

Localization of SAUR proteins to the plasma membrane through protein-lipid interactions.

Punita Nagpal^{1,2}, Paul H. Reeves¹, Brendan Trinidad¹, Laia Armengot-Martinez², Yvon Jaillais², Jason W. Reed^{1,2}

¹Department of Biology, University of North Carolina at Chapel Hill, U.S.A.

²Laboratoire de Reproduction et Developpement des Plantes, Ecole Normale Superieure de Lyon, France

The Small Auxin Up RNA (SAUR) proteins are a large plant-specific family, many of which are produced in growing cells. Increased SAUR activity induces substantial increases in cell growth or in stomatal aperture when expressed in growing cells or in guard cells. Many SAUR proteins associate with the plasma membrane to regulate activity of the PM H⁺-ATPase and possibly other targets. We have found that the SAUR63 protein associates with the plasma membrane through electrostatic interactions between an N-terminal predicted amphipathic α -helix and negatively charged phosphatidylinositol phosphate lipids (PIPs) in the plasma membrane. Experiments with variant SAUR63:YFP proteins indicate that this interaction is necessary and sufficient for growth-promoting activity. Among several other SAUR proteins we have tested, some have similar N-terminal localization motifs, whereas others have distinct localization properties. These results suggest diversity of regulatory mechanisms among different classes of SAUR proteins.