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Cloning and Characterization of a Cysteine Protease Gene from an Unique Korean *Polychaeta, Periserrula* leucophryna in the Yellow Sea and Its Expression

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We have cloned a novel cDNA encoding papain-family cysteine protease from λ TriplEx2 cDNA library of Polychaeta, *Periserrula leucophryna* and the gene was expressed using T7 promoter systems in *Escherichia coli*. The partial DNA fragment was amplified from total RNA by RT-PCR using degenerated primers derived from the conserved region of cysteine protease. The full-length cDNA of the cysteine protease (PLCP) was obtained by screening of the λ TriplEx2 cDNA library using p^{32}-labelled partial probe DNA. The PLCP gene consists of a nucleotide sequence 2591 bp (CDS: 173-1024 bp) encoding a polypeptide of 283 amino acids, which are composed of an 59-residue signal sequence, a 6-residue propeptide, and a 218-residue mature protein. Sequence analysis and alignment revealed significant sequence similarity to other eukaryotic cysteine proteases and the conserved catalytic triad of the Cys^{90}, His^{226}, and Asn^{250} residues which indicate C1 family of papain-like cysteine protease. Northern blot analysis showed 2.5 kb size of the transcript and specific expression patterns in head and skin. SDS-PAGE showed that the molecular weights of the protein was approximately 25 kDa (mature form) and the highest level of the expression was achieved at 6 hr induction. By optimizing the expression of the PLCP gene, the recombinant enzyme will be characterized.