CHARACTERIZATION OF *Tenacibaculum maritimum* INFECTION ON JUVENILE SEABREAM

CONTRIBUTERS
Raquel Carrilho | Márcio Moreira | Marcelo Livramento| Florbela Soares| Pedro Pousão| Pedro Rodrigues| Marco Cerqueira*

Centro de Ciências do Mar (CCMAR/CIMAR LA)
Campus de Gambelas, Universidade do Algarve
Faro, Portugal
E-mail: macerqueira@ualg.pt

INTRODUCTION

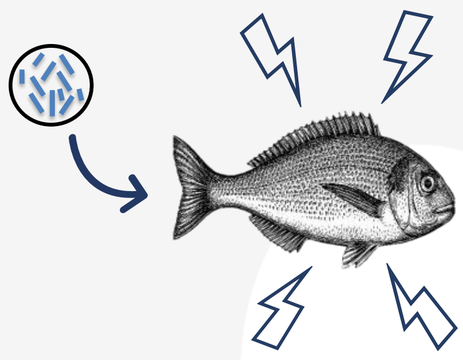
Intensive aquaculture stresses fish, weakening their immunity and increasing disease risk.

Tenacibaculum maritimum, a major Mediterranean pathogen, causes severe lesions and high mortalities

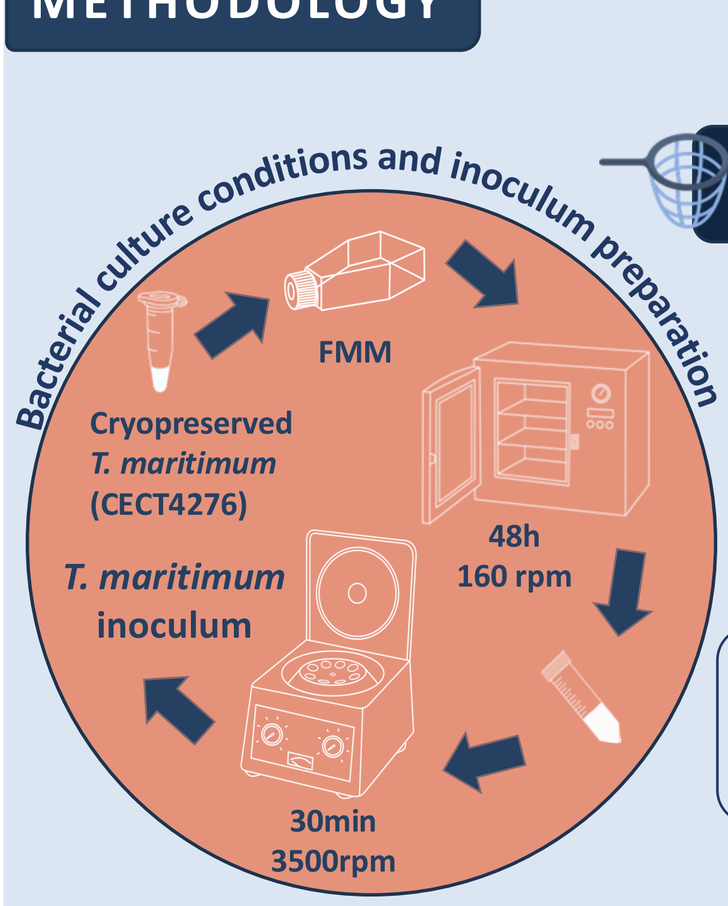
Understanding early fish immune responses is key to better disease control

GOAL

Impact of *Tenacibaculum maritimum (CECT4276)* infection on gilthead seabream *(Sparus aurata)* over time



METHODOLOGY



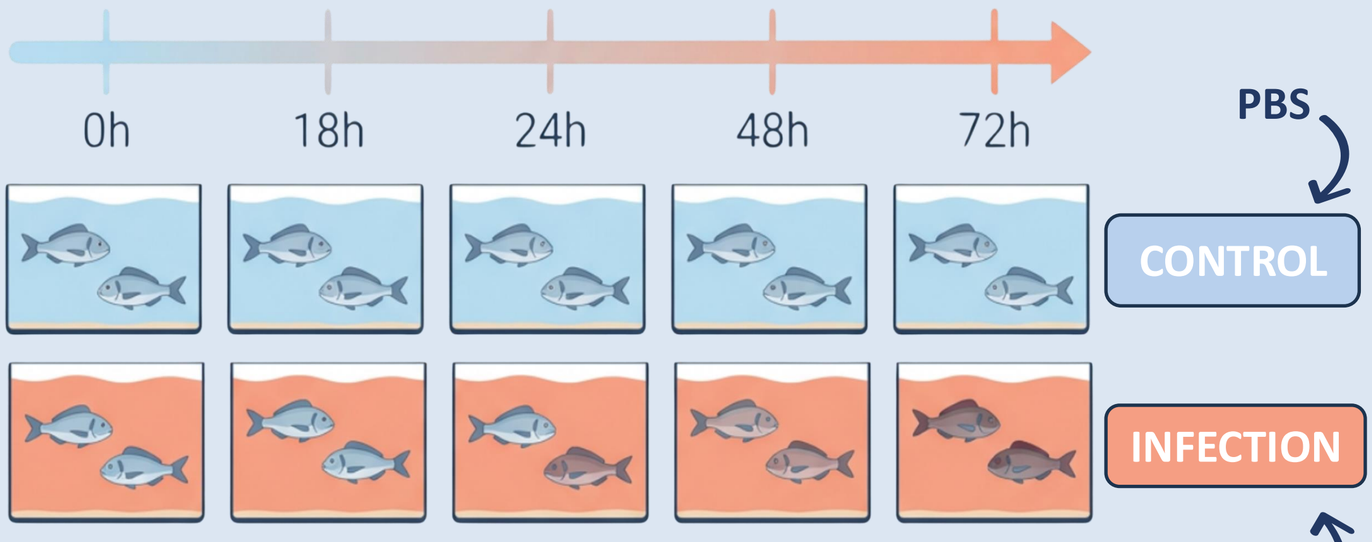


Gilthead seabream

Weight: 21.17 ± 4.57g
T: 22 ± 0.55°C
40L tanks
Time – 72 hours

Plasma → Biochemical indicators
Skin mucus → Proteomics

Sampling times (2 fish/tank)



Infection by immersion bath (28h) with *T. maritimum* (1×10^5 CFU/ml)

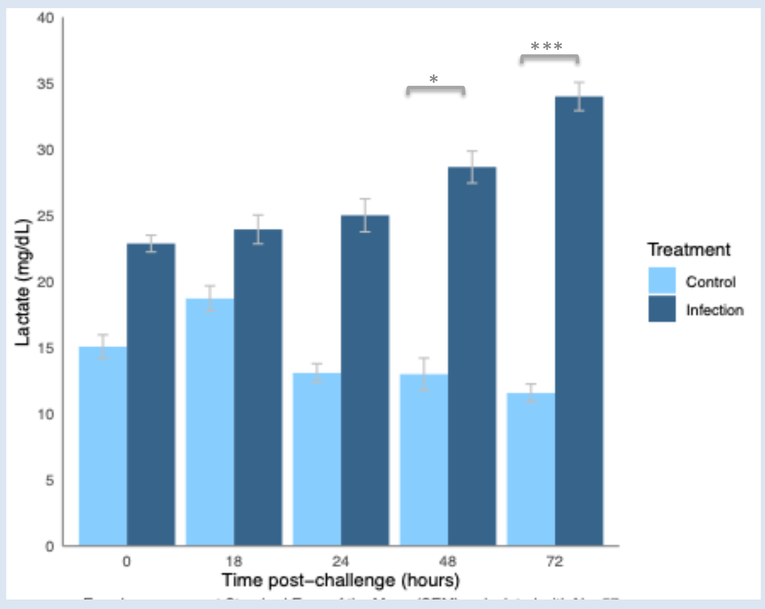
RESULTS

- Hemorrhagic fins
- Skin lesions

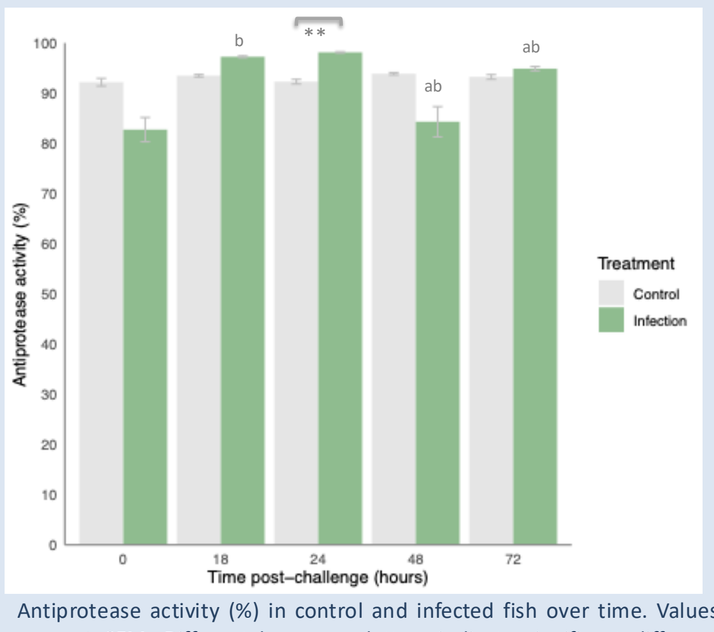


No significant mortality

- **132 differentially abundant proteins in the infection group across time; 77 DAPs in first 18h**
- **Early response (0–18h) → stabilized phase (24–72h) transition**
- **Three defense pathways: immune signaling, antimicrobial proteolysis, barrier protection**
- **Hyaluronan metabolism as primary early enriched process**
- **7 infection biomarkers identified**
- **Bacterial virulence factors detected: Type VI secretion system, metalloproteases, iron uptake**



Lactate concentration (mg/dL) in control and infected fish at 0, 18, 24, 48, and 72h. Values = mean ± SEM. Asterisks indicate significant differences (Two-way ANOVA, $p < 0.05$).



Antiprotease activity (%) in control and infected fish over time. Values = mean ± SEM. Different lowercase letters indicate significant differences across timepoints; asterisks indicate differences between infected and control groups (ART ANOVA, $p < 0.05$).

CONCLUSION

Peak imune response → **18–24h**

Three-phase defense response:
- Recognition and activation (0–18h):
- Metabolic shift and protection (18–24h)
- Stabilization (24–72h)

Metabolically costly but well-regulated
→ Prevents severe disease despite bacterial virulence

Critical intervention window: 0–24 hours

Findings support timely therapeutic interventions to reduce disease severity

Acknowledgments:
This work was financed by project BIOIMMUNE (MAR-02.05.01-FEAMP-0052) and SAUDE&AQUA (MAR-02.05.01-FEAMP-0009) and received Portuguese national funds from FCT - Foundation for Science and Technology through contracts UID/04326/2025, UID/PRR/04326/2025 and LA/P/0101/2020 (DOI: 10.54499/LA/P/0101/2020). Raquel Carrilho acknowledges a FCT PhD scholarship, Refª 2021.06786.BD.

Animals is an international, peer-reviewed, open-access journal established in 2011 and published semi-monthly online by MDPI. The journal is dedicated to high-quality research across a broad range of animal-related disciplines, including zoology and veterinary sciences, and upholds rigorous peer-review and editorial standards to ensure the publication of impactful work. Indexed in the Science Citation Index Expanded (SCIE) within Web of Science, Animals has a 2024 Impact Factor of 2.7 (ranks 15/86 (Q1) in 'Agriculture, Dairy & Animal Science': 21/170 (Q1) in 'Veterinary Sciences'), 5-Year Impact Factor: 3.2.

