SDP1 encodes a protein-tyrosine phosphatase with sequence similarity to mammalian dual-specificity MAP kinase phosphatases. Sdp1 is a stress-inducible enzyme that specifically interacts with and dephosphorylates the stress-activated Slt2p MAP kinase following heat shock. Slt2 is also activated in response to oxidative stress, conditions under which mammalian MKPs are reversibly inactivated by oxidation of the catalytic cysteine residue. However, Sdp1p employs a novel catalytic mechanism that may allow it to remain active under oxidative conditions. When oxidized, both Sdp1p and its paralog Msg5p form a disulfide bond between two additional cysteine residues. This disulfide is required for selective recognition of a tyrosine phosphorylated MAPK substrate and for optimal catalytic activity. Disulfide bond formation appears to be specific to the budding yeast MPKs, which are significantly diverged from metazoan and plant MPKs, and is not found in dual-specificity MKPs from filamentous fungi or fission yeasts.Under normal growth conditions, Sdp1p is diffusely localized in both the nucleus and cytoplasm, but translocates to punctate spots throughout the cell after heat shock. SDP1 transcription is induced by several stress conditions in an Msn2p/Msn4p-dependent manner, but is independent of the Rlm1p transcription factor, a downstream target activated by Slt2p.Sdp1p specifically interacts with the stress-activated Slt2p MAP kinase, and expression of an inactive mutant of Sdp1p causes the accumulation of phosphorylated Slt2p, indicating that Slt2p is a physiological target of the Sdp1p phosphatase. Heat shock-induced Slt2p phosphorylation levels are elevated in the absence of Sdp1pand Sdp1p is required for the dephosphorylation of Slt2p during oxidative conditions.Regarding usage of the SDP1 nameThe SDP1 name has also been used for a recessive extragenic suppressor of temperature-sensitive mutations in the POL3 gene encoding the catalytic subunit of DNA polymerase delta. However, as of July 2007, the gene corresponding to this POL3 suppressor mutation has not yet been identified.