



Giant panda ribosomal protein S14: cDNA, genomic sequence cloning, sequence analysis, and overexpression

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ABSTRACT. RPS14 is a component of the 40S ribosomal subunit encoded by the *RPS14* gene and is required for its maturation. The cDNA and the genomic sequence of *RPS14* were cloned successfully from the giant panda (*Ailuropoda melanoleuca*) using RT-PCR technology and touchdown-PCR, respectively; they were both sequenced and analyzed. The length of the cloned cDNA fragment was 492 bp; it contained an open-reading frame of 456 bp, encoding 151 amino acids. The length of the genomic sequence is 3421 bp; it contains four exons and three introns. Alignment analysis indicates that the nucleotide sequence shares a high degree of homology with those of *Homo sapiens*, *Bos taurus*, *Mus musculus*, *Rattus norvegicus*, *Gallus gallus*, *Xenopus laevis*, and *Danio rerio* (93.64, 83.37, 92.54, 91.89, 87.28, 84.21, and 84.87%, respectively). Comparison of the deduced amino acid sequences of the giant panda with those of these other species revealed that the RPS14 of giant panda is highly homologous with those of *B. taurus*, *R. norvegicus* and *D. rerio* (85.99, 99.34 and 99.34%, respectively), and is 100% identical with the others. This degree of conservation of RPS14 suggests evolutionary selection. Topology prediction shows that there

are two N-glycosylation sites, three protein kinase C phosphorylation sites, two casein kinase II phosphorylation sites, four N-myristoylation sites, two amidation sites, and one ribosomal protein S11 signature in the RPS14 protein of the giant panda. The *RPS14* gene can be readily expressed in *Escherichia coli*. When it was fused with the N-terminally His-tagged protein, it gave rise to accumulation of an expected 22-kDa polypeptide, in good agreement with the predicted molecular weight. The expression product obtained can be purified for studies of its function.

Key words: cDNA cloning; *RPS14*; Giant panda; Overexpression; *Ailuropoda melanoleuca*; Genomic cloning