P16

Characterization of Protein L-isoaspartyl Methyltransferase Purified from Porcine Testis

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L-asparaginyl and L-aspartyl residues in proteins are subject to spontaneous degradation reactions generating isomerized and racemized aspartyl derivatives. Proteins containing L-isoaspartyl and D-aspartyl residues usually have altered structures and diminished biological activities. These residues can be recognized and be repaired to normal L-aspartyl residues by protein L-isoaspartyl methyltransferase(PIMT), which is present at high levels in testis. Although testicular PIMT have been shown to be invoved in either sperm motility or sperm maturation, it may play an important role in the repair of damaged sperm proteins during the prolonged period of epididymal transport and storage. In the present study, as a initial step toward elucidating the function of protein carboxylmethylation in testis, we purified PIMT from porcine testicular cytosol as a momeric 27,000 Da species by ammonium sulfate precipitation, DEAE-sephacel chromatography, SAH-liganded affinity chromatography, and gel filtration chromatography. The optimum pH for the reaction was 6.0. K_m values of the enzyme for the S-adenosyl-L-methionine (SAM), synthetic oligopeptide(VYP-L-isoD-HA) and histone type II-As were 1.0 μM, 33.2 μM and 276 μM respectively. Consequently, properties of the porcine testicular PIMT is similar to that of other mammalian PIMTs.