Aroonsiree Sriboonsan 2009: Characterization of Complementary DNA and Expression of Transferrin Gene in Günther's Walking Catfish (*Clarias macrocephalus* Günther). Master of Science (Aquaculture), Major Field: Aquaculture, Department of Aquaculture. Thesis Advisor: Mr. Prapansak Srisapoome, Ph.D. 104 pages.

The full-length of complementary DNA (cDNA) encoded for transferrin gene of Günther's walking catfish was successfully cloned using 5' and 3' Rapid Amplification cDNA Ends (RACEs) techniques. The complete cDNA of Günther's walking catfish transferrin comprised of 2,183 bp and contained open reading frame (ORF) of 1,884 bp or 628 amino acid residues. Structure of protein predicted on transferrin cDNA showed that this cDNA had two different lobes of iron binding domains (N- and C- lobes) which were held together by a short peptide or interdomain bridge. Sequence analysis revealed that these two lobes had high degree of sequence homology for each other. Transferrin cDNA of Günther's walking was also contained 8 iron binding ligands, 8 second shell-hydrogen-binding-networks, 4 dilysine triggers and 2 carbonate anion binding sites. Comparison analyses of nucleotide sequences between transferrin genes of Günther's walking catfish with other known organism transferrins showed the hightest similarity ranged from 50.5-60.8% to teleost transferrins. Reverse transcription polymerase chain reaction (RT-PCR) technique indicated that transferrin gene of Günther's walking catfish was uniquely expressed only in liver. Expression analysis by real-time RT-PCR was employed to determine the transcriptional response of tranferrin of Günther's walking catfish to bacterial injection at hour 0, 6, 12, 24, 48, 72 and 96, respectively. This study indicated that fish expossed to 10^7 colony forming unit (CFU)/ml of *Aeromonas hydrophila* resulted in significant up-regulation of transferrin mRNAs at hour 96 after challenging ($P<0.05$). On the other hand, the transcriptional expression levels of transferrin were found to be suppressed when fish were injected with 10^9 CFU/ml of *A. hydrophila*.

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