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Isolation of an invertebrate-type lysozyme from the nephridia of the echiura, *Urechis unicinctus*, and its recombinant production and activities

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1 **Isolation of an invertebrate-type lysozyme from the nephridia of the echiura, *Urechis unicinctus*,**
2 **and its recombinant production and activities**

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17 **Keywords:** *Urechis unicinctus*, invertebrate-type lysozyme, protein isolation, recombinant protein
18 production, non-enzymatic antibacterial activity

19
20 **Abbreviations:** AA, amino acid; CFU, colony forming unit; HEWL, hen egg white lysozyme; HPLC,
21 high performance liquid chromatography; IPTG, isopropyl β -D-1-thiogalactopyranoside; MEC,
22 minimal effective concentration; NAG, N-acetylglucosamine; NAM, N-acetylmuramic acid; nano
23 LC-MS/MS, nanoscale liquid chromatography coupled to tandem mass spectrometry; ORF, open
24 reading frame; PBS, phosphate-buffered saline; PCR, polymerase chain reaction; Q-TOF, quadrupole
25 time-of-flight; RACE, rapid amplification cDNA ends; RT-qPCR, real-time quantitative PCR; SDS-
26 PAGE, sodium dodecyl sulfate-polyacrylamide gel electrophoresis; TFA, trifluoroacetic acid; TSB,
27 tryptic soy broth; URDA, ultrasensitive radial diffusion assay; UPLC, ultraperformance liquid
28 chromatography; UTR, untranslated region

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