

segment of the NOR indicating that most of the rDNA cistrons are located in this segment. However, at pachynema the duplicated heterochromatic segment associates with the nucleolus only 16 percent of the time, and 13 percent of the time forms either nucleolar "bubbles" at the center of the heterochromatic segment or a small secondary nucleolus. Cells with only one nucleolus, to which the duplicated segment is not associated, occur 71 percent of the time. At diakinesis ten bivalents are present and only one is associated with the nucleolus. Since the duplicated heterochromatic segment generally is not associated with the nucleolus at pachynema or diakinesis, it is concluded that these cistrons are inactive, at least in microsporogenesis. Hybridization data for the two different duplications of the "euchromatic" segment as compared to appropriate controls show that there are relatively few cistrons located in this segment. Pachytene analysis of these two duplications indicates that the duplicated "euchromatic" segment is intimately associated with the nucleolus more than 95 percent of the time; two nucleoli are formed less than 2 percent of the time. At diakinesis ten bivalents are present and two are associated with the nucleolus. From these observations it is concluded that the "euchromatic" segment contains the active rDNA cistrons, although relatively few in number.

GLADSTONE, PAUL. University of Washington, Seattle. Glucose repression of clamp production in diploids of *Schizophyllum commune*. — The ability of two homokaryons to mate and produce a dikaryon which can fruit is under the control of two complex genes called the *A*- and *B* incompatibility factors. These genes regulate a pair of developmental sequences; when two compatible alleles are brought together by a cell fusion, the sequence is "turned on." The *A*-factor is known to control, among other things, formation of part of the clamp connection (the unfused- or pseudoclamp), but the biochemical function of structural genes involved and the nature of the signal from the *A* factor to those diverse structural genes is obscure. The present work attempted to understand the nature of the *A*-factor signal through use of a system in which the signal is subject to an external control. The diploids which can be formed by mating compatible homokaryons in the presence of the *dik* mutation (KOLTIN and RAPER, Science 160: 85, 1968) have such properties. The cells are predominately uninucleate and, despite the presence of two compatible *A*-factors, there are no pseudoclamps formed under usual growth conditions; that is, the *A* sequence is not expressed. This, however, is altered by a change in growth conditions: diploid colonies on cellophane membranes were grown on media containing 2 percent glucose at 22°C and were transferred after 3–4 days to either fresh glucose media (a control) or to media without any carbon source. (In the latter case radial growth continues at a slow rate for a few days, presumably at the expense of stored polysaccharides.) Diploids on carbon-less medium showed a 3–5-fold increase over the controls in frequency of pseudoclamped, as opposed to simple, septa 70–100 hours after the shift. The change is apparently one of gene expression, not mutation, and is reversible. The glucose effect can be overcome with cyclic AMP: the addition of 0.5 mM cAMP and 10 mM theophylline to glucose medium produced, in a typical experiment, 26 percent pseudoclamps versus 4 percent for control cultures. Either cAMP or theophylline alone produced positive but weaker results. (Supported by PHS grant 1FO2 GM51581-01.)

GLOBERSON, D., and D. NETZER. Volcani Center, Bet Dagan, Israel. Mode of inheritance of resistance in lettuce to downy mildew. — Four races of downy mildew were found in Israel: IL. 1, IL. 2, IL. 3 and IL. 4, the first one appearing only in 1970. Fifty-six cultivars were tested for their reaction to three races: IL. 2, IL. 3 and IL. 4. Thirteen were resistant and fifteen were susceptible to all three races; eight were resistant to IL. 2 and IL. 3, and twenty to IL. 2 and IL. 4. No cultivar was resistant to IL. 4 but susceptible to IL. 2 and IL. 3, or resistant to IL. 2 but susceptible to IL. 3. — Cultivars resistant and susceptible to the different races were crossed in all possible combinations. Segregations in the F_2 and F_3 demonstrated a simple dominance of the resistance to each race and similar results when inoculated with two or three races. In view of these results the following hypothesis is suggested: the resistance to each of the three races (IL. 2, 3, 4) is controlled by a single gene: *B*, *C* and *I*, respectively. These are genes which are epistatic to others: gene *I* determines the resistance to races IL. 4, 3 and 2; gene *B* to IL. 2 and IL. 3;

and gene C to IL. 3. They are usually transferred as a whole unit and therefore it is assumed that they belong to the same linkage group.

GLOVER, S. W., and A. PIEKAROWICZ, Department of Genetics, University of Newcastle-upon-Tyne, and Institute of Microbiology, University of Warsaw, Poland. DNA host specificity in *Haemophilus influenzae*. — Strains of *Haemophilus influenzae* Ra, Rb, Rd, Re and Rf each carry DNA restriction and modification systems. Strain Ra carries two genetically distinct host specificity systems A1 and A2, each of which is able to restrict *Haemophilus* phages HP1 and S2 and each of which confers a specific modification on phage grown in strain Ra. Strain Rd carries at least one restriction and modification system detectable using phage HP1 and this system is unstable in its phenotypic expression. Restriction-deficient mutants isolated from strain Rb indicate that it possesses only one restriction and modification system while restriction-deficient mutants isolated from strain Rf define at least two systems F1 and F2. Preliminary results indicate that the two systems F1 and F2 are the same as those present in strain Re. One interesting feature of the host specificity system in strain Rf is the marked difference in efficiency of the two systems. The efficiency of plating (e.o.p.) of phage HP1.0 on Rf mutants carrying F2 only is about 10^{-3} while the e.o.p. of phage on mutants carrying F1 only is about 10^{-8} .

GODDARD, M. W., P. N. HOWARD, G. R. STODDARD and J. R. SEELY, Department of Pediatrics and the Clinical Research Center, Children's Memorial Hospital, University of Oklahoma Health Sciences Center, Oklahoma City. 46, XX,del(5) (q14q31)? in monozygous twins. — Cytogenetic evaluation of dysmorphic monozygous twin girls (red cell phenotypes identical for 19 antigens) revealed a Bq⁻ complement in both peripheral blood and skin fibroblast cultures. The parents' chromosomes are normal. — Phenotype of each twin at five months of age included psychomotor retardation, probable visual and hearing loss, midface hypoplasia, flat broad nasal bridge with upturned nose, hypertelorism, epicanthal folds, high palate with broad maxillary ridges, micrognathia, down-turning of mouth, low set ears, proximal interphalangeal joint contractures of multiple fingers; abnormal dermatoglyphics, shortened feet with dorsiflexion of toes and pes cavus, possible pulmonary stenosis and hypoplastic labia. — Preliminary results from Giemsa banding (G-bands) produced by the papain technique suggest the interpretation of the deletion to be 46, XX,del(5) (pter → q14: :q31 → qter). Studies to further delineate the nature of the deletion are continuing. — Red blood cell phenotypes for 19 antigens of parents and probands revealed no discordance providing negative evidence for these loci being contained in this deleted segment of chromosome 5. Further gene loci studies are in progress. (Supported by PHS grants RR-62 and 5-S01-RR05411.)

GODWARD, M. B. E., and S. MUGHAL, Queen Mary College, London University, England. Electron microscopy of mitotic cells of *Spirogyra* and *Cladophora*. — A typical stratified kinetochore is present in *Cladophora* and a less well defined one in *Spirogyra*. The long chromosomes of *Spirogyra* may have more than one kinetochore. Microtubules also attach to persisting free nucleolar material in this genus, but not in *Cladophora* where some nucleolar material remains on the nucleolar organizing chromosome through mitosis.

GOEL, SURESH C., and JAGDISH K. MATHUR, Zoology Department, Poona University, India. Studies on the developing hind limbs of *Calotes versicolor* with particular reference to the effects of trypan blue. — In the embryos the hind limbs appear as separate buds distinct from those of the fore limbs. The bud consists of a loose mesenchyme covered by two-cell-layered ectoderm. The ectoderm at the distal end of the bud soon develops into an apical ectodermal ridge (AER). At the time of its maximum development the AER is up to five cell-layers thick, nipple-shaped and more pyroninophilic than any other tissue of the bud. At the same time the first blastemal condensation, that of the femur, appears in the mesoderm. Later the condensations of the tibia and fibula, the metatarsals and tarsals, and the phalanges appear in the given sequence, and the AER regresses except at the tips of the phalanges. — The treatment of the eggs, around the time of