Cloning, Expression and Molecular Modelling of a New Carboxypeptidase Inhibitor from "Andean Potato"

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Until now only a few proteases inhibitors (PIs) have successfully progressed through clinical trials and are currently available as relatively safe and effective medicines for humans. They are used in the treatment of diseases like cancer1, parasite infections such as Malaria2, cardiovascular3 and neurodegenerative disorders including Alzheimer4. Plant inhibitors for many proteases are known and described, but natural carboxypeptidases inhibitors are rarely reported. A new potato carboxypeptidase inhibitor (PCI) was isolated from Andean potato. A partial PCI-cDNA clone was obtained through 3’ RACE-PCR using total RNA extracted from roots and primers designed from the conserved domains and the poly A tail. The amplified cDNA encodes a polypeptide that contains a 27 residue N-terminal pro-region, the 39 residue mature PCI protein, and a 7 residue C-terminal extension5. Alignment and phylogenetic analysis show that the new PCI contains three disulfide bonds, but the secondary binding site shows interesting changes compared to the known PCI. The novel PCI was expressed in E. coli as a recombinant protein. We propose to purify and characterize this new inhibitor against target proteases involved in specific pathologies for the development of new biodrugs.

Word keys: Inhibitor, biodrugs, potatoes

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