Autophagy in Pacific oyster, *Crassostrea gigas*

**1. Is autophagy flux present and functional in Pacific oyster?**

**2. Could autophagy protect Pacific oyster against *Vibrio aestuarianus* infection?**

**3. Could autophagy protect Pacific oyster against OsHV-1 infection?**

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**Autophagy in Pacific oyster, *Crassostrea gigas***

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Since 2008, the oyster aquaculture industry, which mainly relies on the production of the Pacific oyster, *Crassostrea gigas*, has been affected by mass mortality outbreaks in France and Europe. Two pathogens have been associated with mass mortality outbreaks, the virus *ostreid herpesvirus 1* (OsHV-1) and the bacterium *Vibrio aestuarianus*. A study was carried out in order to show that the autophagy pathway is present and functional in Pacific oysters. Moreover, interactions between oyster pathogens (OsHV-1 and *V. aestuarianus*) and autophagy were explored. Results suggested that autophagy as a conserved intracellular pathway can play a key role in innate immunity in the Pacific oyster.

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**A body of proof supporting autophagy flux in Pacific oyster**

**Autophagy may play a protective role during OsHV-1 infection**

- LC3-II detection increases during viral infection
- Autophagy modulation is related to OsHV-1 infection susceptibility

**Autophagy may protect oysters from *Vibrio aestuarianus* infection**

- LC3-II detection decreases during bacterial infection
- Autophagy modulation is related *V. aestuarianus* infection susceptibility

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**Conclusions**

- Results suggest that autophagy is induced upon OsHV-1 infection and unmodified (inhibited with NH4Cl) upon *V. aestuarianus* infection.

<table>
<thead>
<tr>
<th>NH4Cl</th>
<th>OsHV-1</th>
<th><em>V. aestuarianus</em></th>
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- Autophagy could be interpreted as protective pathway against OsHV-1 and *V. aestuarianus* infections

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**Perspectives**

Mortality outbreaks are often observed during spring and summer where concentrations of algae, which represent the main source of energy for oysters, are important.

- It is well known that starvation is a potent stimulus of autophagy. It would be of interest to analyze if there is a correlation between food supply, autophagy and mortality outbreaks.

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**Fig A. Phylogenetic trees of ATG proteins**

**Fig B. Bacterial DNA quantification 20h post infection**

**Fig C. Western blot of protein LC3 20h post infection**

**Fig D.  Transmission electron microscopy**

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**Fig A. Monitoring of oyster survival during OsHV-1 infection**

- LC3-II detection increases during viral infection
- Autophagy modulation is related to OsHV-1 infection susceptibility

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**Fig B. Monitoring of oyster survival during *V. aestuarianus* infection**

- LC3-II detection decreases during bacterial infection
- Autophagy modulation is related *V. aestuarianus* infection susceptibility

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**Fig C. Western blot of protein LC3 20h post infection**

**Fig D. Quantification Western blot of protein LC3 20h post infection**

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**Fig B. Bacterial DNA quantification 20h post infection**

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**Fig D. Transmission electron microscopy**

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