cDNA Sequence, Amino Acid Sequence, and Molecular Model of Grasshopper Lectin (GHA) MAS

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Grasshopper lectin (GHA) is an immuno-molecule with a role in defense and protection mechanisms of the insect. Molecular cloning and DNA sequencing procedures are used to characterize the lectin molecule. A cDNA library constructed in a lambda gt11 expression vector yielded an antibody-positive clone that contained a 300 bp cDNA that was labeled and used to isolate additional positive clones by hybridization to DNA lifts. An 879 bp cDNA fragment coding for the amino portion of the GHA protein was isolated, cloned, and sequenced. The carboxyl region of the protein was obtained through 3' RACE procedures to yield an entire open reading frame coding for a protein of 324 amino acids, followed by a 147 nt 3' NTR. A 1000 nt 5' NTR was identified by 5' RACE procedures. The deduced amino acid sequence shows familial homology when aligned with that of other C-type lectins. The GHA molecule is novel among the invertebrate lectins in that it contains two carbohydrate recognition domains (CRD), presumably having arisen by a gene duplication event. A 3D homology model of one CRD has been generated based on the crystalline structures of two related vertebrate lectins.