



# Water flow inhibits the synthesis of vitellogenin of conger eel (*Conger myriaster*) during artificial reproduction

Rucong Liu, Kang Li, Guixiang Wang, Zhixin Jiang, Xubing Ba, Liping Liu\*

<sup>a</sup> Key Laboratory of Exploration and Utilization of Aquatic Genetic Resources, Ministry of Education, Shanghai Ocean University, Shanghai 201306, China;

<sup>b</sup> Shanghai Engineering Research Center of Aquaculture, Shanghai Ocean University, Shanghai 201306, China;

<sup>c</sup> National Demonstration Center for Experimental Fisheries Science Education, Shanghai Ocean University, Shanghai 201306, China)

## Introduction

Conger eel (*Conger myriaster*) is a high economic species that migrates from offshore to spawn. It's valuable to investigate the effect of swimming on the development of the gonads, and provide a basis for the future research on artificial reproduction.

## Materials and Methods

1. A total of four groups including: A1. still water group without hormone injection; A2. flowing water group without hormone injection; B1. still group injected with hormone; B2. flowing group injected with hormone. Six eels were sampled once a month in each group, and the biometric parameters were measured as well.
2. Enzyme-linked immunosorbent assay was applied to determine the VTG content in liver and serum.
3. Quantitative real-time PCR was used to detect the expression of VTG and Er genes in the liver.

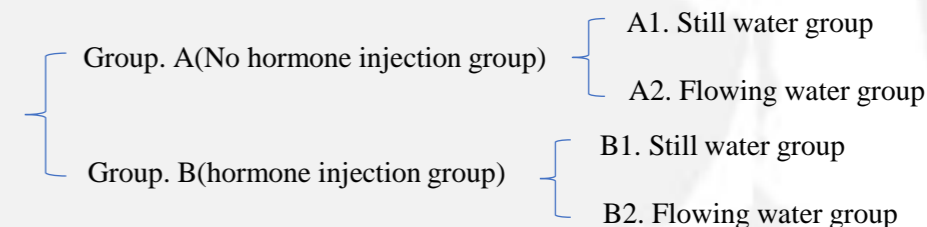


Fig1. Grouping situation

## Results

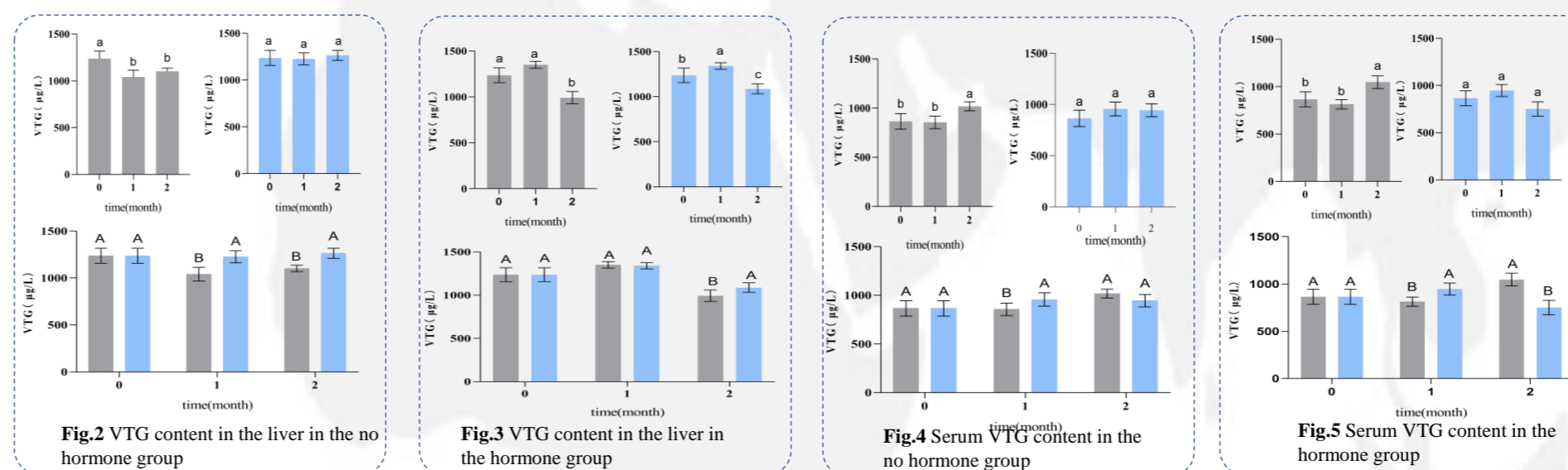
### Morphological change

Table1: Morphological Index

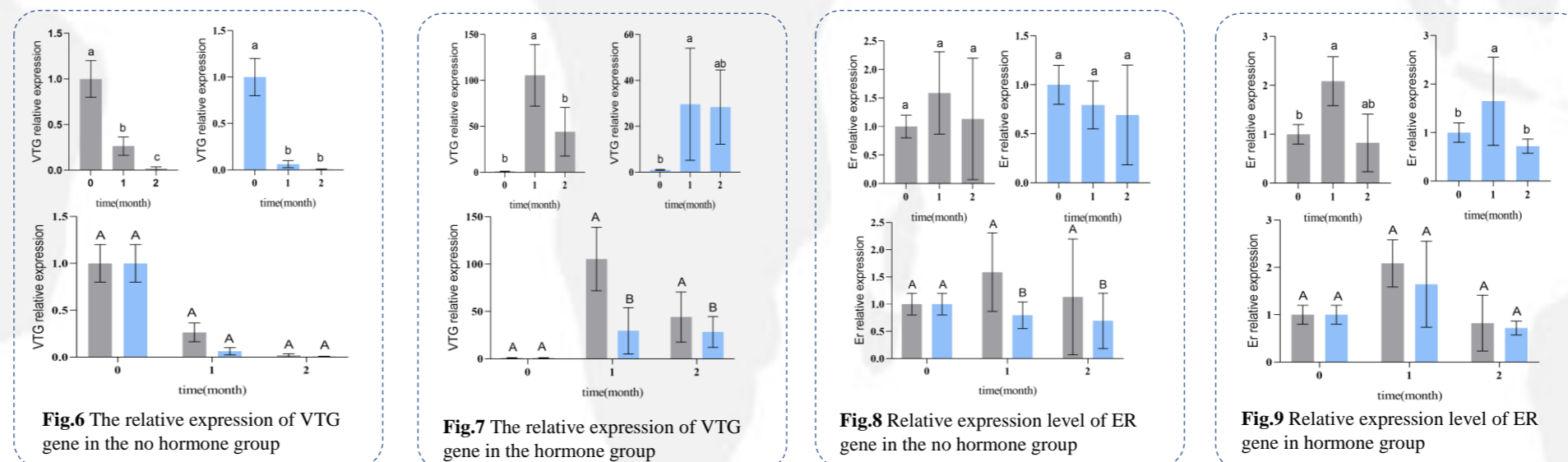
	start	one month	two month
A1			
BW(g)	239.17±50.08 <sup>a</sup>	284±34.98 <sup>Ab</sup>	269.17±33.11 <sup>Aa</sup>
TL(cm)	57.65±3.92 <sup>a</sup>	58.27±1.6 <sup>Aa</sup>	59.02±2.9 <sup>Aa</sup>
AI	0.3778±0.01 <sup>a</sup>	0.3731±0.0054 <sup>Aa</sup>	0.3739±0.0139 <sup>Aa</sup>
DI	0.0047±0.0024 <sup>a</sup>	0.0028±0.0006 <sup>Aa</sup>	0.0029±0.0008 <sup>Aa</sup>
GSI	0.0266±0.0218 <sup>b</sup>	0.0639±0.0251 <sup>Aa</sup>	0.0436±0.0264 <sup>Ab</sup>
HIS	0.0138±0.0021 <sup>a</sup>	0.0114±0.0019 <sup>Aa</sup>	0.0105±0.001 <sup>Aa</sup>
A2			
BW(g)		250.67±23.05 <sup>Ba</sup>	237.5±19.3 <sup>Ba</sup>
TL(cm)		57.35±3.9 <sup>Aa</sup>	54.67±2.4 <sup>Ba</sup>
AI		0.3704±0.0139 <sup>Aa</sup>	0.3639±0.0137 <sup>Aa</sup>
DI		0.0021±0.00033 <sup>Bb</sup>	0.0024±0.0004 <sup>Bb</sup>
GSI		0.0413±0.0356 <sup>Aa</sup>	0.0403±0.0535 <sup>Aa</sup>
HIS		0.012±0.0009 <sup>Aa</sup>	0.0114±0.0029 <sup>Aa</sup>
B1			
BW(g)		368.33±46.63 <sup>Aa</sup>	358.33±95.84 <sup>Aa</sup>
TL(cm)		59.48±1.52 <sup>Aa</sup>	58.37±4.1 <sup>Aa</sup>
AI		0.3883±0.0092 <sup>Aa</sup>	0.3797±0.0228 <sup>Aa</sup>
DI		0.0011±0.00018 <sup>Bb</sup>	0.0011±0.00048 <sup>Bb</sup>
GSI		0.1762±0.042 <sup>b</sup>	0.2636±0.1709 <sup>Aa</sup>
HIS		0.0172±0.0044 <sup>Aa</sup>	0.0141±0.0019 <sup>Ab</sup>
B2			
BW(g)		358.5±43.07 <sup>Aa</sup>	340.33±71.39 <sup>Aa</sup>
TL(cm)		61.73±2.33 <sup>Aa</sup>	59.37±2.67 <sup>Aa</sup>
AI		0.3841±0.0054 <sup>Aa</sup>	0.3797±0.0122 <sup>Aa</sup>
DI		0.0015±0.00019 <sup>Ab</sup>	0.0019±0.0015 <sup>Ab</sup>
GSI		0.1141±0.0437 <sup>Bb</sup>	0.23748±0.1221 <sup>Aa</sup>
HIS		0.0168±0.0028 <sup>Aa</sup>	0.0149±0.0032 <sup>Aa</sup>

Notes: BW-Body Weight; TL-Total length; AI-Anal length; DI-Digestive tract index; GSI-Gonadal index; HIS-Liver index. A1, A2, B1, B2-four different group. The significance of the difference at different times within the same group is represented by a. The significant difference between the flowing water group and the still water group at the same time is represented by A (P<0.05).

### VTG content in liver and serum



### VTG gene expression in the liver



Notes: The significance of the difference at different times within the same group is represented by a. The significant difference between the flowing water group and the still water group at the same time is represented by A (P<0.05).

1. Swimming couldn't trigger the development of gonads if the eel cultured without hormone injection. Interestingly, the digestive tract of the eel from flowing water group was significantly smaller than the eel from still water group, as well as the reduction of body size.

2. The effect of swimming on the VTG content in the liver and serum is not significant, and the VTG content in the liver of the swimming group injected with hormones is slightly lower.

3. In the hormone injection group, swimming can inhibit the expression of VTG gene and affect the expression of Er gene.

## Contact

Rucong Liu, Key Laboratory of Exploration and Utilization of Aquatic Genetic Resources, Ministry of Education, Shanghai Ocean University, Shanghai, China  
Email: m190100261@st.shou.edu.cn

## Summary

- ◆ Swimming couldn't trigger the development of gonads if the eel cultured without hormone injection.
- ◆ Under the condition of hormone injection, water stimulation inhibits the expression of vitellogenin gene