BIN1 is a novel MYC-interacting protein with features of a tumour suppressor. BIN1 is a novel protein that interacts with the functionally critical Myc box regions at the N terminus of the MYC oncoprotein. BIN1 is structurally related to amphiphysin, a breast cancer-associated autoimmune antigen, and RVS167, a negative regulator of the yeast cell cycle, suggesting roles in malignancy and cell cycle control. Consistent with this likelihood, BIN1 inhibited malignant cell transformation by MYC. Although BIN1 is expressed in many normal cells, its levels were greatly reduced or undetectable in 14/27 carcinoma cell lines and 3/6 primary breast tumours. Deficits were functionally significant because ectopic expression of BIN1 inhibited the growth of tumour cells lacking endogenous message. We conclude that BIN1 is an MYC-interacting protein with features of a tumour suppressor.