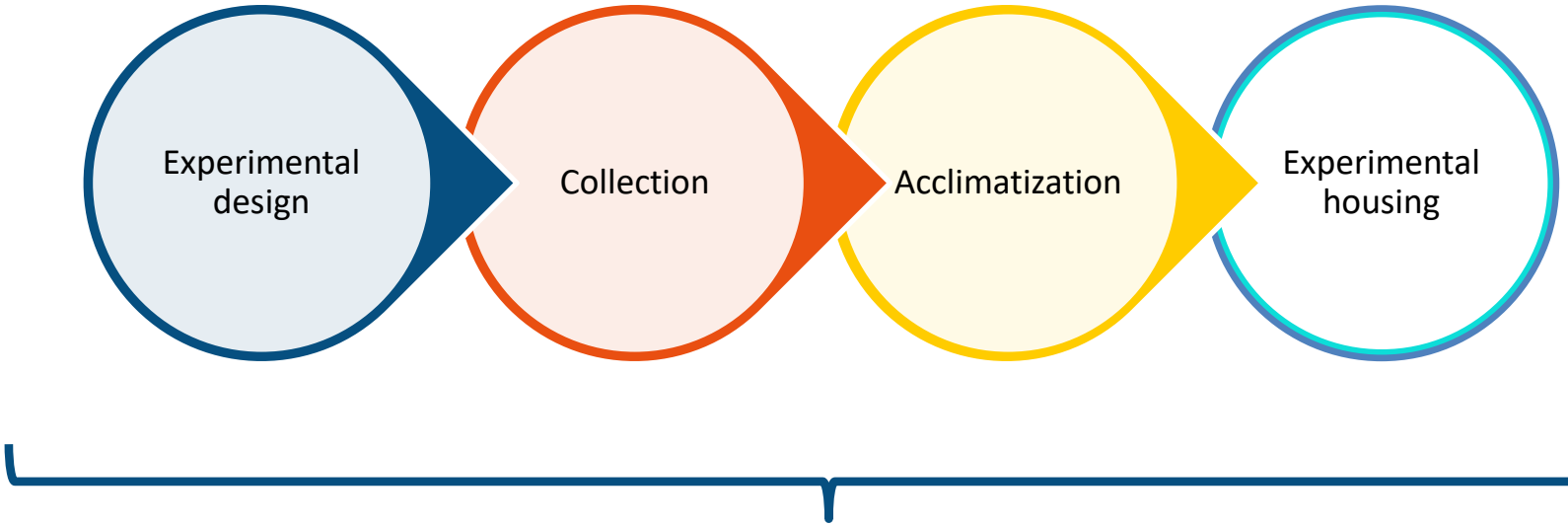
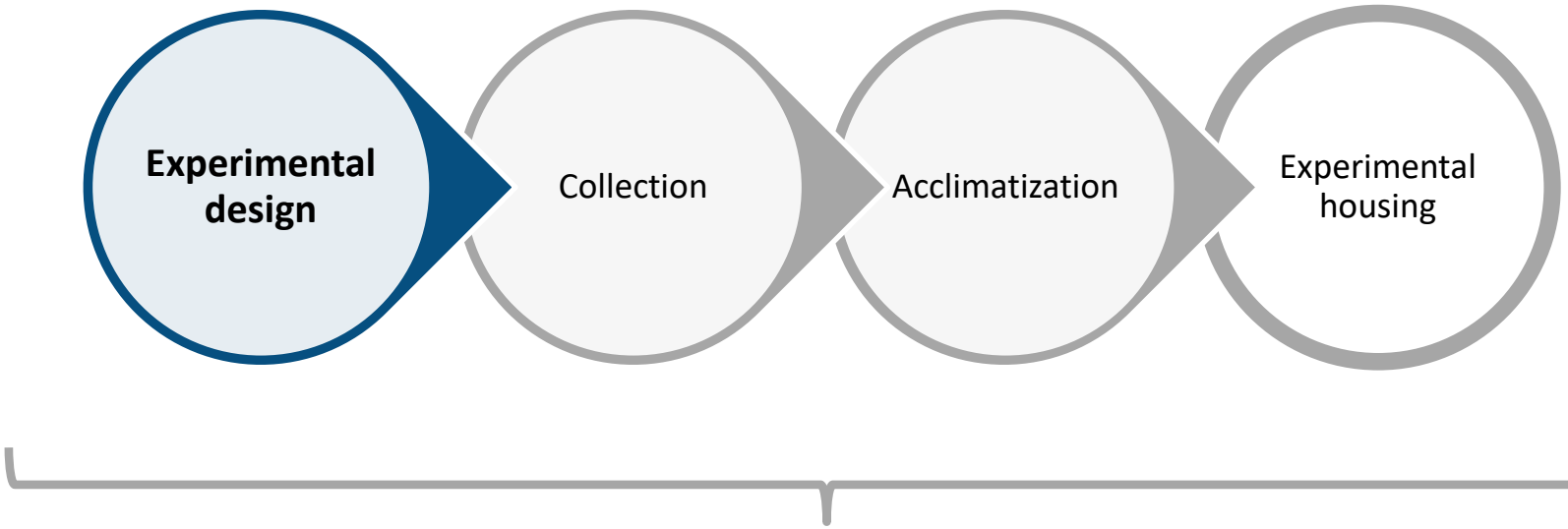
21

Working with wild-caught flatfish in experiments

# TWO SIDES OF THE STORY




**CONTROL THE ANIMAL WELFARE DURING EVERY STEP!**

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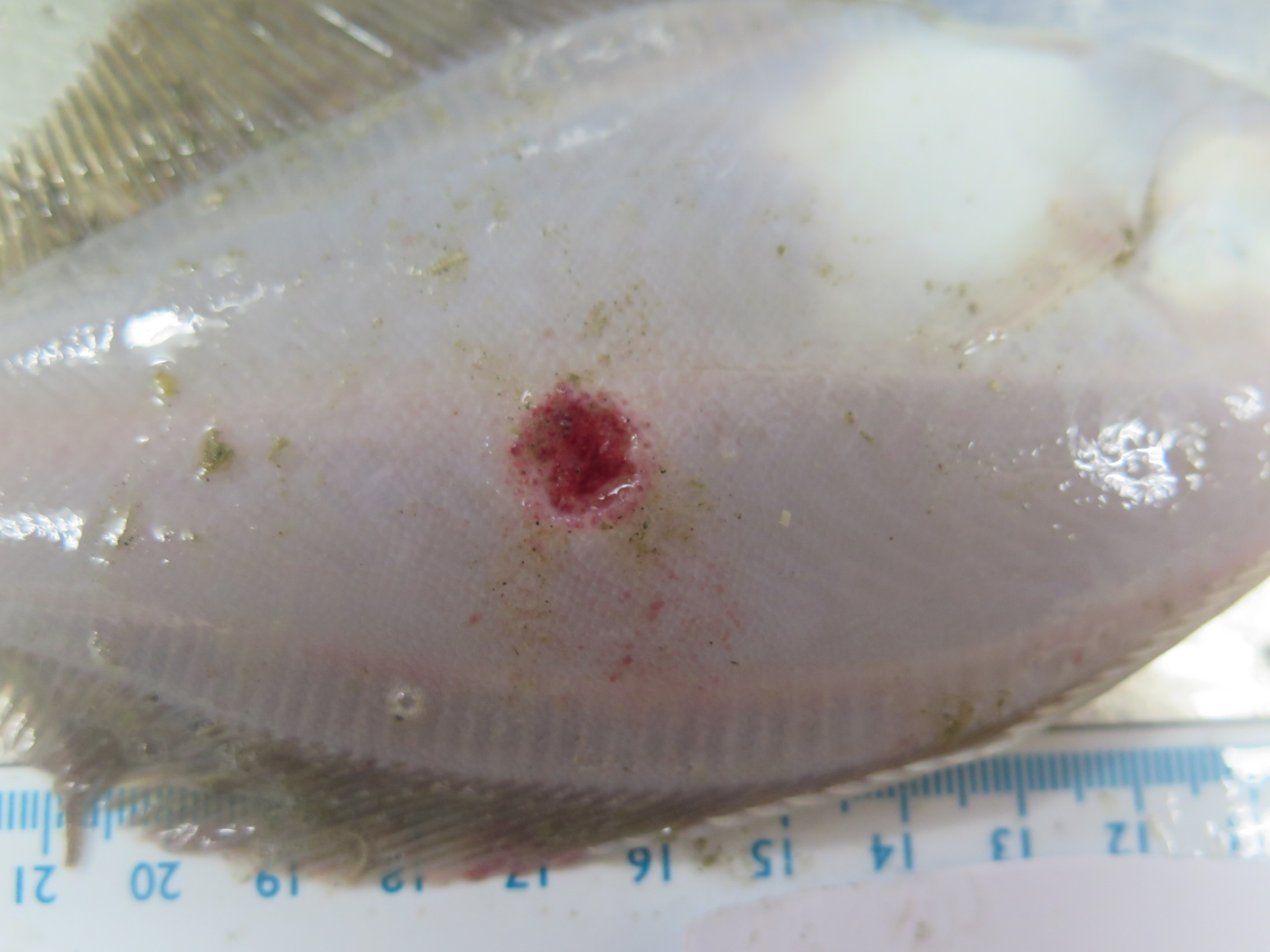
12
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# Role of bacteria in skin ulceration development

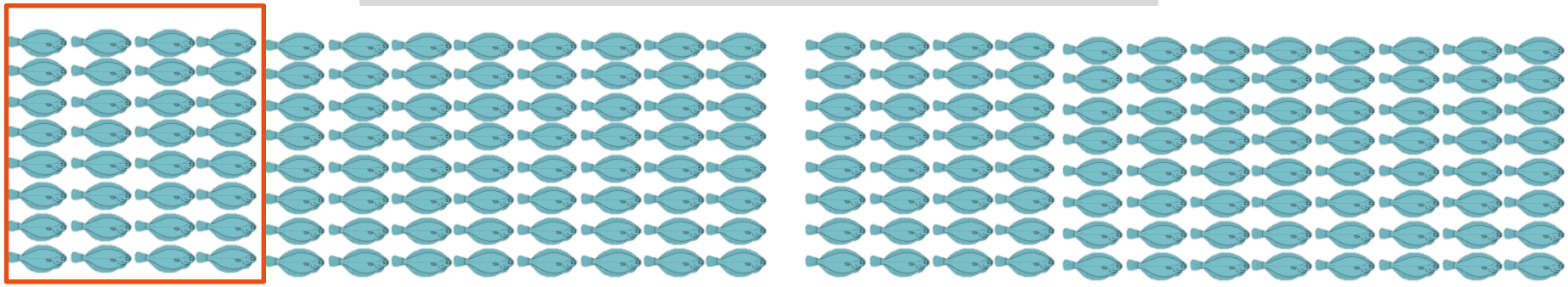
Bacterial infection

Mechanical | Chemical | None

Sham treated control

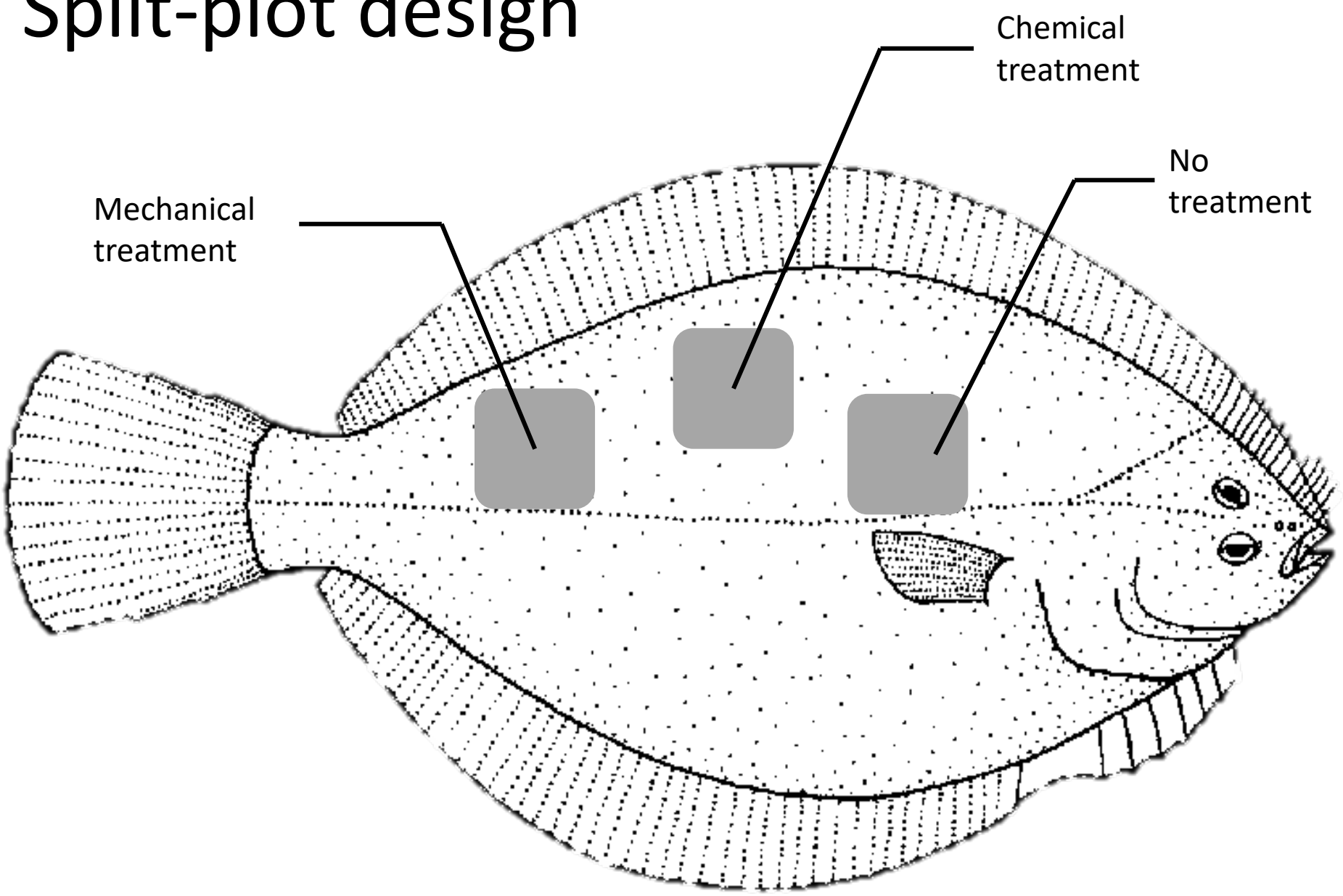
Mechanical | Chemical | None

Power analysis:
32 fish per group



**TOTAL: 192 FISH**

# Split-plot design



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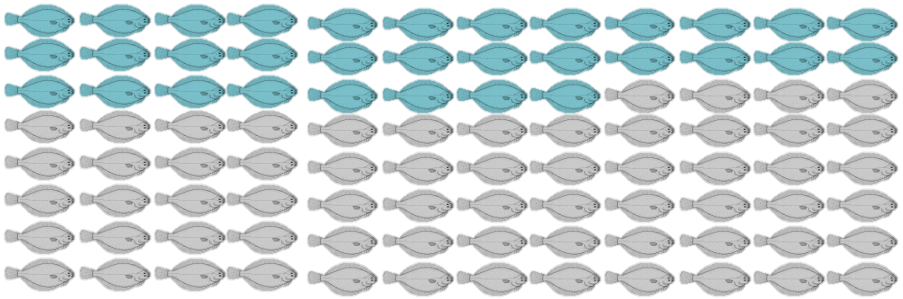
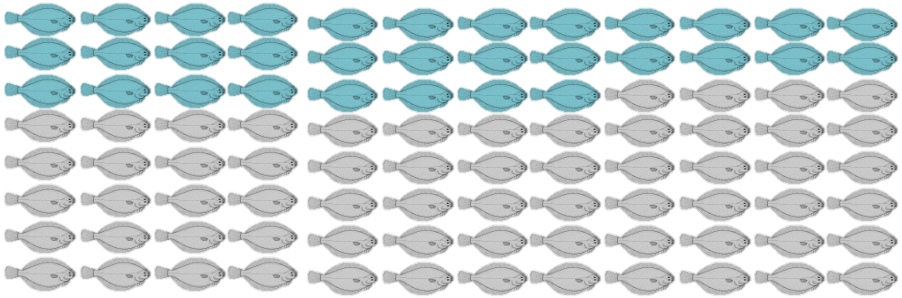
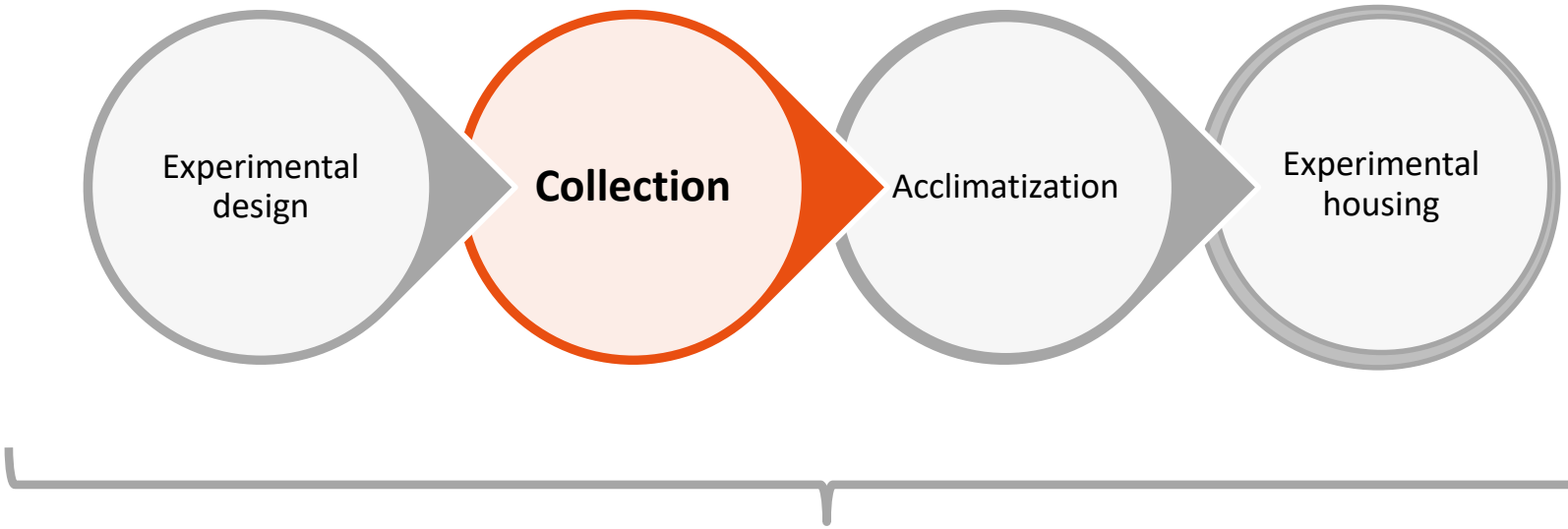




**TOTAL: 64 FISH ➔ Reduction**

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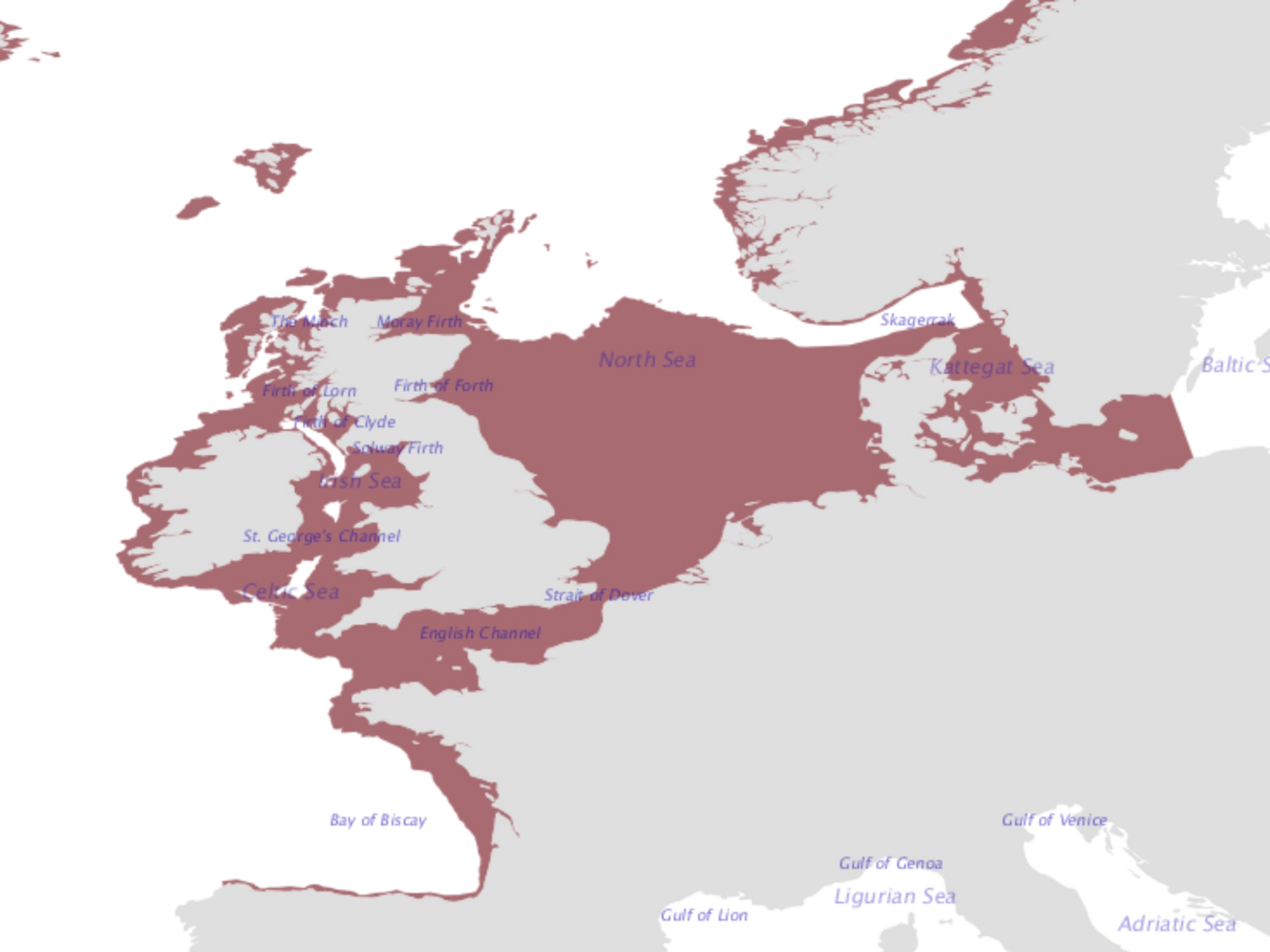
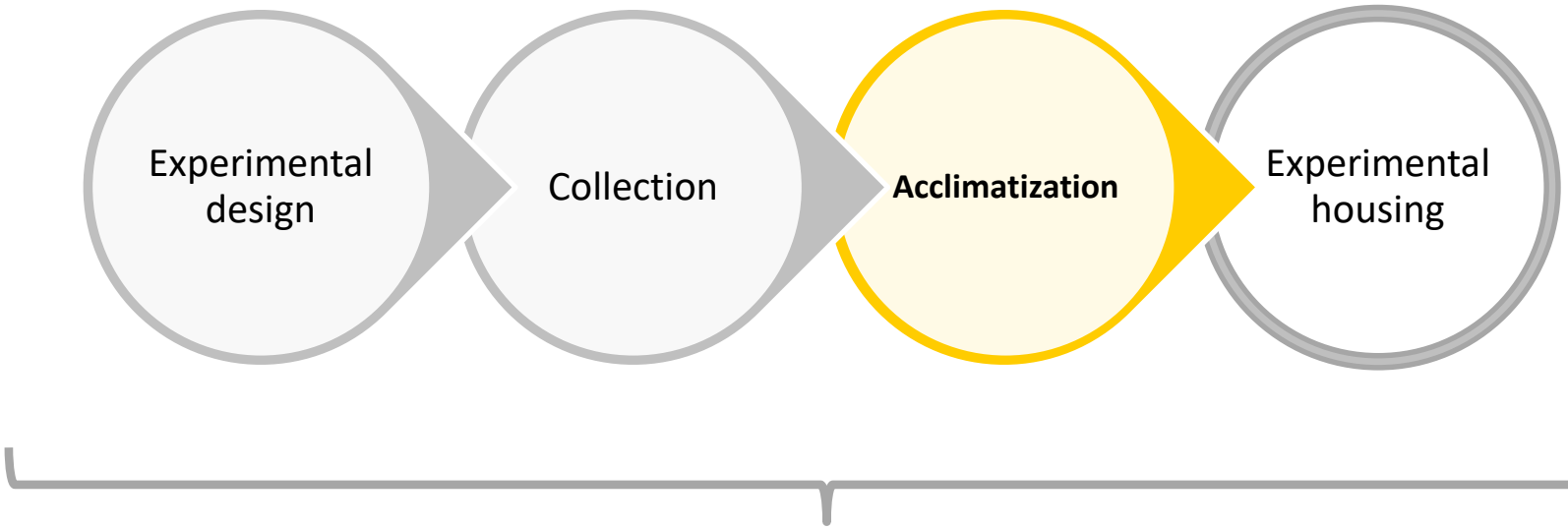

The Minch
Moray Firth
North Sea
Skagerrak
Kattegat Sea
Baltic S
Firth of Lorn
Firth of Forth
Firth of Clyde
Solway Firth
Irish Sea
St. George's Channel
Celtic Sea
Strait of Dover
English Channel
Bay of Biscay
Gulf of Venice
Gulf of Genoa
Ligurian Sea
Gulf of Lion
Adriatic Sea

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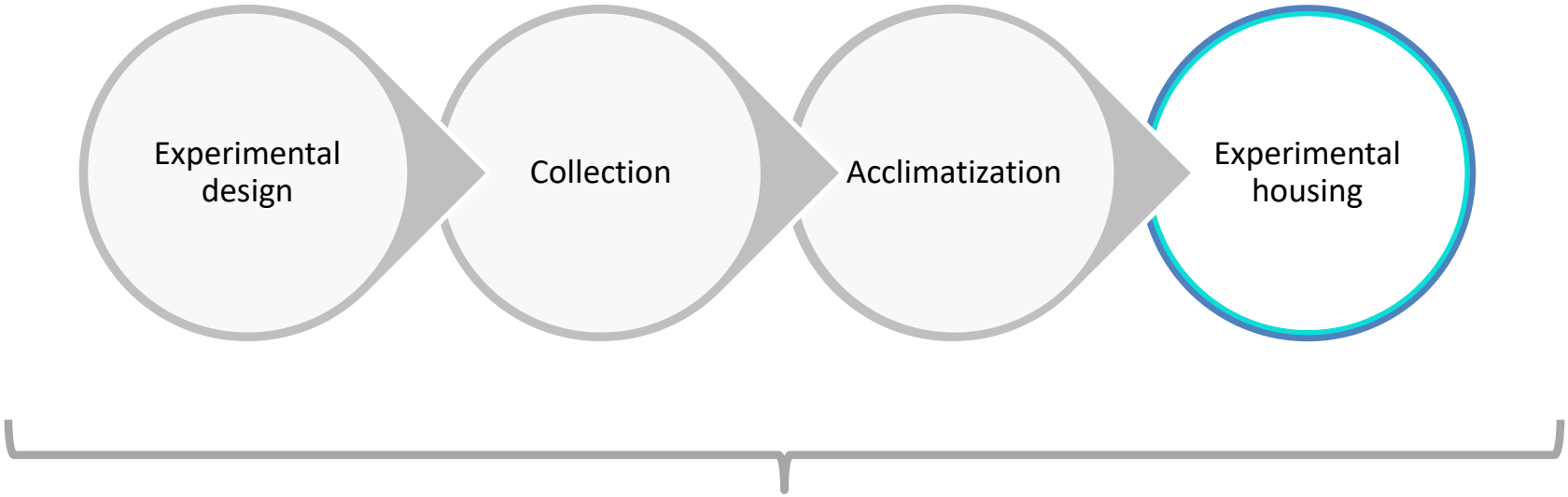
5

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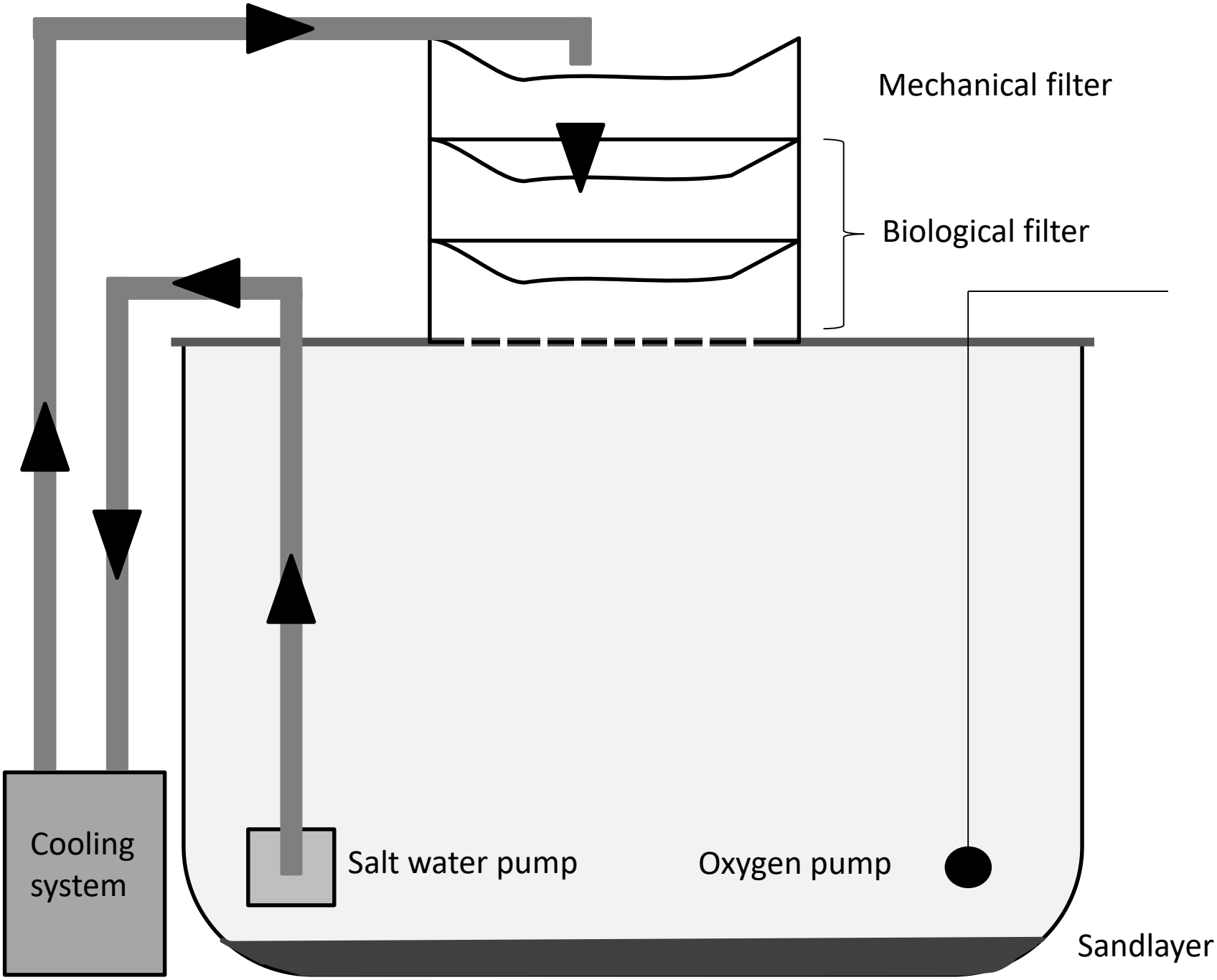
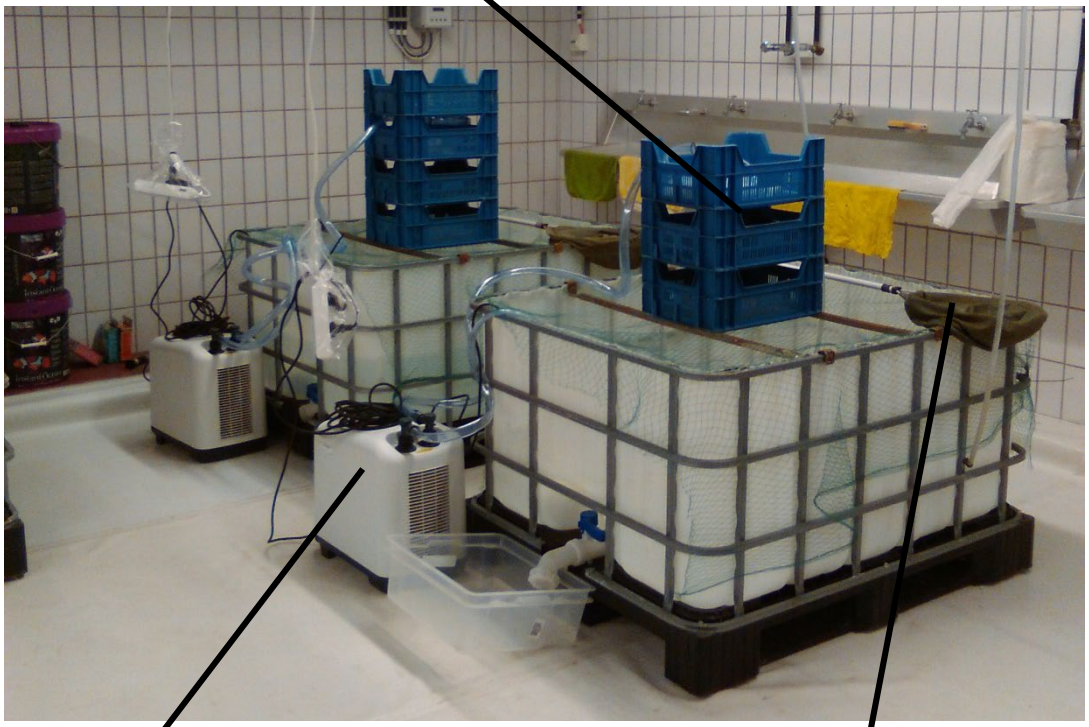

Mechanical filter
Biological filter
Cooling system
Salt water pump
Oxygen pump
Sandlayer

Mechanical and biological filter



Cooling system

Seperate net for each tank

# Sandlayer

**PROS**

- Natural habitat of fish
- Offers opportunity for normal behavior
- Enrichment
- Less skin lesions (blind side) and pigmentation disorders compared to smooth PVC tanks
- Better growth
- Less aggression

**CONS**

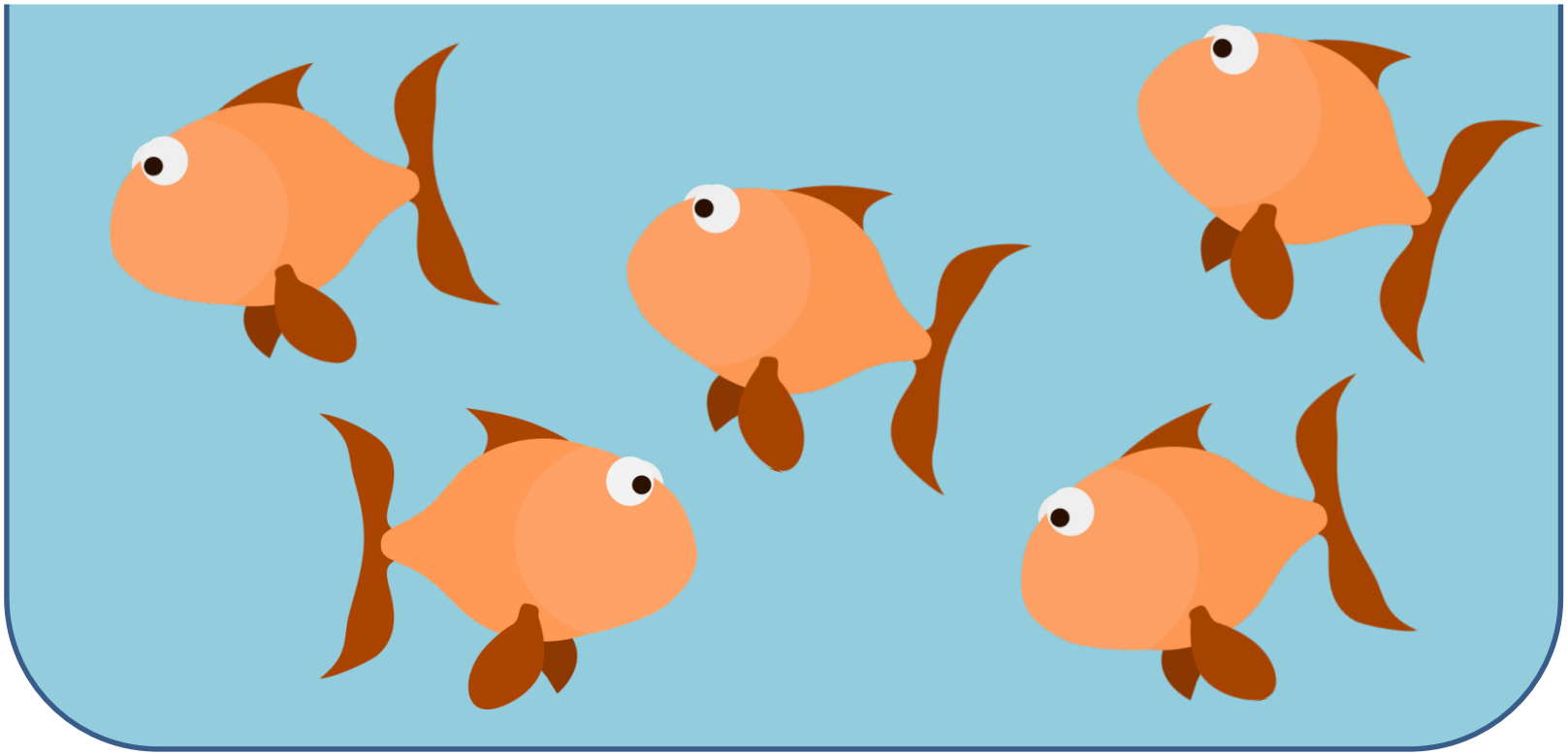
- Difficult for maintenance
- Potential source for reduced water quality and bacterial bloom

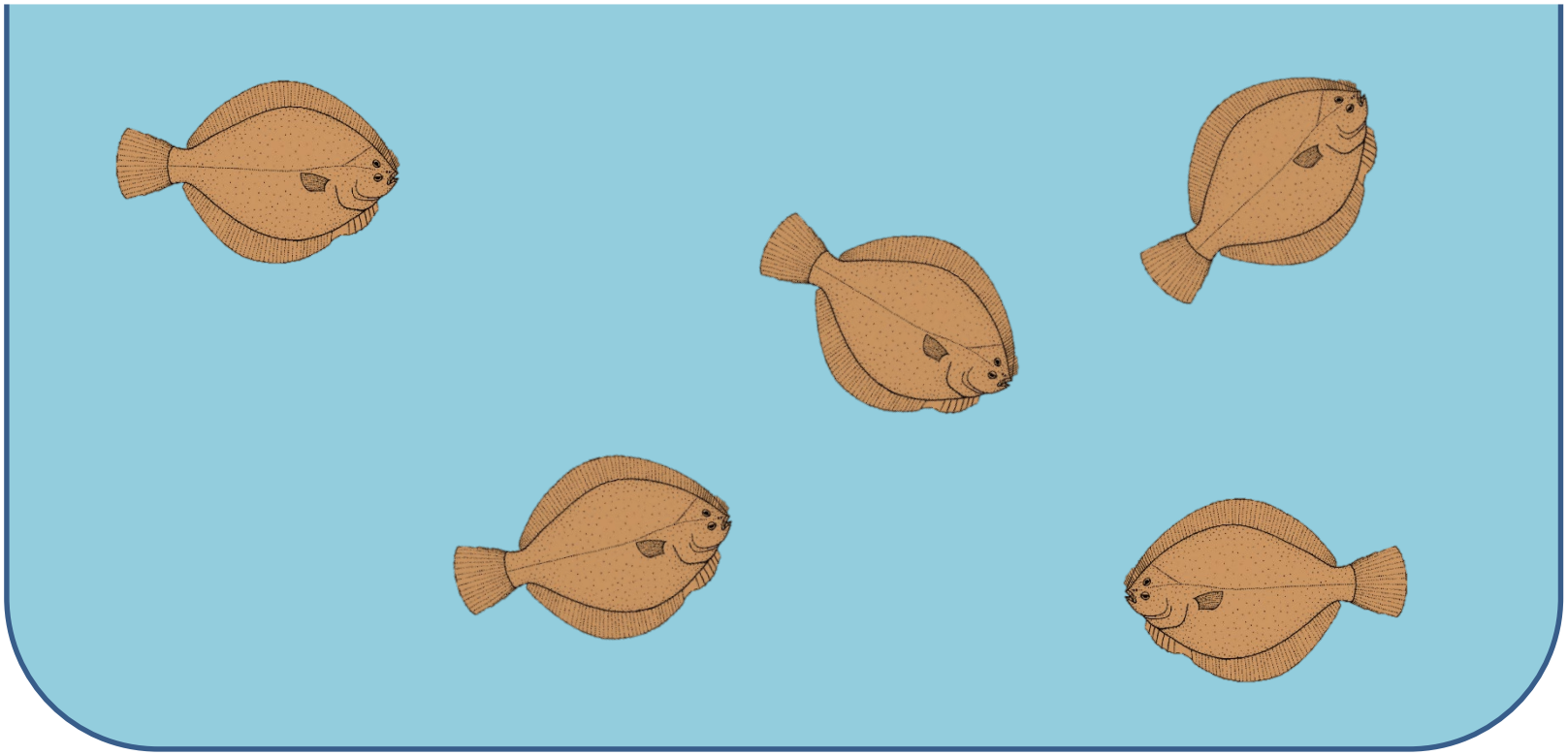
(Ottesen and Strand, 1996)

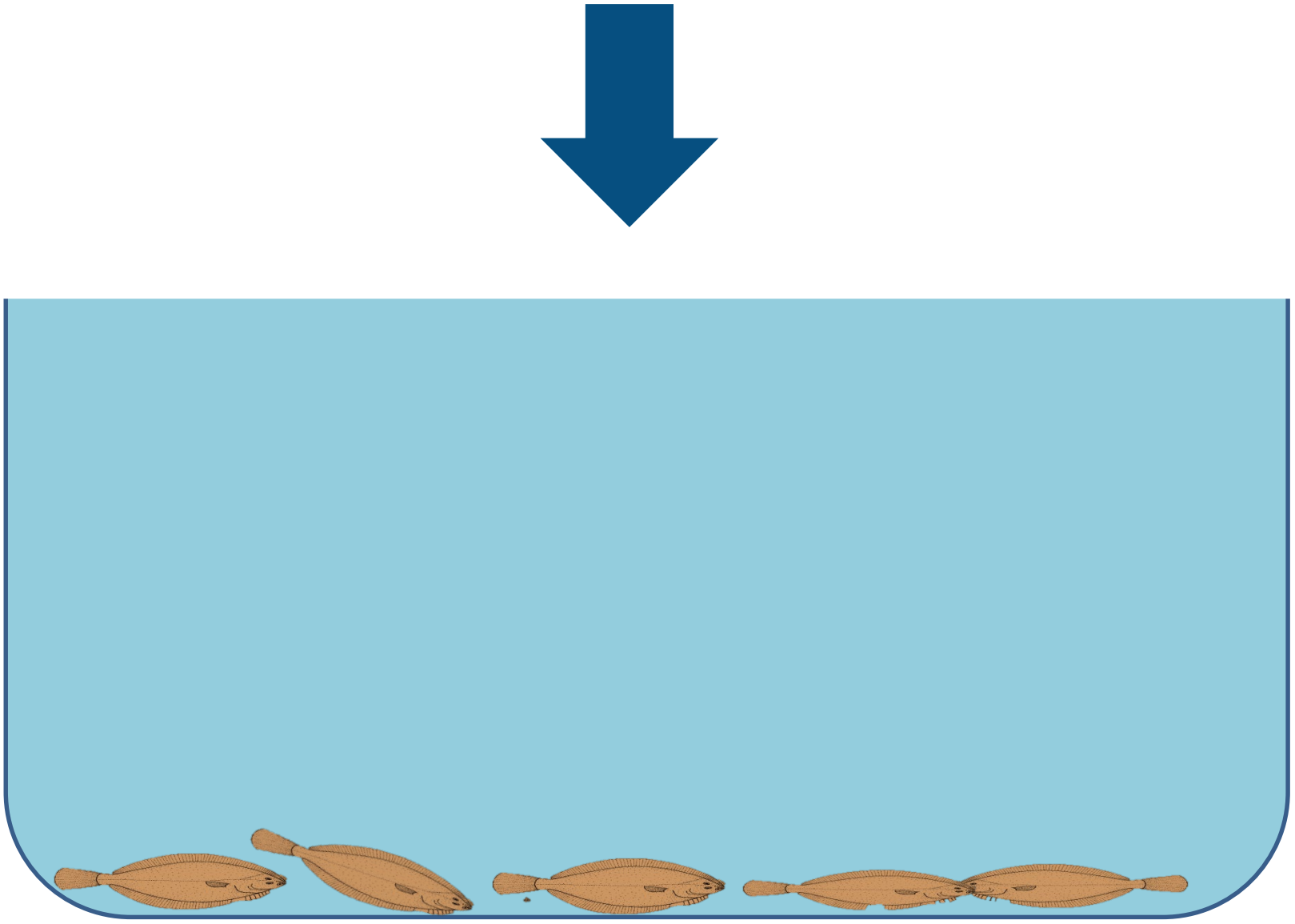
# Stocking density:

number of fish / $m^3$

$kg/m^3$



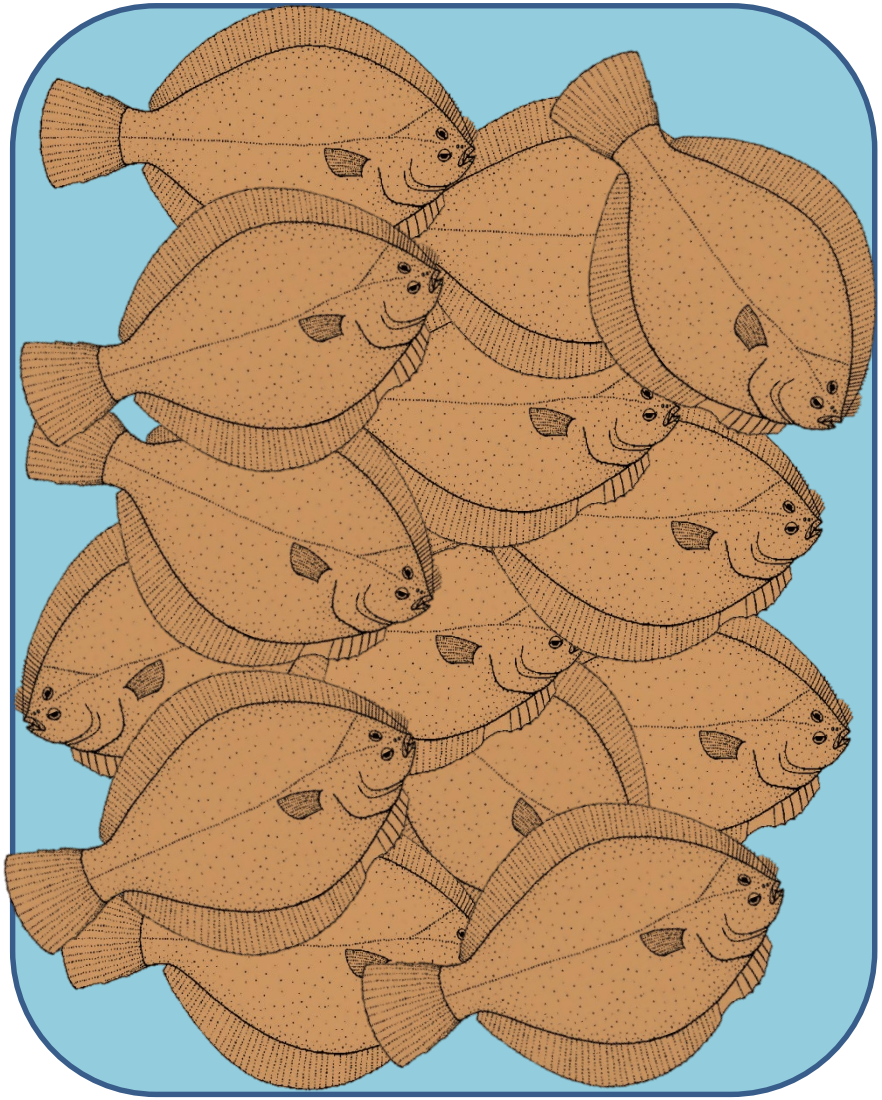


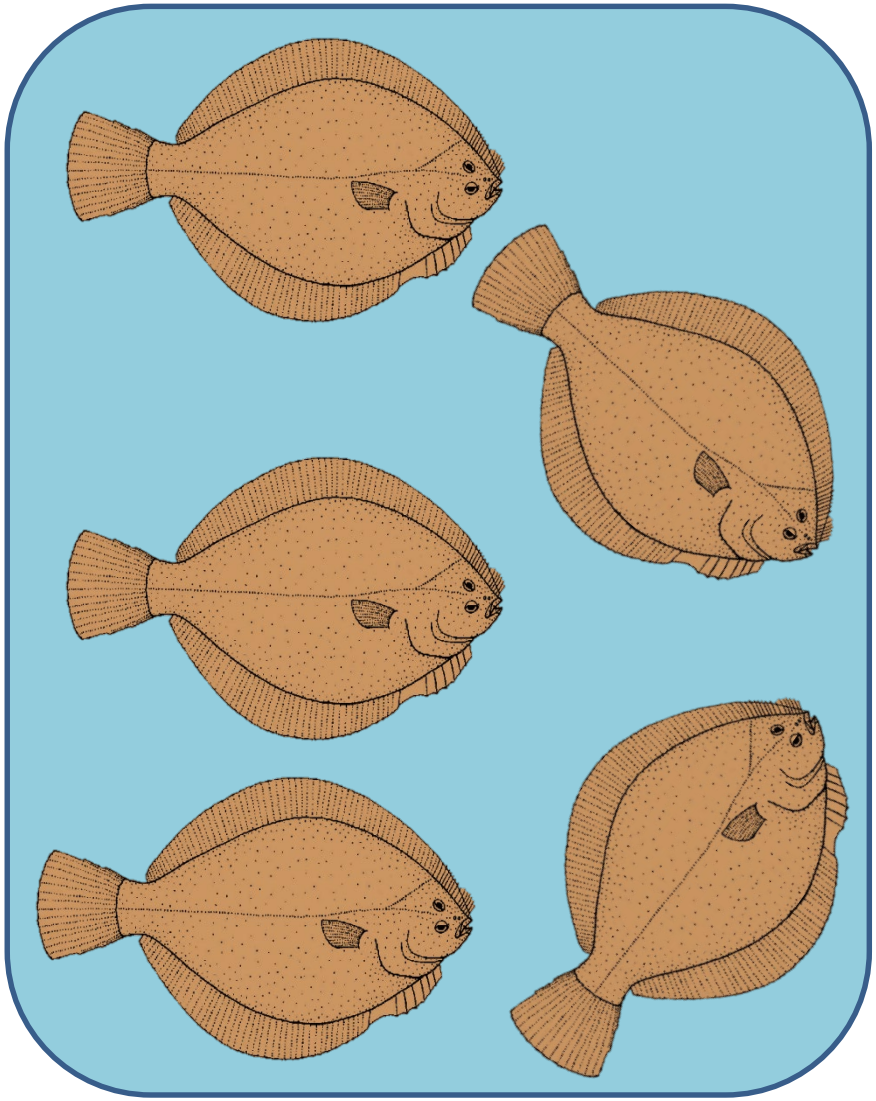


**Stocking density:**

number of fish /$m^2$

$kg/m^2$



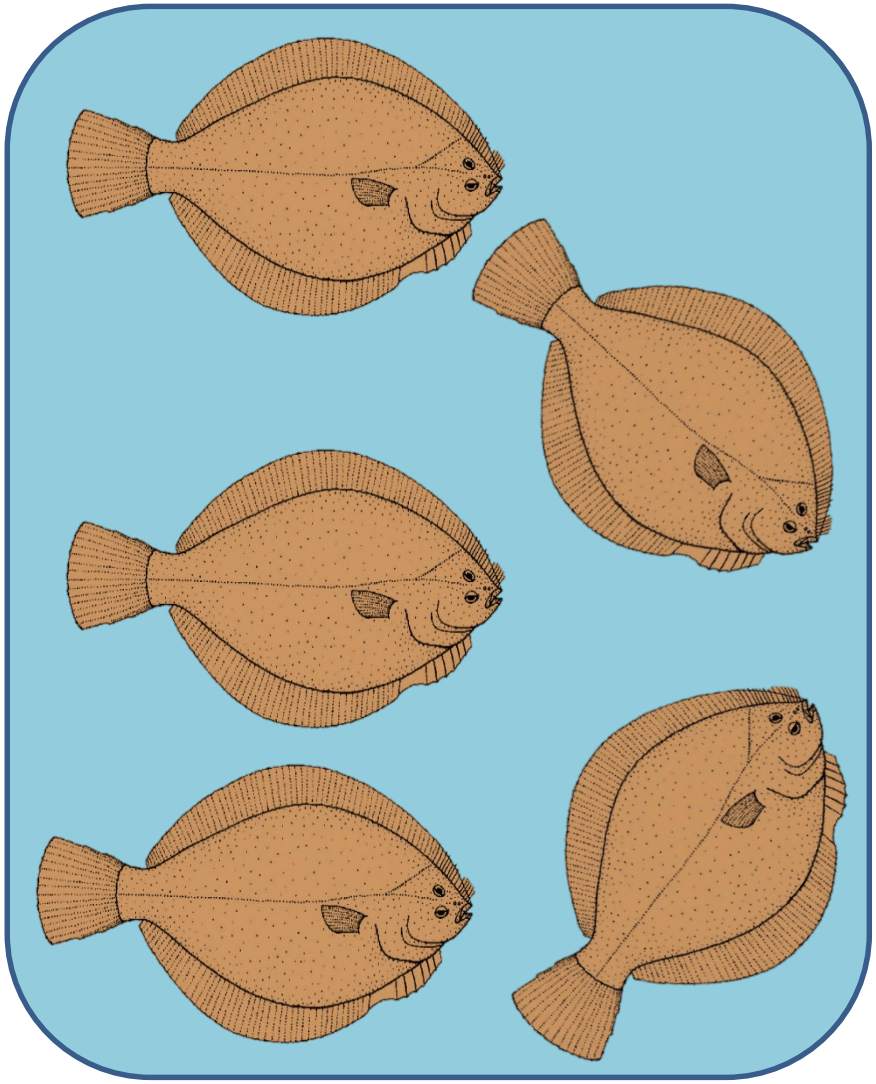


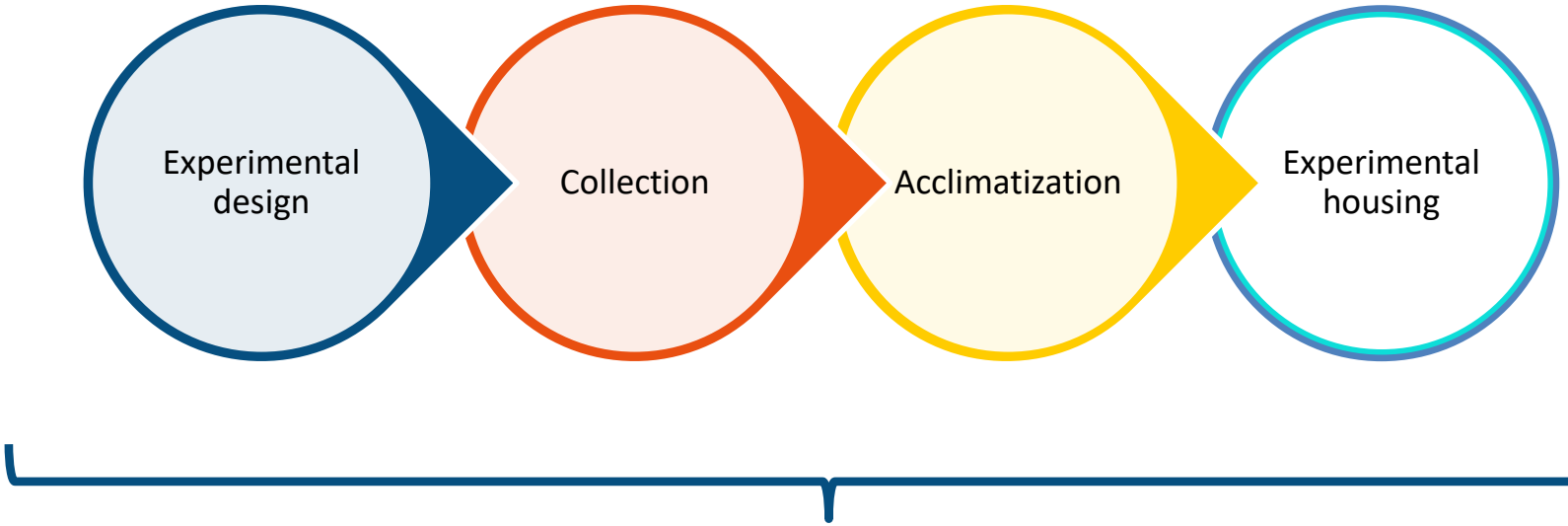
# Stocking density

**Turbot** (*Scophthalmus maximus*)
0.6 – 1 kg
➔ 15 – 29 kg/m²
(Daniels and Watanabe, 2010)

**Dover sole** (*Solea solea*)
0.6 – 3 kg/m²
(FAO)

**Common dab**
2.4 kg/ m²






**CONTROL THE ANIMAL WELFARE DURING EVERY STEP!**

# (measuring) fish welfare is complex …

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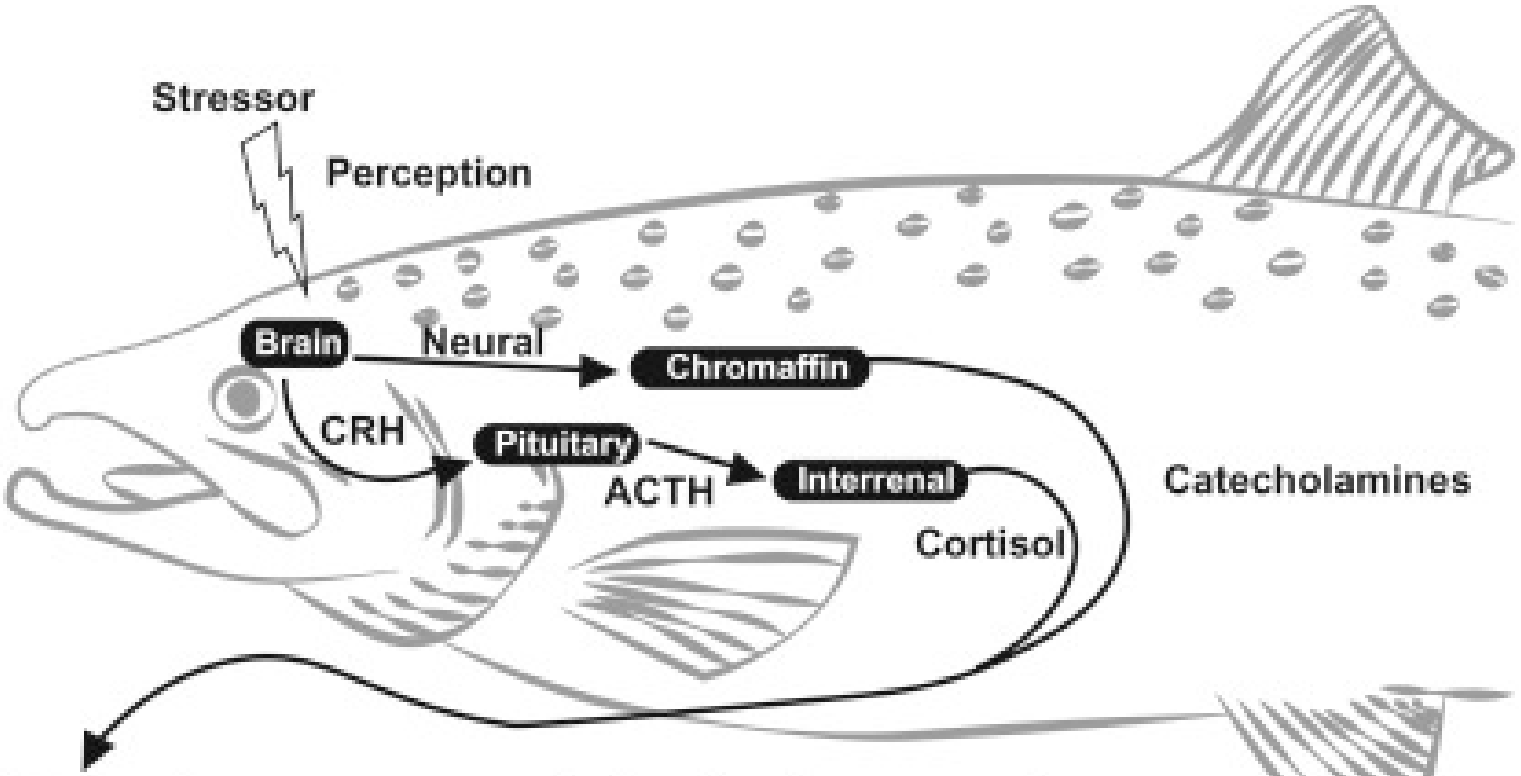
# … but also necessary for scientific research…

Physiological and behavioral changes

➔ Important for welfare of the fish

➔ Important for reliablity of the research results




**Secondary**

**Energy**
- Glucose ↑
- Lactate ↑
- Cardiovascular ↑
- FFA, Pr, ↑↓

**Hydromineral**
- Water ↑↓
- Na ↑↓
- K ↑↓
- Gill vascularization

**Immune**
- Redistribution
- Suppression

**Tertiary**

**Disease Rx**
- AB

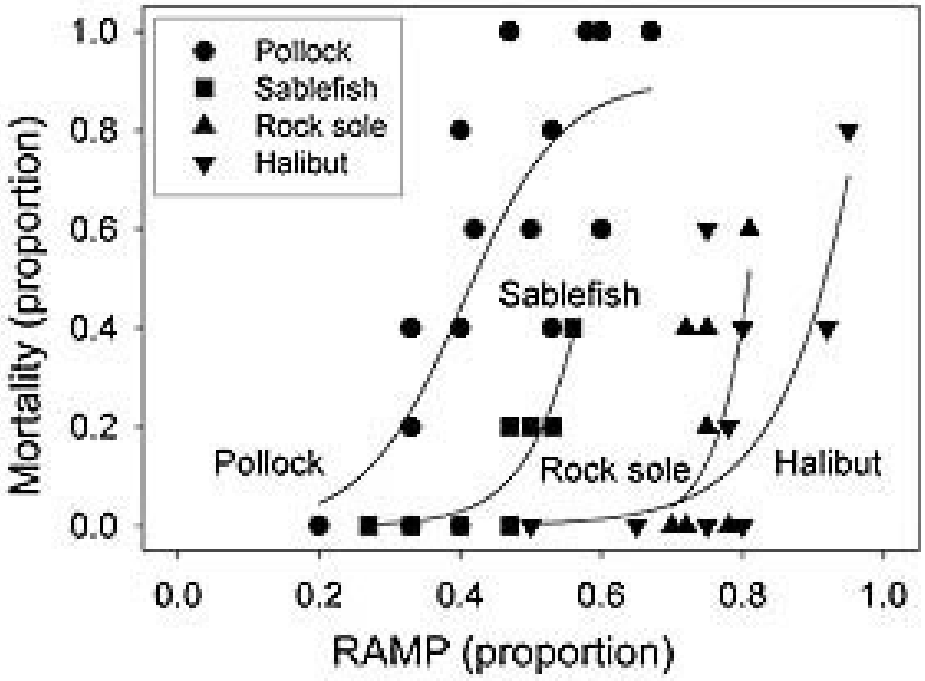
**Development**
- Retarded

**Behavior**
- Learning
- Predator avoidance
- Migration

**Growth**
- Hypertrophy
- Hyperplasia
- Apoptosis

**Reproduction**
- Accelerated
- Inhibited
- Fecundity

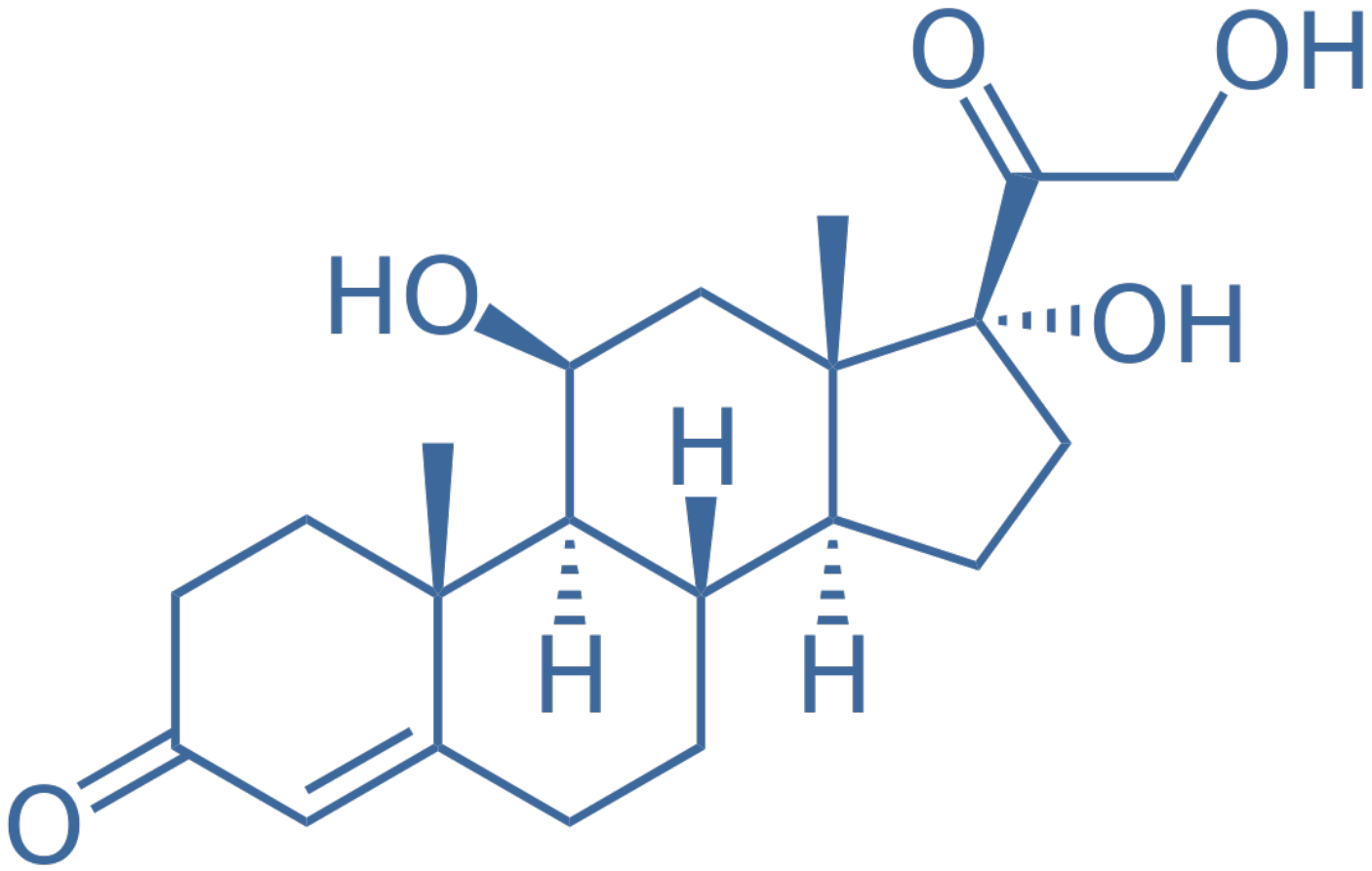
# Reflex action mortality predictors (RAMP)



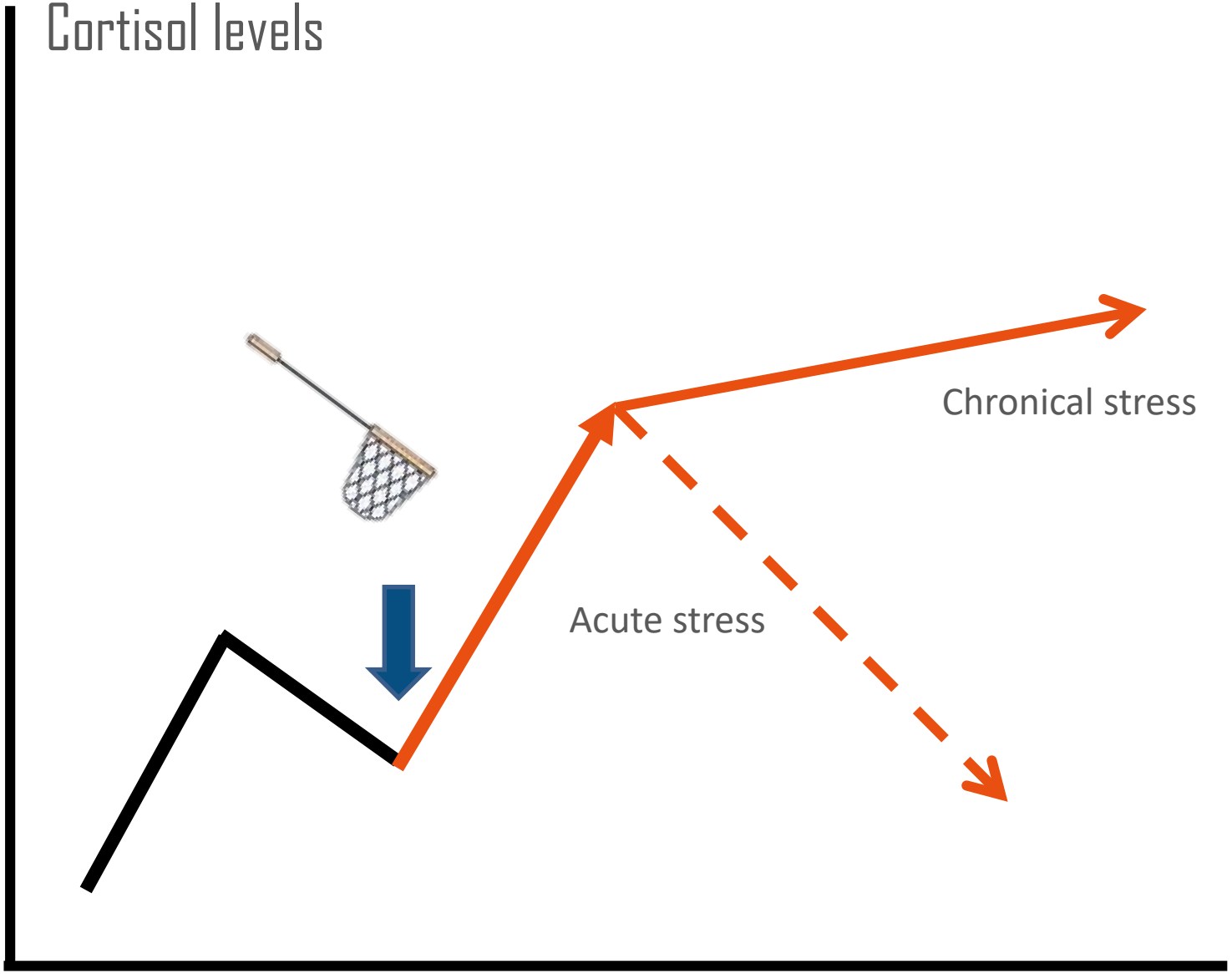

Regular handling can cause stress or extra lesions on the skin

… should be minimalized

# Cortisol



# Cortisol levels



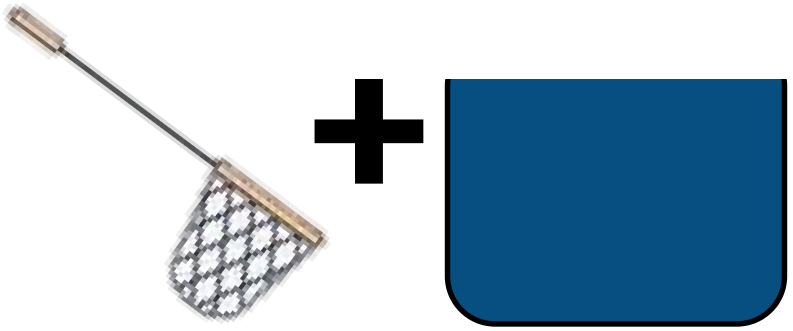

StressChron
Stress Unravelled
100 µm

# Can common dab store cortisol in the scales?

## Wild caught fish:

0.004 ± 0.006
µg cortisol/kg scales

## Control group:

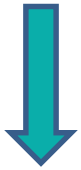


0.066 ± 0.066
µg cortisol/kg scales

# Is a correlation observed between the plasma and scale cortisol levels?

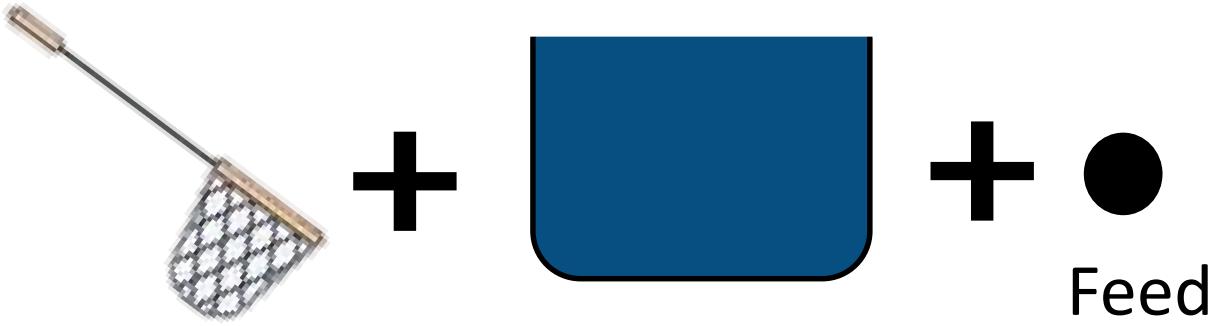
Feeding of cortisol

increase of plasma cortisol



increase of scale cortisol

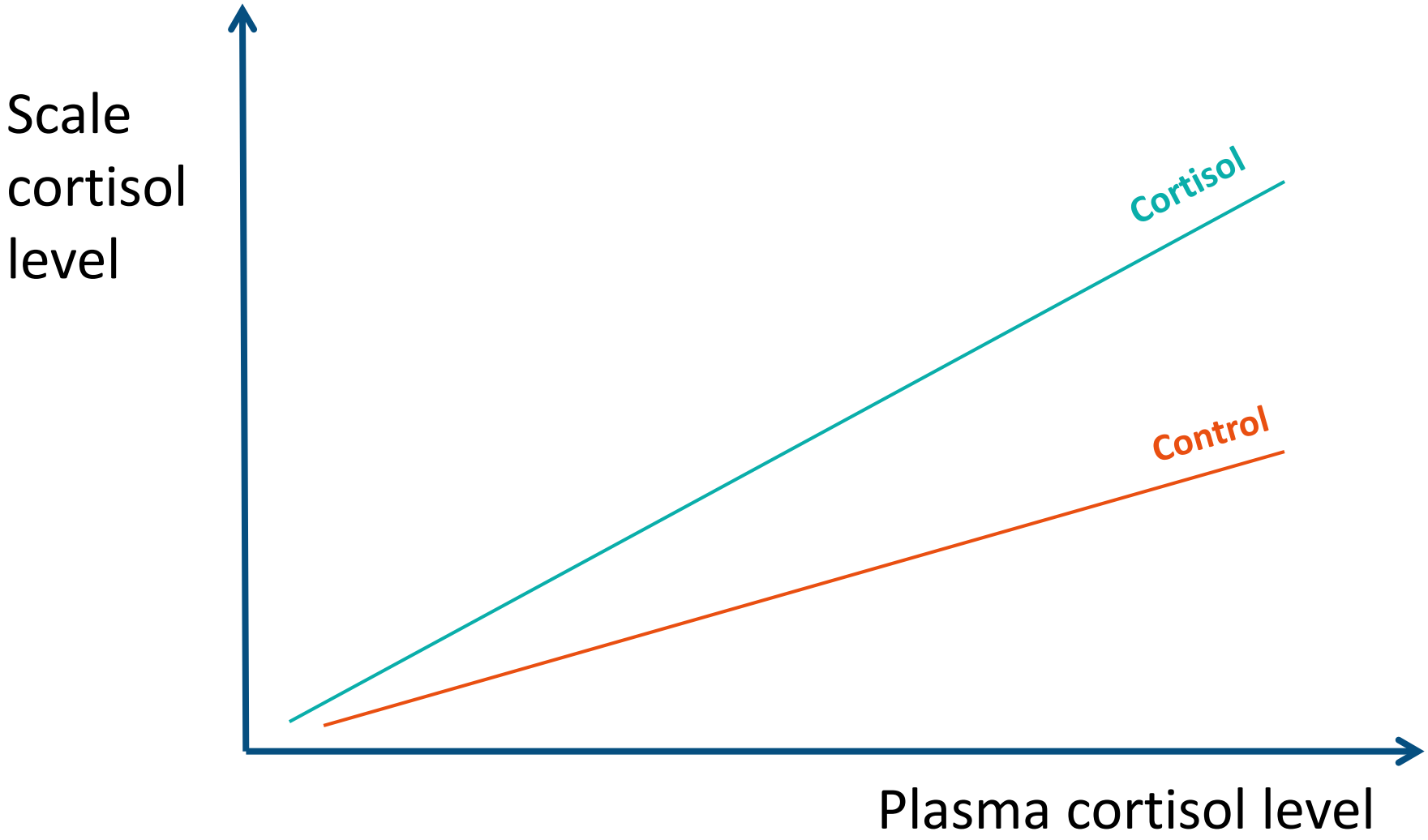
# Control group:



Feed

# Cortisol group:

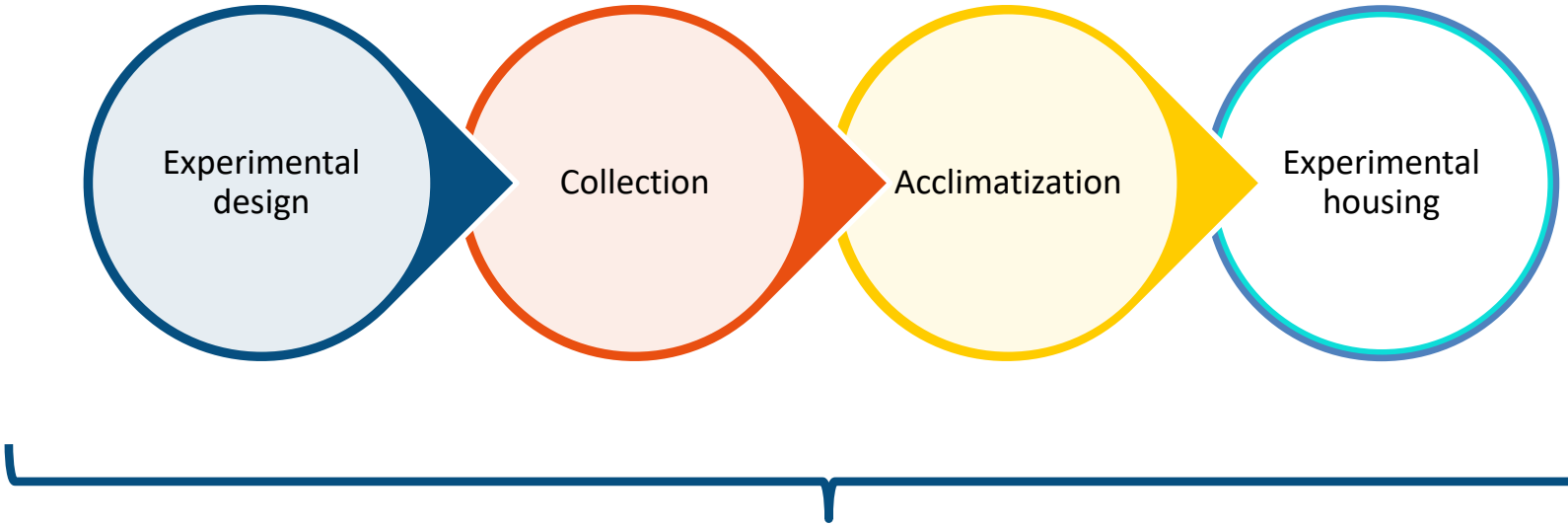

Feed supplemented with cortisol




When cortisol increases in the plasma, more cortisol is stored in the scales!

# Many questions remain …

- Welfare effects?
- Health effects?
- Stable incorporation in scales?

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# THANK YOU FOR YOUR ATTENTION!

Maaike Vercauteren
maaike.vercauteren@ugent.be