Aap1p is an alanine/arginine aminopeptidase that localizes to the nucleus and cytoplasm. Aap1p acts as a positive regulator of glycogen accumulation, either directly or indirectly. AAP1 is constitutively expressed under normal growth conditions, and is induced in a Gcn4p-dependent manner in response to histidine starvation. AAP1 expression is decreased in an mpk1 null mutant relative to wild-type in response to linoleic acid hydroperoxide.aap1 null mutants are viable, but accumulate less glycogen than wild type at the diauxic shift when glucose is depleted from the medium, and display a slight dampening of the heat shock response. Overproduction of Aap1p results in hyperaccumulation of glycogen, an increased growth rate on acetate-based medium, and increased expression of the HSP70-related SSA3 gene during entry into stationary phase. Overproduction also suppresses the temperature-sensitive growth defect of an spr5-27 mutant on non-fermentable carbon sources.Aap1p is a member of the M1 family of metalloaminopeptidases, which includes Ape2p and bacterial and mammalian membrane alanyl aminopeptidases, mammalian glutamyl aminopeptidases and leukotriene A-4 hydrolases. Aap1p also has similarity to Aspergillus niger ApsA and to mouse pre-B cell antigen BPI.