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Germins and germin-like proteins (GLPs) play diversified roles in plant development and basic defense. In this study, 36 EST-clones encoding GLPs were identified. Sequence similarity analysis demonstrated that the peanut genome possessed multi-gene family encoding at least 8 GLPs, named AhGLP1 to AhGLP8. Out of the 8 AhGLPs, three (AhGLP1 AhGLP2 and AhGLP3) were identified in 14, 10 and 7 EST clones, respectively, whereas the remaining ones were identified in a single clone. The length of the deduced amino acid residues of AhGLPs is ranged from 208 to 223 with exceptions of AhGLP6 and AhGLP8, which was incomplete at carboxyl terminus. All the AhGLPs contained a possible N-terminal signal peptide with a range of 17-24 residues in length excluding AhGLP7, which was predicted to contain a non-cleavable amino-terminal sequence. Phylogenetic analysis showed that these AhGLPs were classified into three subfamilies (subfamily 1, 2 and 3). All AhGLPs shared the conserved structural motifs that other known GLPs have. Southern blot analysis revealed that AhGLP1 and AhGLP2 likely have at least four copies in the allotetraploid peanut genome. The recombinant mature AhGLP1 and AhGLP2 proteins were successfully expressed in E. coli. The purified recombinant AhGLP2 protein shows the superoxide dismutase activity in enzymatic assay. However, attempts to demonstrate oxalate oxidase (OXOX) activity for AhGLP2 protein have failed. The superoxide dismutase (SOD) activity related to AhGLP2 was stable up to 70°C and resistant to high concentration of hydrogen peroxide, which revealed that AhGLP SOD might be a manganese-containing SOD. Moreover, AhGLP2 was capable of providing protection in E. coli against oxidative damage attributable to free radicals caused by the herbicide paraquat, suggesting that AhGLP associated with SOD activity will likely protect peanut from reactive oxygen metabolites. In summary, the results provide the insight information into the diverse nature of the peanut GLP family and suggest that some of AhGLPs might play an important role in plant defense responding to environmental abiotic or biotic stress.