

CHARACTERIZATION AND GENE EXPRESSION PATTERNS OF CALPAIN FAMILY IN STRIPED CATFISH

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Calpains are calcium-dependent intracellular neutral cysteine proteases that have been known to play an important role in post-mortem proteolysis and meat tenderisation in fish. In this study, the calpain family (CAPN) in striped catfish (Pangasianodon hypophthalmus) which is one of major aquaculture species in Vietnam was characterized. Firstly, the catfish genome database was searched for calpain gene family, then, classification, phylogenetic relationship and gene structure were analyzed. In striped catfish genome, 14 calpain genes were found that are orthologs to other vertebrate species, which were classified into typical and atypical calpains according to their structures. Next, the transcriptional gene expression of typical CAPN-1, -2, -3, -11, -13 genes in muscle, liver and brain tissues of the striped catfish were examined. The results showed that gene expression of CAPN-2 and CAPN-13 genes was barely detectable, while that of CAPN-1, -3, -11 genes was widely detected in all three types of tissues. In striped catfish muscle tissue, CAPN-3 transcript abundance was nearly three and 27 fold greater than CAPN-11 and CAPN-1, respectively. Our results suggest that CAPN-3 in P. hypophthalmus is also a muscle-specific calpain, which had been reported in other species. The results of this study provide a data resource for further research on the function of calpain genes and their genetic diversity that might be correlated with muscle texture in striped catfish.

Key words: Calpain family, CAPN, expression profile, Pangasianodon hypophthalmus, striped catfish.

ХАРАКТЕРИСТИКИ ТА ПАТЕРНИ ЕКСПРЕСІЇ ГЕНІВ РОДИНИ КАЛЬПАЇНІВ У ПАНГАСІАНОДОНА ВЕЛИКООКОГО

Кальпаїни — це залежні від кальцію внутрішньоклітинні нейтральні цистеїнові протеази, відомі сво-

єю важливою роллю, яку вони відіграють у post mortem протеолізі та тендеризації м'яса риби. У цьому дослідженні було проведено вивчення характеристик родини кальпаїнів (CAPN) у пангасіанодона великоокого (*Pangasianodon hypophthalmus*), який є одним із основних видів, використовуваних у рибоводному господарстві В'єтнаму. Спочатку було проведено пошук родини кальпаїнів у базі даних геному сомів, потім аналіз класифікації, філогенетичних відносин і структури гену. Було виявлено, що в геномі пангасіанодона великоокого 14 кальпаїнів є ортологами для інших видів хребетних, і проведено їхню класифікацію з поділом на типові та атипові кальпаїни згідно з їхньою структурою. Далі було проведено вивчення експресії транскрипційних генів, типових генів CAPN-1, -2, -3, -11, -13, у тканинах м'язів, печінки і мозку пангасіанодона великоокого. Результати продемонстрували, що експресія генів CAPN-2 і CAPN-13 була ледь помітною, у той час як експресія генів CAPN-1, -3, -11 була значною і спостерігалась у всіх трьох типах тканин. У тканині м'язів пангасіанодона великоокого наявність транскрипту CAPN-3 майже втричі та у 27 разів перевищувала показники CAPN-11 і CAPN-1, відповідно. Наші результати дозволяють припустити, що CAPN-3 у *P. hypophthalmus* також є кальпаїном, характерним для м'язів, як було відмічено у повідомленнях щодо інших видів. Результати цього дослідження надають дані для подальшого вивчення кальпаїнів та їхнього генетичного різноманіття, яке може корелювати з текстурою м'язів пангасіанодона великоокого.

Ключові слова: родина кальпаїнів, CAPN, профіль експресії, *Pangasianodon hypophthalmus*, пангасіанодон великоокий.

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