Novel zinc protease gene isolated from *Dictyostelium discoideum* is structurally related to mammalian leukotriene A4 hydrolase

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**ABSTRACT.** The allantoicase (allC) gene of *Dictyostelium discoideum* allC RNAi mutant strain was silenced using the RNA interference technique. The mutant strain is motile, aggregated, and could not undergo further morphological development. The growth rate is high and the cells show a shortened cell cycle comparing with wild-type *D. discoideum*. However, the mechanisms regarding these actions remain unclear. mRNA differential display was used in this study to identify genetic differences. A novel *D. discoideum* gene (GenBank accession number: KC759140) encoding a new zinc protease was cloned. The amino acid sequence of the novel gene exhibited a conserved zinc-binding domain (HEX2HX18E) that allowed its classification into the M1 family of metallopeptidases. The gene encoded a 345-amino acid protein with a theoretical molecular mass of 39.69 kDa and a theoretical pl of 6.05. This protein showed strong homology with leukotriene A4 (LTA4) hydrolase of *Homo sapiens* (41% identity and 60% similarity at the amino acid level). By analyzing quantitative reverse transcription-
polymerase chain reaction data, this zinc protease gene was more highly expressed in *D. discoideum* allC RNAi mutant type than in wild-type KAx-3 cells during the trophophase. The novel zinc protease gene may function as an LTA4 hydrolase and contribute to the shortening of the allC RNAi mutant cell cycle.

**Key words:** *Dictyostelium discoideum*; Leukotriene A4 hydrolase; M1 family; Zinc-binding site