Activator protein 1 (AP-1) is a transcription factor that regulates gene expression in response to a variety of stimuli, including cytokines, growth factors, stress, and bacterial and viral infections.

AP-1 controls a number of cellular processes including differentiation, proliferation, and apoptosis.

The structure of AP-1 is a heterodimer composed of proteins belonging to the c-Fos, c-Jun, ATF and JDP families.

The Fos gene family consists of 4 members: c-Fos, FOSB, FOSL1, and FOSL2. These genes encode leucine zipper proteins that can dimerize with proteins of the JUN family, thereby forming the transcription factor complex AP-1. As such, the FOS proteins have been implicated as regulators of cell proliferation, differentiation, and transformation.

Marques et al. identified the AP-1 transcription factor FOSL1 as a key regulator of the mesenchymal (MES) subtype.

They provided a mechanistic basis to the role of the neurofibromatosis type 1 gene (NF1), a negative regulator of the RAS/MAPK pathway, in Glioblastoma mesenchymal transformation through the modulation of FOSL1 expression. Depletion of FOSL1 in NF1-mutant human BTSCs and Kras-mutant mouse neural stem cells results in loss of the mesenchymal gene signature and reduction in stem cell properties and in vivo tumorigenic potential. This data demonstrate that FOSL1 controls Glioblastoma plasticity and aggressiveness in response to NF1 alterations [1)].

1)
Marques C, Unterkircher T, Kroon P, Oldrini B, Izzo A, Dramaretska Y, Ferrarese R, Kling E, Schnell O, Nelander S, Wagner EF, Bakiri L, Gargiulo G, Carro MS, Squatrito M. NF1 regulates mesenchymal glioblastoma plasticity and aggressiveness through the AP-1 transcription factor FOSL1. Elife. 2021 Aug 17;10:e64846. doi: 10.7554/eLife.64846. PMID: 34399888.