

# Integrated transcriptomic and metabolomic analyses identify key factors in the vitellogenesis of juvenile Sichuan bream (*Sinibrama taeniatus*)

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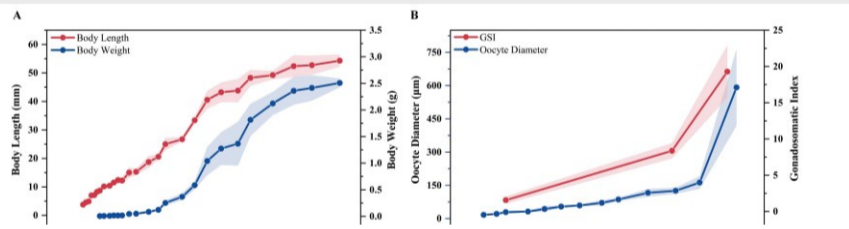
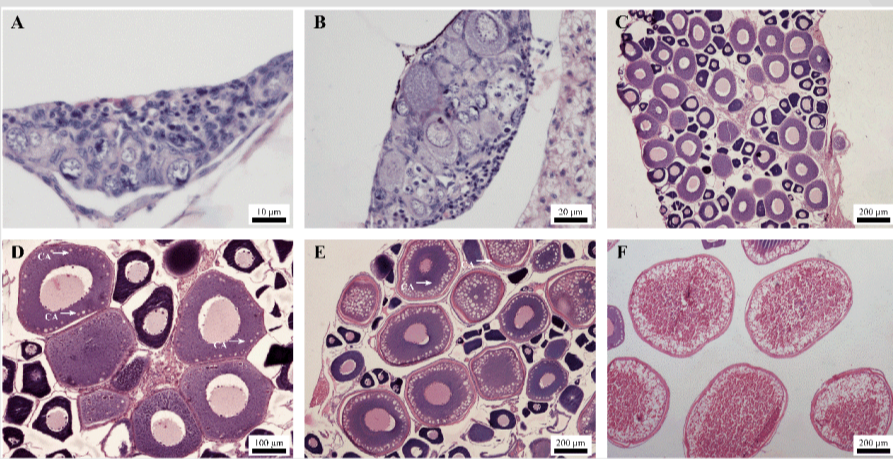
Li, Dengyue Yuan, Zhijian Wang



## 1. Introduction

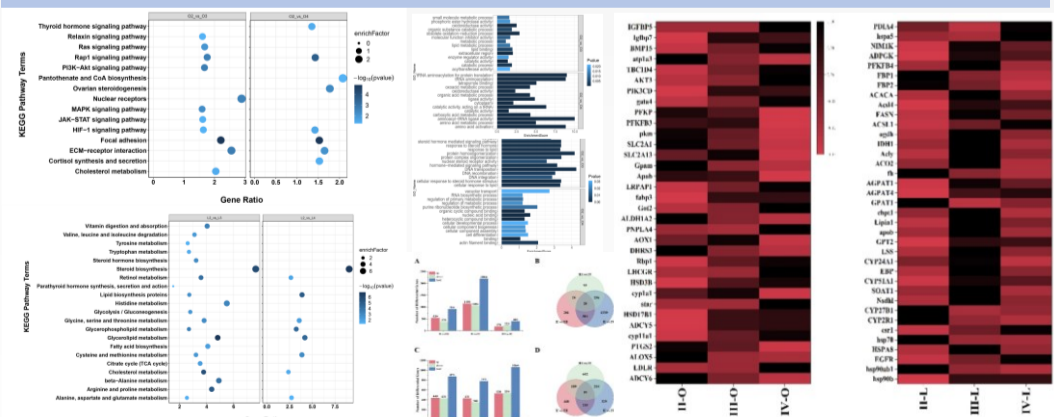
Vitellogenesis is the most complex and important stage of fish oogenesis. The purpose of this study was to explore the biological changes related to the ovarian maturation process, especially the vitellogenesis stage, in juvenile Sichuan bream by regularly measuring their growth performance, ovarian development status, serum steroid hormones, thyroid hormones and Vtg levels and the combination of transcriptomic and metabolomic analysis of ovary and liver.

## 2. Stages of oogenesis



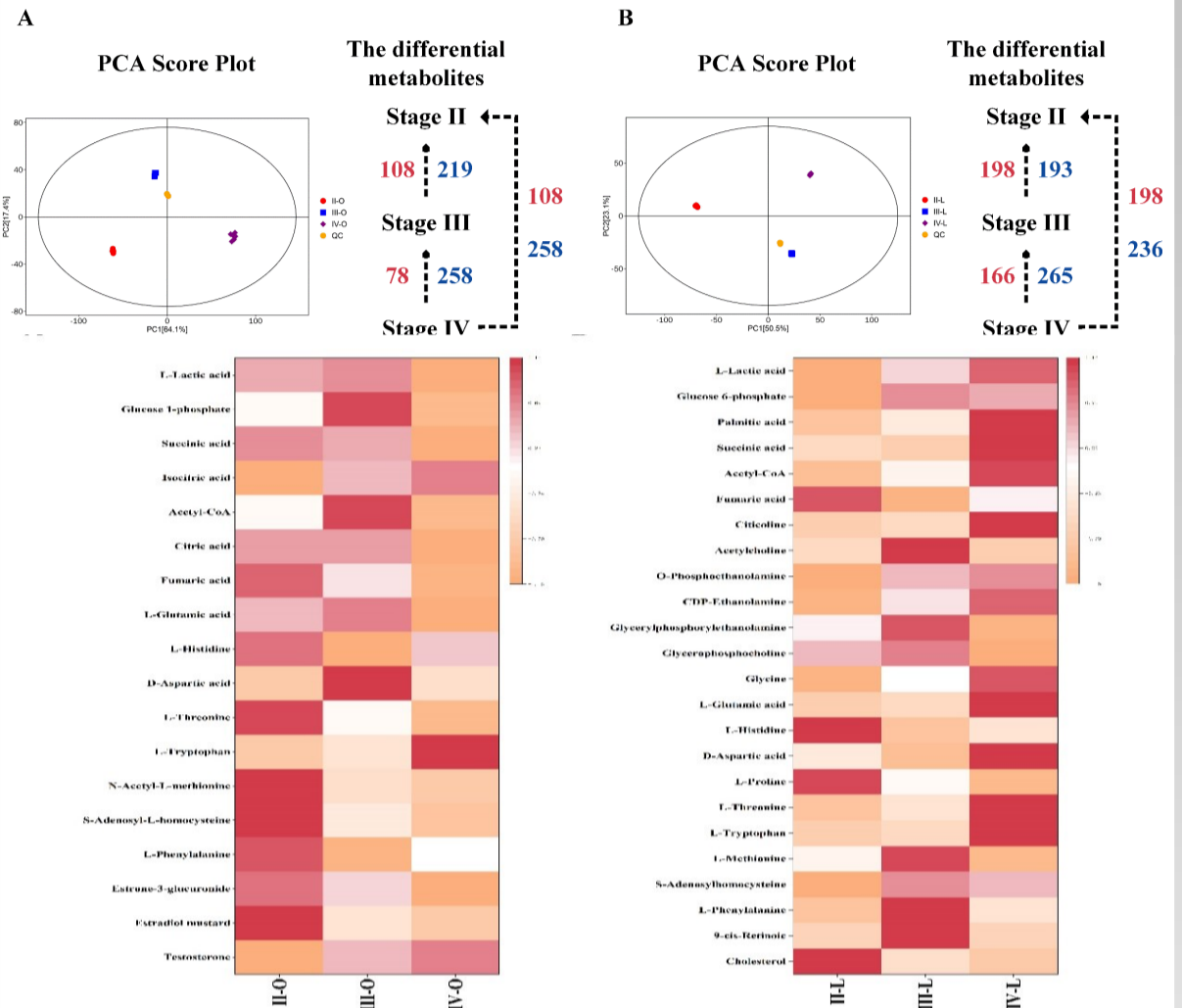
The vitellogenesis stage takes a long time, involving changes in the morphology of oocytes and the redistribution of nutrients and energy in the organism.

## 3. Energy metabolism



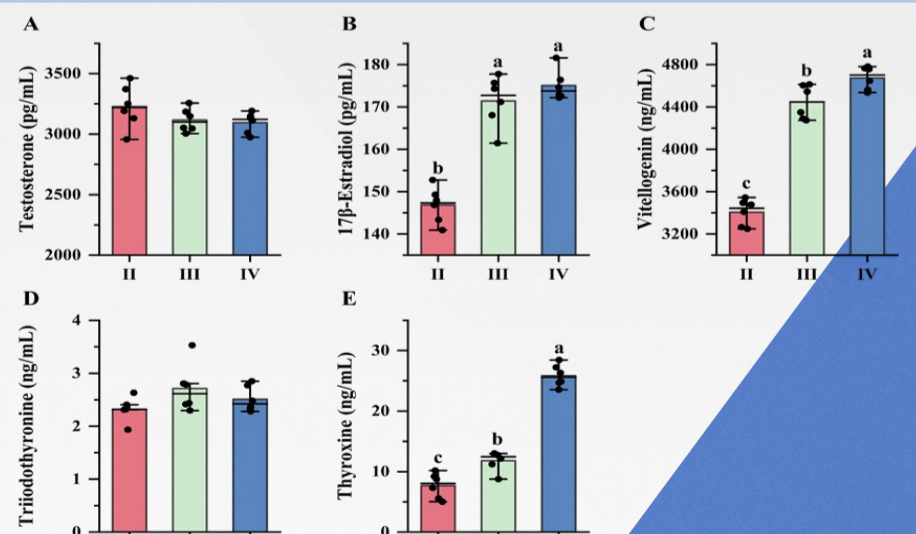
In the liver, energy metabolism was promoted by activating glucolipid metabolic pathways to provide sufficient ATP, but at the same time, the ovary tends to retain nutrients rather than decompose them to produce energy.

## 4. Yolk nutrients transport



we have identified several key factors involved in the metabolism of neutral lipids, polar lipids, amino acids and vitamins, which are involved in the assembly and transport of important yolk nutrients.

## 4. Yolk substance transport



E<sub>2</sub> and T<sub>4</sub> are parallel to Vtg level changes, and they may be the key factors to initiate vitellogenesis. The initiation of vitellogenesis was found to be associated with a surge in serum E<sub>2</sub> levels, but the sustained increase in Vtg levels in the late stage may be due more to upregulation of the estrogen receptor.