

P032 Esf2p, a U3-associated factor required for the initial steps of small ribosomal subunit synthesis

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Ynr054cp (Esf2p) is the yeast homolog of mouse ABT1, a protein previously identified as a putative partner of the TATA-element binding protein TBP. However, large-scale studies have indicated that Esf2p is primarily localized to the nucleolus, and that it physically associates with pre-rRNA processing factors. Here, we show that *ESF2*-depleted cells are defective for pre-rRNA processing at the early nucleolar cleavages A0-A2 and consequently are inhibited for 18S rRNA synthesis. Esf2p was stably associated with 5'- external transcribed spacer (ETS), the box C+D snoRNA U3, as well as additional box C+D snoRNAs and proteins enriched within 90S pre-ribosomes. Esf2p co-localized on glycerol gradients with 90S pre-ribosomes and slower migrating particles containing 5'-ETS fragments. Strikingly, upon Esf2p depletion, the sedimentation profile of U3 and other snoRNAs was severely affected with a notable shift towards fast migrating particles including 90S pre-ribosomes. These results demonstrate that Esf2p plays a key role in early ribosome biogenesis and suggest that the protein is required to remodel the structure of the 90S pre-ribosome following early nucleolar cleavages, possibly through recycling the U3 RNP. The identification of ABT1 in a large-scale analysis of the human nucleolar proteome suggests that this role may also be conserved in mammals.