Abstract

F1 transgenic common carp, *Cyprinus carpio*, containing rainbow trout growth hormone gene, p-RSVrtGH1 cDNA were compared to non-transgenic full-sibling for percent fat, protein and moisture, amino acid profile and fatty acid profile. Percent protein was higher (*P < 0.05*) for transgenic individuals than for controls, (19.5 vs. 18.1). Percent fat was lower (*P < 0.05*) for transgenic common carp than for non-transgenic controls (3.3 vs. 3.8) Transgenic individuals had lower (*P < 0.05*) moisture content, 70.9%, than controls,(76.9% vs. 75.8%). Of the 18 amino acids examined the transgenic genotype had higher (*P < 0.05*) levels for the amino acids leucine, methionine and glutamic acid. Observed values for transgenic individuals were higher for all amino acids except glycine, alanine and proline. The ratio among the 18 amino acids remained the same except the percentages increased (*P < 0.05*) from 15.4 to 15.8% and 2.7 to 3.0%, and decreased from 6.6 to 4.9% for glutamic acid, histidine and glycine, respectively, for transgenic individuals relative to controls. The essential amino acid ratios (A/E ratios) of lysine and histidine were significantly higher (*P < 0.05*) in transgenic compared to control fish muscle. The C18:1 fatty acids dominated the fatty acid composition of both groups and fatty acid levels were unchanged in transgenic and control common carp.

Mapping of carp (*Cyprinus carpio*) and crucian carp (*Carassius auratus*) mitochondrial DNA with reference to restriction endonuclease analysis of their triploid hybrid mitochondrial DNA

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Abstract

The carp (*Cyprinus carpio*) and the crucian carp (*Carassius auratus*) are two typical freshwater fish cultured in China. Their artificial multiple triploid hybrid that was found to be fertile was induced by our laboratory. Restriction endonuclease fragment patterns of mtDNA were analyzed using eight kinds of six-base pair restriction endonuclease. The mtDNA physical maps of carp and crucian carp were constructed by means of seven different restriction endonuclease. Summing the molecular weight of fragments with each enzyme, the mitochondrial genomes from carp and crucian carp appear to be 17.0 kbp and 16.3 kbp, Circular hNA, respectively. It was found that the length and restriction site of the specific strain mtDNA showed relative stability, only one restriction endonuclease cut site was
different between the mirror carp and the red common carp (intraspecific comparison). However, the restriction endonuclease cut sites and fragment length of mtDNA between the carp and the crucian carp differ widely (interspecific comparison). Restriction endonuclease analysis of triploid hybrid mtDNA reveals that it appears to be the same as that of the maternal parent, the crucian carp. A series of small DNA molecules, ranging in size from 300 bp to 600 bp, was found in mitochondria of the triploid hybrid, but not in the parental individual. The origin and function of this kind of DNA, tentatively named heterogeneous small mitochondrial DNA (hss-mtDNA) are unknown and remained to be studied.

Differences in amino acid metabolism in Atlantic salmon (*Salmo salar* L.) and Arctic charr (*Salvelinus alpinus* L.) with genetically different trypsin isozymes

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Abstract

Protein metabolism was studied through facilitation of amino acids in the plasma and white muscle after a single feeding. Samples were taken immediately (0 h) and at 6, 12, 24, 48 and 72 hours post-feeding. The comparisons were made between Atlantic salmon with and without trypsin isozyme TRP-2*92 in the pyloric caeca, and between two strains of Arctic charr, an anadromous Hammerfest carrying trypsin isozyme TRP-2*92 and a non-anadromous Skogseid lacking the isozyme. The fishes were at the same age of about 1 e year old, and were differentiated individually after biopsy for pyloric caeca by labelling with Floy anchor tag.

During 2 weeks of the experimental period, there were no differences in growth between the two phenotypes of Atlantic salmon (0.38 ± 0.04% per day), while Hammerfest (0.52 ± 0.13% per day) grew slower than Skogseid (1.12 ± 0.04% per day) due to size differences.

Higher digestion and absorption of dietary protein were genetically associated with the presence of the isozyme in both species. Postprandial total free amino acids (FAA) levels in the plasma of Atlantic salmon carrying the isozyme were significantly higher, with faster and significantly higher elevation in their muscle, than those for Atlantic salmon lacking the isozyme. The levels also increased significantly in the plasma after feeding for Hammerfest, with faster and significantly higher elevation in their muscle than those in Skogseid charr. Higher levels of total FAA in the muscle may indicate genetically higher protein synthesis in the organism in general, while higher protein synthesis status at the time of studying was associated with higher elevation of muscle essential FAA, which resulted in higher ratio of essential to non-essential FAA in the muscle. Muscle glutamic acid may also indicate