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Nucleotide sequence of a rat glutathione peroxidase cDNA

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Glutathione peroxidase is present in both cytosols and mitochondria of the cells to protect membranes and DNAs against peroxidative damage (1). We have isolated cDNA clones coding for the rat enzyme by screening a Sprague-Dawley rat liver cDNA library constructed in λgt11 (Clontech Laboratories, Inc., Palo Alto, CA) with a synthetic oligonucleotide with sequence according to the known nucleotide residues 113 to 187 of the mouse gene (2). One hundred forty hybridized clones were obtained from approximately 350,000 recombinant bacteriophages. The nucleotide sequence of one of the longest cDNA inserts showed that, similar to the mouse and human genes (2-4), the selenocysteine in the active site is encoded by the nonsense codon "TGA" (Fig. 1, as indicated by the underline). The deduced amino acid sequence of the rat enzyme is 94% and 86% homologous to those of the mouse and human enzymes, respectively (2-4).

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G TCATACCCAC GTGGATATTC ATAACACAAT TGCCGGCTTC TCACAGAGCT GTGACCTTTA TCCAGGAGAT GATTTGTTTG AACTACTTCC CAAGAATTGC CGTGGCT   108

GCC CCAGGGAGAT ACCTGTAGAC AGCCCGGAGC TGAAGGAGGC ACTTGGTCAT TCCATTGCAC AGCTTAATGC ACAGCATAAC CATATTTTCT ATTTCAAGAT TGACA   216

CCGTG AAAAAGGCAA CATCACAGGT GGTTGCTGGA GTAATATATG TGATTGAGTT CATAGCCAGA GAAACTAACT GTTCCAAGCA AAGTAAAACA GAACTGACAG CGG   324
                                  1                                   10                                      20
                                  Met Ser Ala Ala Arg Leu Ser Ala Val Ala Gln Ser Thr Val Tyr Ala Phe Ser Ala Arg Pro Leu
ATTTTTG AGTCCAATAT CTTCTACAGT     ATG TCT GCT GCT CGG CTC TCC GCG GTG GCA CAG TCC ACC GTG TAT GCC TTC TCC GCG CGC CCG CTG   417
                             30                                      40                                      50
Ala Gly Gly Glu Pro Val Ser Leu Gly Ser Leu Arg Gly Lys Val Leu Leu Ile Glu Asn Val Ala Ser Leu SeC Gly Thr Thr Thr Arg
GCG GGC GGG GAG CCC GTG AGC CTG GGC TCC CTG CGG GGC AAG GTG CTG CTC ATT GAG AAT GTC GCG TCC CTC TGA GGC ACC ACG ACC CGG   507
                             60                                      70                                      80
Asp Tyr Thr Glu Met Asn Asp Leu Gln Lys Arg Leu Gly Pro Arg Gly Leu Val Val Leu Gly Phe Pro Cys Asn Gln Phe Gly His Gln
GAC TAC ACC GAA ATG AAT GAT CTG CAG AAG CGT CTG GGG CCT CGT GGC CTG GTG GTG CTC GGT TTC CCG TGC AAT CAG TTC GGA CAT CAG   597
                             90                                     100                                     110
Glu Asn Gly Lys Asn Glu Glu Ile Leu Asn Ser Leu Lys Tyr Val Arg Pro Gly Gly Gly Phe Glu Pro Asn Phe Thr Leu Phe Glu Lys
GAG AAT GGC AAG AAT GAA GAG ATT CTG AAT TCC CTC AAG TAT GTC CGA CCC GGT GGT GGG TTC GAG CCC AAC TTT ACA TTG TTT GAG AAG   687
                            120                                     130                                     140
Cys Glu Val Asn Gly Glu Lys Ala His Pro Leu Phe Thr Phe Leu Arg Asn Ala Leu Pro Ala Pro Ser Asp Asp Pro Thr Ala Leu Met
TGC GAG GTG AAT GGT GAG AAG GCT CAC CCG CTC TTT ACC TTC CTG CGG AAT GCC TTG CCA GCA CCC AGT GAC GAT CCC ACT GCG CTC ATG   777
                            150                                     160                                     170
Thr Asp Pro Lys Tyr Ile Ile Trp Ser Pro Val Cys Arg Asn Asp Ile Ser Trp Asn Phe Glu Lys Phe Leu Val Gly Pro Asp Gly Val
ACC GAC CCC AAG TAC ATC ATT TGG TCC CCG GTG TGC CGC AAC GAC ATT TCC TGG AAC TTT GAG AAG TTC CTG GTA GGT CCA GAC GGT GTT   867
                            180                                     190                                     200
Pro Val Arg Arg Tyr Ser Arg Arg Phe Arg Thr Ile Asp Ile Glu Pro Asp Ile Glu Ala Leu Leu Ser Lys Gln Pro Ser Asn Pro  *
CCA GTG CGC AGA TAC AGC AGG CGC TTT CGC ACC ATC GAC ATC GAA CCC GAT ATA GAA GCC CTG CTG TCC AAG CAG CCT AGC AAC CCC TAA   957

GGCATTCCTG GTATCTGGGC TTGGTGATGG CTGGCTGCCC TCCGGGGGGA GGTTTTTCCA TGACGGTGTT TCCTCTAAAT TTACATGGAG AAACACCTGA TTTCCAGAA  1066

A AATCCCCTCA GATGGGCGCT GGTCTCGTCC ATTCCCGATG CCTTTACGCC TAAAGAAAGG CGGTTTCACC ACTAAGAATA AAGTGCTGAA TGTC                 1161
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Figure 1. Nucleotide sequence and deduced amino acid sequence of rat glutathione peroxidase cDNA.

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