

# Immune stimulation in European sea bass (*Dicentrarchus labrax*) larvae by administration of Poly-β-hydroxybutyrate (PHB)

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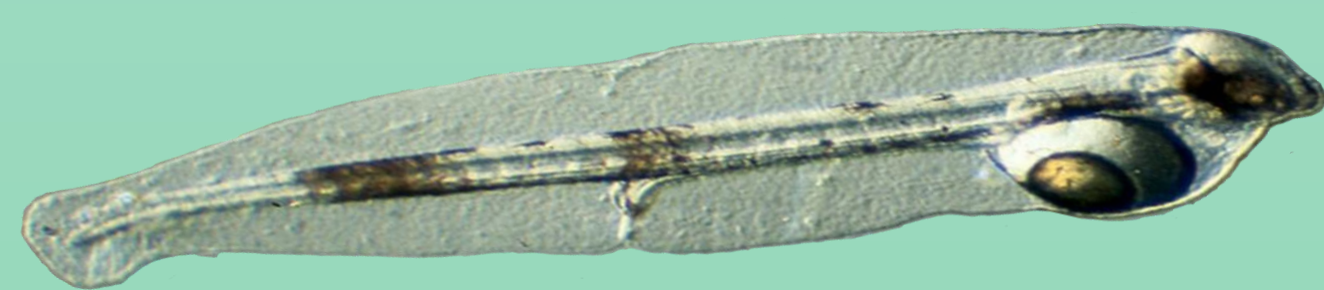
## BACKGROUND

- Major **bottleneck** in aquaculture production: **Mass mortality of fish larvae**
- **Promising solution:** Application of **immunostimulants** such as PHB to **improve the immunocompetence, disease resistance and survival rates** of larval fish

## QUESTION: Does PHB stimulate the immune system of newly hatched fish larvae?

## EXPERIMENTAL APPROACH

### ✧ Species in focus



European sea bass larva ©fishbase.us

- European sea bass (*Dicentrarchus labrax*)
- Important aquaculture species
- **Newly hatched sea bass larvae** were used for the experiment and fed with **rotifers** three times a day

### ✧ Immunostimulant in focus



Bacteria containing PHB inclusions © K. Thomas

- Poly-β-hydroxybutyrate (PHB) is a bacterial energy storage compound
- For the experiment freeze-dried **PHB-containing bacteria** (*Alcaligenes eutrophus*) were used
- We used bacteria with a **low PHB content** (2.5%) and with a **high PHB content** (75%) and administered them for 14 days

### ✧ Experimental design



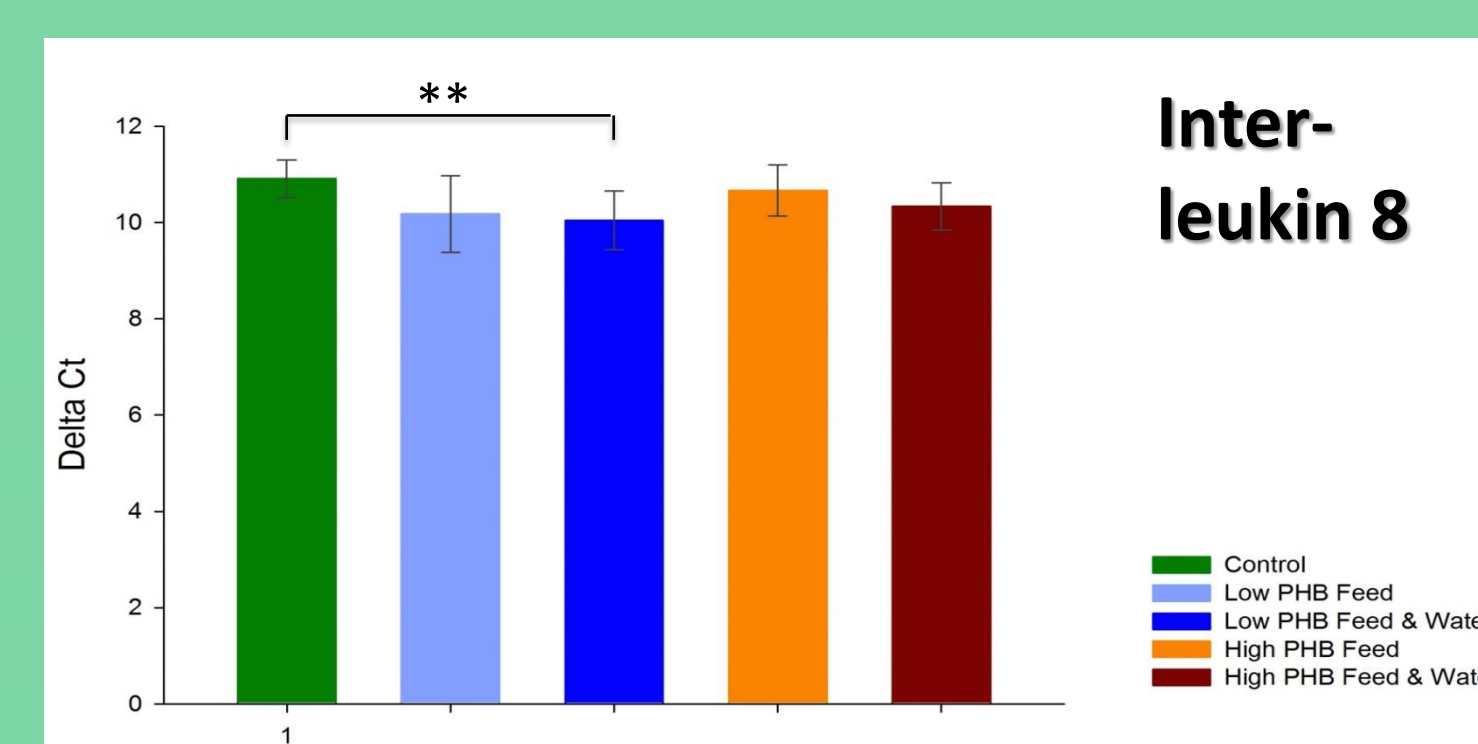
Setup for larval experiments

- Group A:**
  - A.1 Bacteria with **low PHB** content were fed from first-feeding on via **rotifers** and added directly to the **water**
  - A.2 Bacteria with **low PHB** content only via **rotifers**
- Group B:**
  - B.1 Bacteria with **high PHB** content were fed from first-feeding on via **rotifers** and added directly to the **water**
  - B.2 Bacteria with **high PHB** content only via **rotifers**
- Group C: No PHB-containing bacteria** via rotifers or in the water

### ✧ Response variables

- **Immune gene expression analysis**
- **Disease resistance** (bath challenge with *V. anguillarum*)
- Analysis of **gut microbiota composition**
- **Mortality rates**
- **Dry weight and length** of larvae

### ✧ Preliminary results - gene expression



IL 8 was **upregulated** in larvae from the „Low PHB Feed & Water“ treatment compared to the Control treatment (no PHB)



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