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The template for 5S ribosomal RNA is not necessary for formation of a nucleolus — Ribosomes in eukaryotic organisms (excluding ribosomes in mitochondria and chloroplasts) are 80S and are composed of a 60S subunit and a 40S subunit. The 60S subunit contains a 28S rRNA (ribosomal RNA) molecule and the 40S subunit contains an 18S rRNA molecule. The templates for 18S and 28S rRNAs are at the nucleolar organizing region in all eukaryotic organisms analyzed including maize (Phillips, Kleese and Wang 1971, Chromosoma (Berl.) 36:79-88). McClintock (1934, Zeitschr. Zellf. U. Mikr. Anat. 21:294-328) demonstrated that the nucleolar organizing region on chromosome 6 is necessary for formation of the nucleolus in maize.

In addition, each 60S ribosomal subunit contains a 5S and a 7S rRNA molecule. Recently, the location of the template for 5S rRNA has been determined in maize using in-situ hybridization of ^{125}I-labeled 5S maize rRNA with maize pachytene chromosomes (Wimber, Duffey, Steffensen and Prensky 1974, Chromosoma (Berl.) 47:353-359). The template for 5S rRNA is located on the long arm of chromosome 2.

The purpose of the current study was to determine if the template for 5S rRNA is also necessary for the formation of a normal nucleolus. In other words, is the 5S rRNA template also a nucleolar organizing region? For this purpose, meiosis in plants monosomic for the chromosome bearing the 5S template (monosomic 2 plants) was studied.

The monosomic 2 plants were selected from progeny of a cross between R/r-X1 plants in inbred W22 with Mangelsdorf's Multiple Chromosome Tester (see Weber 1973, Theoret. Appl. Genetics 43:167-173). Microsporocyte samples were taken from monosomic 2 plants, fixed and analyzed by the propio-carmine squash technique. All monosomic 2 plants were analyzed at diakinesis to verify that an entire chromosome was missing.

A monosomic 2 plant contains only one chromosome 2; thus, no more than two microspores of a quartet of microspores could contain a chromosome 2. Since a univalent chromosome is often lost during meiosis, some of the quartets contain a chromosome 2 in only one member, and other quartets would not include any chromosome 2.

If the 5S rRNA template is necessary for formation of a normal nucleolus, then normal nucleoli would be present in no more than two of the four members of a quartet in a monosomic 2 plant. However, if the 5S rRNA is not necessary for the formation of a normal nucleolus, then normal-appearing nucleoli would be present in all four members.

Four monosomic 2 plants were analyzed, and the following results were obtained:

Plant Number	Quartets with normal nucleoli in		
	4 cells	3 cells	other
3549-31	200	0	0
3550-14	276	2	0
4374-53	278	0	0
4480-27	259	0	0
Total	1013	2	0

In each quartet the four nucleoli appeared identical. It is clear from these data that the 5S template is not necessary for formation of a normal-appearing nucleolus at the quartet stage. Thus, the 5S rRNA template is not a nucleolar-organizing region in these cells. [Research supported in part by U. S. Atomic Energy Commission Contract AT(11-1)-2121].

David F. Weber

A test of the effects of DPX 3778 on the meiotic cytology in Zea mays — DPX 3778, an experimental compound from E. I. DuPont De Nemours and Co., Inc., appears to have promise as a pollen control agent. Extensive tests in several laboratories (Laible and Kincaid in this Newsletter, and others) indicate that relatively low amounts of this compound (as low as 0.5 lb/A) can prevent pollen release in corn, so that use of this compound might be an alternative for detasseling in commercial seed production.

In addition, this compound can induce production of silks and kernels in the staminate inflorescence, cause bent or curved tassels, induce both flowers in some spikelets to function and delay silking time (Laible and Kincaid in this News Letter; Charles Laible, personal communication).

Because this compound has such a wide spectrum of effects, and because it is effective in preventing pollen release if it is applied near the time that meiosis is taking place, it was felt that this chemical might also affect meiosis. At the time this study was carried out, the most effective time to treat plants was believed to be at the time meiosis was taking place. However, it is now known that if plants are treated 7 days before anthesis (long after meiosis is completed), the chemical is effective as a pollen control agent.

Plants of the inbred KYS were sprayed with DPX 3778 as an over-the-top spray at a rate of 5 lb/A. Microsporocyte samples were taken at 4, 8.5 and 48.5 hours after treatment. The microsporocyte samples were fixed and prepared for slides by the propio-carmine squash method. Pachytene, diakinesis, metaphase I, anaphase I,