



读书报告

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Effects of acute hyperglycemia stress on plasma glucose, glycogen content, and expressions of glycogen synthase and phosphorylase in hybrid grouper (*Epinephelus fuscoguttatus* ♀ × *E. lanceolatus* ♂)

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Abstract In the present study, the hybrid grouper (*Epinephelus fuscoguttatus* ♀ × *E. lanceolatus* ♂), a typical carnivorous fish, was chosen as a model to investigate the regulation of glycogen metabolism owing to its characteristic of glucose intolerance. The variation of plasma glucose concentration, glycogen content, and expressions of glycogen metabolism-related genes under acute hyperglycemia stress were measured. Following glucose administration, plasma glucose concentration increased immediately, and the glucose level remained ele-

fish species. Meanwhile, the glycogen content in both liver and muscle changed significantly during the clearance of plasma glucose. However, the peak value of hepatic glycogen (1 and 12 h post injection) appeared much earlier than muscle (3 and 24 h post injection). To investigate the regulation of glycogen metabolism from molecular aspect, the complete coding sequence (CDS) of glycogen synthase (GS) and glycogen phosphorylase (GP) in both liver and muscle types were obtained, encoding a polypeptide of 704, 711, 853, and 842 amino

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研究背景

Part1

石斑鱼，是一种肉食性鱼类，生长速度快，具有重要的市场经济价值。研究表明，高碳水化合物的膳食会导致过多的肝糖原沉积，影响肝脏的正常功能。葡萄糖耐量试验，可通过检测血浆葡萄糖变化，来研究鱼类利用碳水化合物的能力。

本文旨在研究急性高血糖应激对石斑鱼血糖、糖原含量以及糖原合成酶和磷酸化酶表达量的影响。



材料与amp;方法

Part2

杂交石斑鱼 ($80.4 \pm 2.1\text{g}$)

禁食24h, 注射葡萄糖(0.5mg/g)或等体积的PBS

注射0、1、3、6、12、24和48h后抽血,
取肝脏和肌肉组织

血浆葡萄糖

糖原含量

同源性分析

系统进化树

糖原合成酶

糖原磷酸化酶

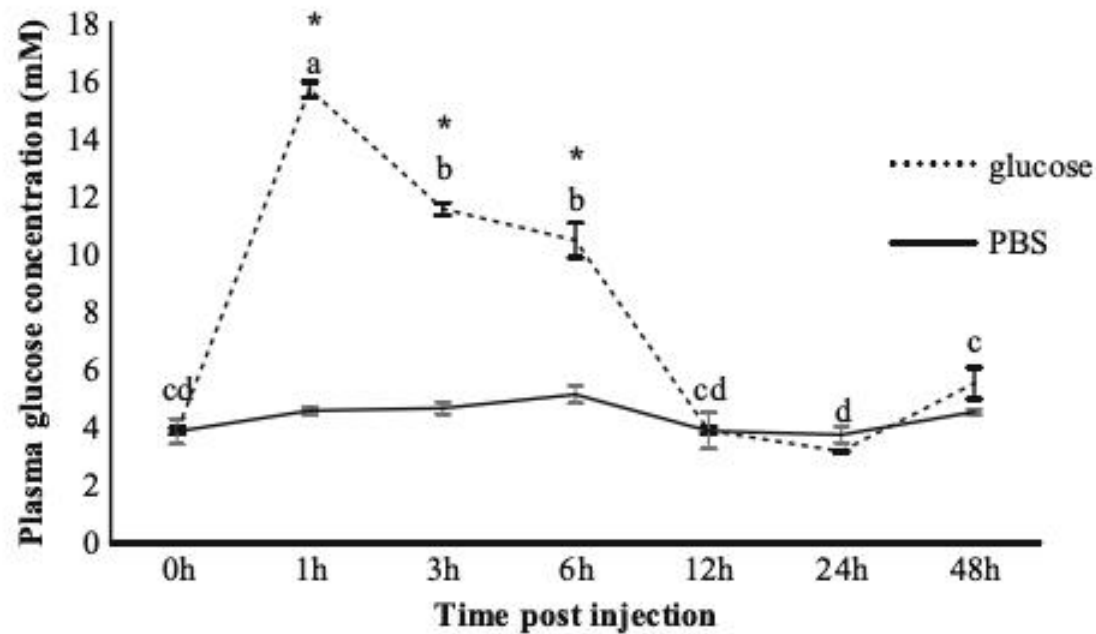
结果分析

Part3

Table 1 Primer used in the present study

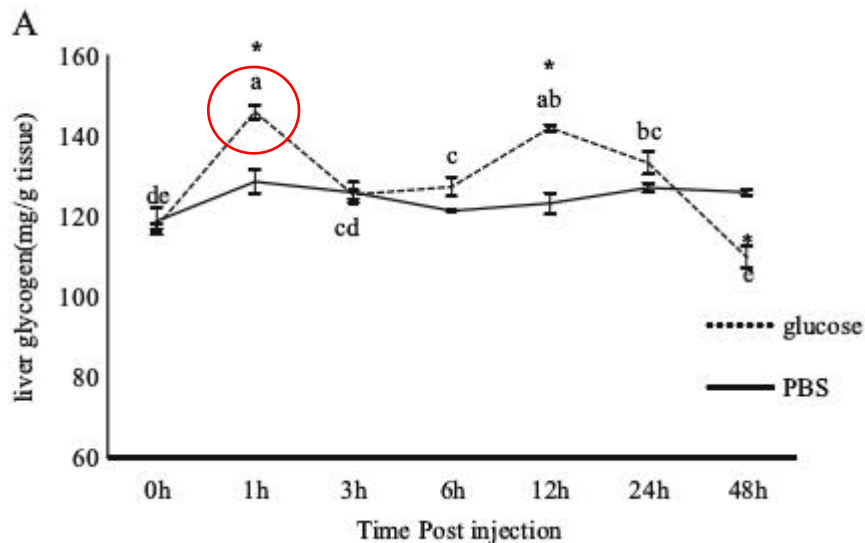
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GSL-R	TCAGTTTCCTGACTCTCCAG	PCR amplification
GSM-F	ATGCCGCTGGCTCGCAGCCT	PCR amplification
GSM-R	TCAGTTTTTGTGCGTTGTG	PCR amplification
GPL-F	ATGGCCAAGCCGCTGACAGAC	PCR amplification
GPL-R	TCACATTTTCTTCAGAGCTC	PCR amplification
GPM-F	ATGTCTAAGCCCTTGTCTGAC	PCR amplification
GPM-R	TTAGCGAGGATCGTCAGGAG	PCR amplification
GS-L-F	CAGGTTTTGGCTGCTTTATG	RT-QPCR
GS-L-R	CTCTCAGTTCGGTTCCGTTG	RT-QPCR
GS-M-F	TCTACTGCCTGCTTCCTTAT	RT-QPCR
GS-M-R	CCTGTTGGAACCATCTTCAC	RT-QPCR
GP-L-F	TCACAGAATACGCCACCGAG	RT-QPCR
GP-L-R	CATTTTTGAGACACCCACAG	RT-QPCR
GS-M-F	TACACCAACCACACCGTCC	RT-QPCR
GS-M-R	TGTCTCCCTCCTCAATCAG	RT-QPCR
β -Actin-F	CTCTGGGCAACGGAACCTCT	RT-QPCR
β -Actin-R	GTGCGTGACATCAAGGAGAAGC	RT-QPCR

血浆葡萄糖含量

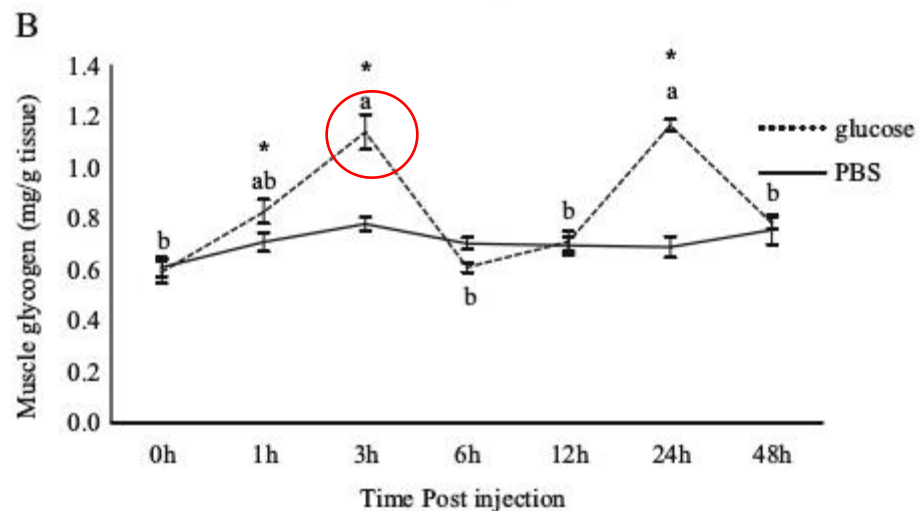


糖负荷后，血糖水平先升高后降低，恢复到基础水平需12h，说明石斑鱼的葡萄糖清除率低。

肝糖原和肌糖原含量



肝脏



肌肉

肝糖原达到峰值的时间比肌糖原早，说明在维持葡萄糖稳态中，肝脏起主导作用。


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与硬骨鱼类(如斑马鱼、大黄鱼等)的同源性

为89-95%,与人的同源性为78-83%.

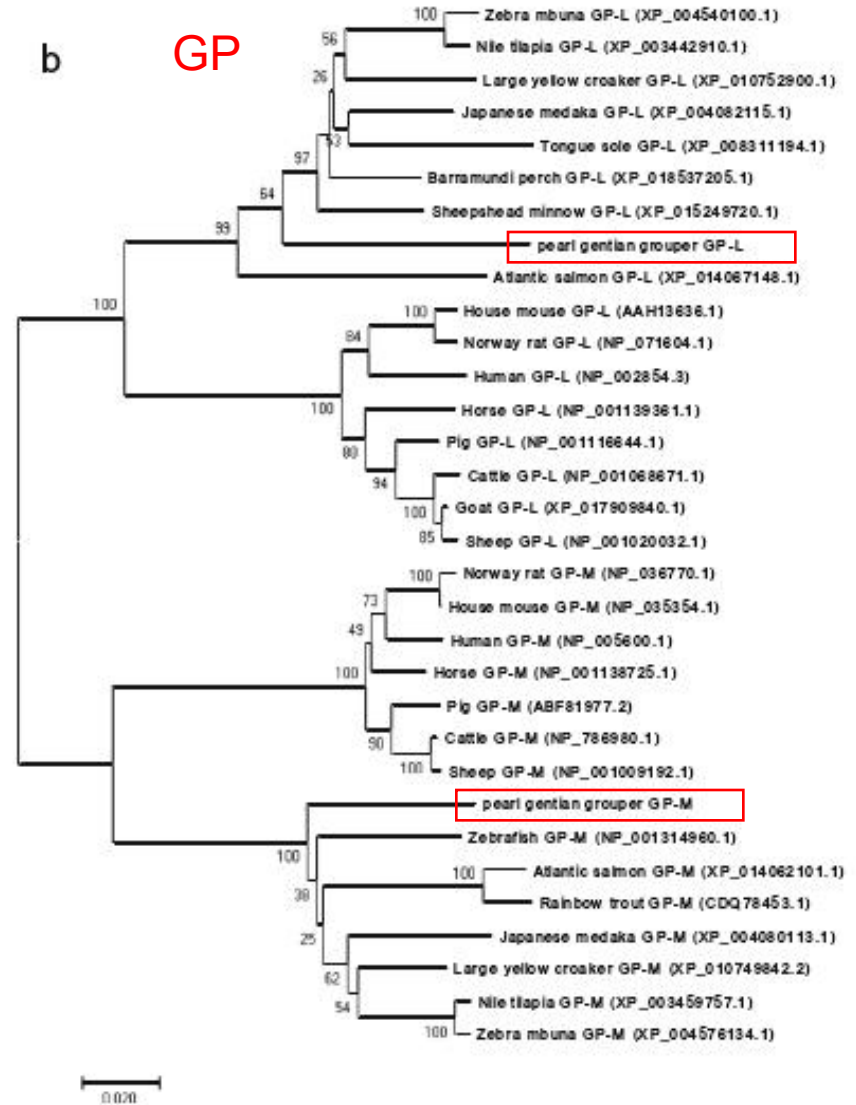
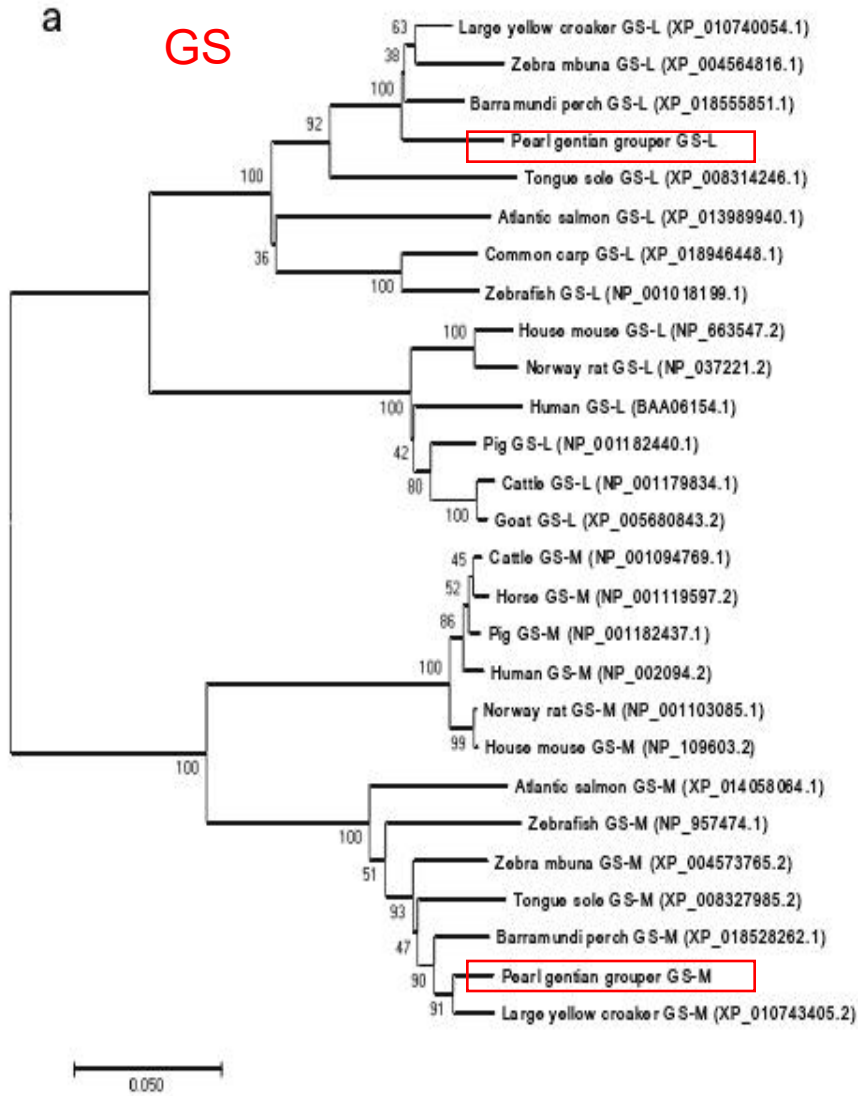
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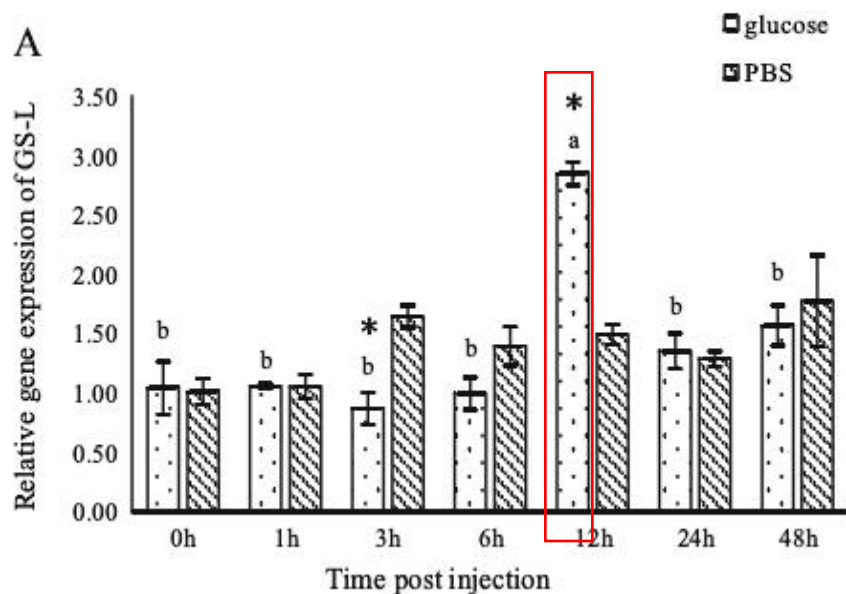
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系统发育树分析

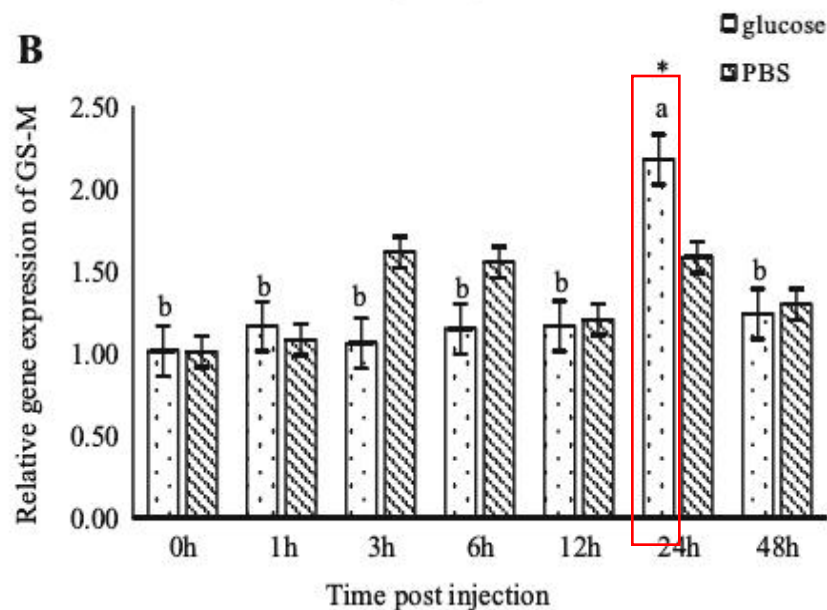


与哺乳动物相比，石斑鱼GS和GP与其他鱼类的节点支持率高。

糖原合成酶GS



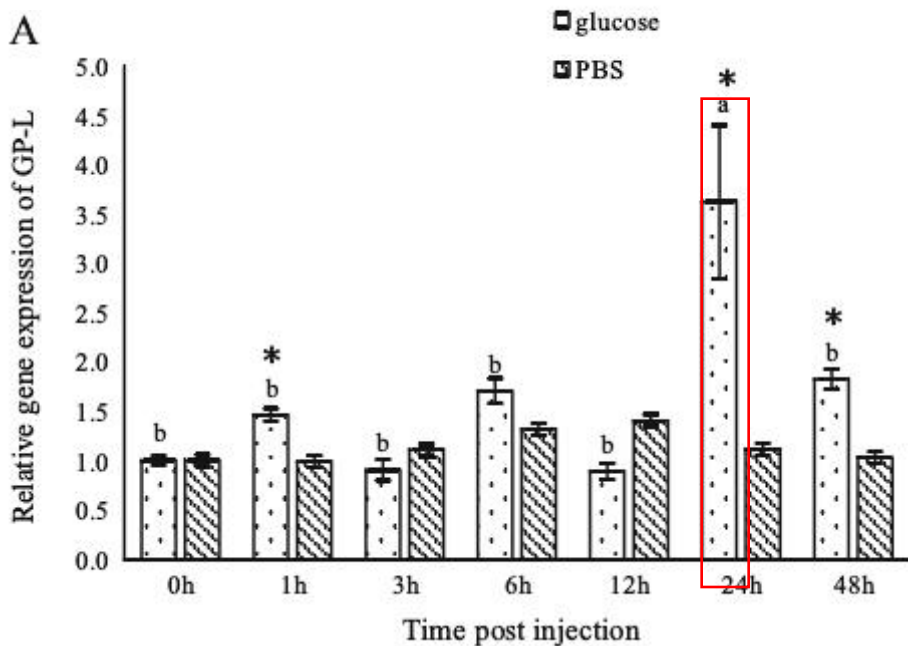
肝脏



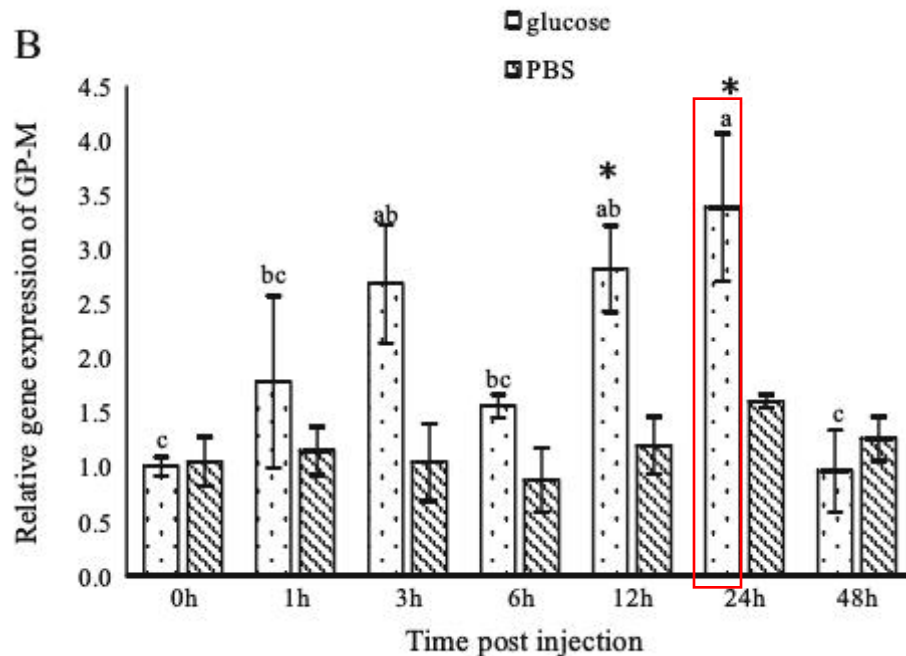
肌肉

肝脏GS和肌肉GS表达量分别在12h和24h显著升高，说明石斑鱼通过上调GS的表达量促进葡萄糖转化为糖原，来调节葡萄糖稳态。

糖原磷酸化酶GP



肝脏



肌肉

糖负荷后，肝脏GP和肌肉GP表达量在24h时显著升高，表明在一定程度上糖原的变化与GS的表达量是一致的。

总结

The background of the slide is a light blue gradient. In the center, there is a faint, semi-transparent graphic of a globe with a network of white lines crisscrossing over it, suggesting a global network or data flow. A horizontal line, colored blue and green, is positioned below the main title.

Part4

1.糖负荷后，石斑鱼血糖急剧升高，且需12h才能恢复到基础水平，表明石斑鱼具有葡萄糖不耐症和葡萄糖清除率低的特点。

2.糖负荷后，石斑鱼可通过调节GS和GP的表达量，来维持血糖稳态。

思考

Part5

文献中涉及的网址和软件，以及实验结果为以后论文的写作提供了参考。

The background features a light blue globe with a network of white lines connecting various points, suggesting a global or digital theme. The globe is centered and slightly faded.

THANKS

谢 谢 聆 听