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Functional and genetic characteristics of Sac3p and its domains

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1. By examining the behaviour of GFP-sac3NM-Nup constructs, we can conclude, that we could relocalise the sac3NM-domains to the nuclear envelope with three different nucleoporins (Nup60, Nup42, Nsp1C). As the construct with Nup60 complemented both the mRNA-export defect and the growth defect of the strains with NM-domains (N-terminal plus middle domains) alone, we conclude, that the correct location with respect to SAC3 is the inner side of the nuclear pore complex, as this nucleoporin resides in the nucleoplasmic side of the nuclear pore complex (NPC), whereas Nup42 is located on the cytoplasmic face, and Nsp1C has a symmetrical distribution. Nevertheless, the C-terminal domain can be substituted with a pore-targeting molecule without severely influencing the function of the SAC3-protein. This means, that the main function of the C-terminal domain of Sac3p is ensuring its location in the inner side of NPC, whereas the NM-domain seems to be more or less enough for exerting its function, when targeted to the inner side of NPC, either the location is ensured by the original C-terminal domain, or by another pore-targeting molecule.

2. SAC3 is not sl with either NUP1 or NUP60, but NUP1 is sl with NUP60, which can mean, that they have a redundant function in targeting Sac3p to the inner side of the NPC. The Sac3p is

mislocalised in case of deleting the Nup1-gene, whereas in the Nup60-deletion strain this effect is not too strong. Thus Nup1 plays an important role in the targeting of Sac3p to the NPC.

3. We could set up an sl-screen for investigating the genetic relationship between SAC3 and other genes. So far we have found two new sl-genes for SAC3, encoding a transcription factor and a protein with unknown function. Neither of the deletion strains of these genes show an mRNA-export defect, interestingly.

4. The THP1 gene shows sl-relationship with YRA1 and MEX67, but not with NUP1, NUP60 or SAC3. Deletion strains of THP1 gene exhibit an mRNA-export defect. These data together show, that it has an important function in mRNA-export. Its described functions, and its biochemical interaction with SAC3, however, can point out the presence of another link, connecting the mRNA-export and the transcriptional processes.