

# Gene markers of dietary macronutrient composition and growth in the skeletal muscle of gilthead sea bream (*Sparus aurata*)

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## Abstract

To increase our current knowledge on the nutritional regulation of growth and gene expression pattern in fish skeletal muscle, the effect of dietary macronutrient composition was assessed on digestibility, nutrient retention, growth performance, and the mRNA levels of key genes involved in functionality, growth and development of the skeletal muscle in gilthead sea bream (*Sparus aurata*). Long-term starvation decreased the expression of myogenic regulatory factors such as Myod2, Myf5, myogenin (Myog) and Myf6 in the skeletal muscle of *S. aurata*. The supply of high or medium protein, low carbohydrate diets enhanced growth parameters, feed efficiency ratio, feed conversion ratio and significantly upregulated myod2. However, the supply of low protein, high carbohydrate diets restricted growth and stimulated the mRNA levels of myostatin, while downregulated follistatin (fst), igf1, mtor and rps6. Microarray analysis revealed igfals, tnni2, and gadd45a as gene markers upregulated by diets enriched with protein, lipids and carbohydrates, respectively. The results of the present study show that in addition to myod2, fst, igf1, mtor and rps6, the expression levels of igfals, tnni2 and remarkably gadd45a in the skeletal muscle can be used as markers to evaluate the effect of dietary macronutrient changes on fish growth and muscle development in *S. aurata*. © 2022 The Authors

## Author keywords

Dietary macronutrients; Gene expression; Gene markers; Growth; Muscle; *Sparus aurata*