export. Using yeast mutants defective in the *CRM1* gene or sensitive to Leptomycin B (Crm1p inhibitor) we found that SA2 is exported from the nucleus in a Crm1p-dependent manner. We assume that such export can be an element of SA1-SA2 exchange in the cohesin complex. At present, the putative NES-es are tested to identify those which are indeed functional.

Moreover, although SA proteins can not replace Irr1p we found that their presence in yeast cells provoked phenotypic changes, which indicates that some functions are interchangeable between yeast and human cohesins.

Key words: chromosome, segregation, nucleus, protein, transport

30) LOCALIZATION OF Nopp140 WITHIN MAMMALIAN CELLS DURING INTERPHASE AND MITOSIS

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Nopp140 is a nonribosomal, nucleolar protein. Unlike most other nucleolar proteins, Nopp140 does not carry RNA-binding motifs or glycine/arginine-rich stretches, as deduced from the known primary sequences of different species. On the contrary, its amino- and carboxy-termini are separated by a long, central domain, consisting of ten repeats of acidic serine clusters alternating with lysine-, alanine-, and proline-rich basic stretches. Most serine residues of the acidic repeats are phosphorylated by casein kinase 2, which makes Nopp140 one of the most highly phosphorylated proteins in the cell with ~80 phosphates per molecule. Nopp140 has also been detected in the dense fibrillar component of nucleoli and in Cajal bodies. Despite these biochemical characteristics and these locations, the biological functions of Nopp140 are still unclear.

In order to shed light on the cellular function of Nopp140, we re-investigated the precise location of this protein within different mammalian cells during the cell cycle by immunofluorescence confocal microscopy coupled to three-dimensional (3D) image reconstructions and immunogold electron microscopy.

During interphase, 3D image reconstructions of confocal sections revealed that nucleolar labelling appeared as several tiny spheres organized in necklaces. Moreover, after an immunogold labelling procedure, gold particles were detected not only over the dense fibrillar component but also over the fibrillar centers of nucleoli in untreated and actinomycin D-treated cells. Labelling was also consistently present in Cajal bodies. After pulse-chase experiments with BrUTP, colocalization was more prominent after a 10-15 min chase than after a 5 min chase.

During mitosis, confocal analysis indicated that Nopp140 organization was lost. The protein dispersed between and around the chromosomes in prophase. From prometaphase to telophase, it was also detected in numerous cytoplasmic nucleolus-derived foci. During telophase, it reappeared in the reforming nucleoli of daughter nuclei.

Altogether, these results strongly suggest that Nopp140 could be a component implicated in the early steps of pre-rRNA processing.