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Synaptonemal complexes in Neurospora

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Abstract

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Synaptonemal complexes have been identified in nuclei of N. crassa at pachytene, using the technique developed with Neottiella by Westergaard and von Wettstein (1970 Compt. Rend. Trav. Lab. Carlsberg 37: 195) for isolating; embedding and sectioning single asci. Prior to isolation of asci, the perithecia from a cross between wild type strain 74A and lysine-requiring asco strain 374020 (FGSC#405) were fixed for 6 hours in 6.5% glutaraldehyde dissolved in 0.067 M phosphate buffer at pH 7.0. After washing in buffer, pest-fixation in 2% OsO_4 in buffer was carried out. Crosser were executed according to Barry (1966 Neurospora Newsl. IO: 12), 300 mg/l lysine being added to the crossing medium.

Unlike in Neottiella, the chromatin of the pachytene bivalents of N. crassa is poorly contrasted and difficult to distinguish from the nucleoplasm in electron micrographs. However, the components of the synaptonemal complex are distinctly contrasted. The synaptonemal complex is absent from nuclei which, according to ascus size, should be at early diplotene (Barry 1969 Chromoromo 26: 119).

The synaptonemal complex in N. crassa consists of two binded lateral components (co. 400 Å in diameter) which are held about 1200 Å apart by a central region containing the ca. 200 Å thick central component. The later.1 components seem to contain alternating thick and thin bands with a center to center spacing of about 170 A. Thus they are similar to Neottiella and other ascomycetes (Westergaard and von Wettstein 1970 Rev. Cytol. et Biol. veg. 33: 1). Occasional local thickenings of the central component into electron dense nodes ca. IWO Å x 500 Å in section are characteristic for the synaptonemal complex of N. crassa. These nodes partly fill the space of the central region and are larger than the electron dense granules described by Schrantz (loc. cit.) in the central components of Pustularia cupularis and Galactinia plebia. - - - Institute of Genetics, University of Copenhagen, Øster Farimagsgade 2A, DK-1353, Copenhagen K., Denmark