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建鲤*IGF Ⅰa*基因的SNPs位点筛选及其与增重的相关性分析

SNPs identification and the correlation analysis with weight gain of *IGF Ⅰa* in 〖WTHX〗Cyprinus carpio 〖WTHZ〗var.〖WTHX〗 jian

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中文关键词: 建鲤 *IGF Ⅰa* SNPs 增重 相关性

英文关键词:*Cyprinus carpio var. jian* insulin like growth factor single nucleotide polymorphisms weight gain correlation

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中文摘要:

机体生长主要受到促生长激素释放激素—生长激素—胰岛素样生长因子(GHRH-GH-IGFs)生长轴调控，类胰岛素生长因子IGF Ⅰ是生长激素（GH）发挥生物学功能的重要传导因子。实验特异性扩增了建鲤(*Cyprinus carpio* var. *jian*) *IGF Ⅰa*基因的5个外显子和3个内含子（内含子1、内含子3和内含子4）。通过比对10尾建鲤的序列，共找到SNPs位点8个。使用PCR RFLP方法检测了5个家系共372尾建鲤的内含子1_C175G，12个家系共987尾的内含子1_A993G和内含子4_A511C 3个位点。内含子1_C175G雌雄个体均以GG型频率为最高，分别是0.44和 0.43； 此位点在幼鱼和成鱼时期与雌、雄建鲤增重均无相关性；内含子1_A993G雌雄个体均以AG型频率最高，分别是0.76和 0.72； 此位点在成鱼阶段与雄性建鲤增重呈显著相关($P<0.05$)；内含子4_A511C在雌雄个体中均以CC型频率最高，分别是0.48和0.47；其在幼鱼和成鱼阶段均与增重存在极显著的相关性($P<0.01$)。本次试验表明在建鲤体内，*IGF Ⅰ*基因在不同生长阶段的表达量不同，且处于同一生长阶段的雌雄个体间的表达也存在差异。内含子1_A993G、内含子4_A511C均与建鲤增重存在相关性，可以考虑作为建鲤分子育种的相关依据。

英文摘要:

The GHRH-GH-ⅠGFs growth axis plays an essential and central role in body growth. The insulin like growth factor, located downstream of the axis, is a critical conduction factor of GH transmission and biological function exertion. In this experiment, we specifically isolated 5 exons and 3 introns (intron1, intron3, and intron4) of *IGF Ⅰa* gene in *Cyprinus carpio var. jian*. A total of 8 SNPs were screened by comparing the sequences of 10 individuals. PCR RFLP was applied in detecting the intron 1_C175G genotypes of 372 individuals from 5 families; the intron 1_A993G and intron 4_A511C genotypes of 987 individuals from 12 families. And then we identified the genotype, counted the allele frequency and analyzed the correlation between the three SNPs and weight gain. The results showed that the GG genotype frequency (male 0.43 and female 0.44) was the highest in intron 1_C175G, while this locus showed no association with weight gain. Intron 1_A993G locus significantly correlated with male weight gain in adult stages ($P<0.05$) and AG genotype displayed the highest frequency, 0.76 in female and 0.72 in male. 0.48 in female and 0.47 in male of CC genotype was the highest allele frequency for locus intron 4_A511C, which was remarkably associated with both male and female weight gain in both juvenile and adult stages($P<0.01$). This experiment indicated that the expression of IGF Ⅰ gene varied between the different growth stages in *Cyprinus carpio var. jian*. Furthermore, expression diversity also existed between male and female individuals even at the same growth stage. The intron 1_A993G and intron 4_A511C were found significantly related with weight gain and could be considered as references in molecular breeding in *Cyprinus carpio var. jian.*

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