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Supernumerary chromosomes in *Drosophila nasuta albomicana*

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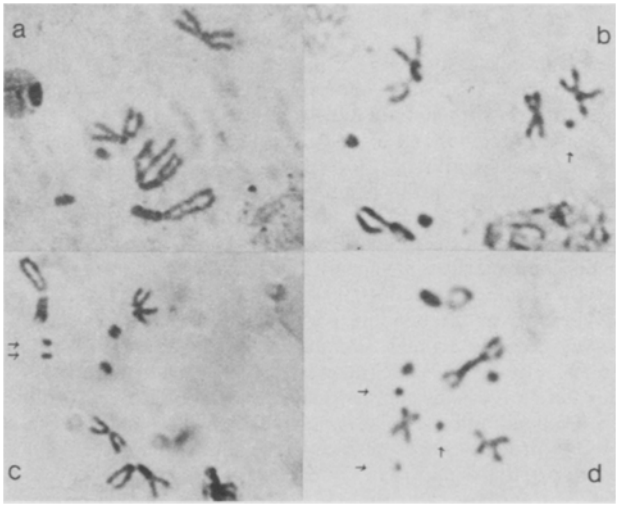
Summary. Supernumerary chromosomes have been detected in the karyotype of *D.n.albomicana.* Their number varies from one to three. They are the smallest elements in the karyotype. Karyotypes of *D.n.albomicana* with and without supernumerary chromosomes have been presented.
Key words. Drosophila nasuta albomicana; chromosomes, supernumerary; karyotype.

Karyotypic variation is frequent in *Drosophila.* It may be due to inversions[1,2], heterochromatin variation[3,4], and the nature of microchromosomes and sex chromosomes[5]. Karyotypic plasticity due to the presence of extra chromosomes or supernumerary chromosomes is rare in *Drosophila*[2]. The presence of such chromosomes in *Drosophila nasuta albomicana* was first detected by Kitagawa (personal communication). We present here the preliminary cytology of supernumerary chromosomes in the Chiangmai (Thailand) strains of *D.n.albomicana* provided by Prof. O. Kitagawa.

Materials and methods. D.n.albomicana is a chromosomal race in the *nasuta* subgroup of the *immigrans* species group of *Drosophila*[6,7]. The Chiangmai strains were maintained at 21 °C on wheat cream agar medium seeded with yeast. Neural ganglia from third instar larvae were pretreated in 1% sodium citrate hypotonic solution for 15 min and fixed in alcohol/acetic acid (3:1).Air dried preparations were made following the procedure adapted by Lakhotia and Kumar[8] with slight modifications.

Results and discussions. The normal chromosome complement of *D.n.albomicana* is 2n = 6 as reported earlier[9]. It has two pairs of metacentrics – one of them represents chromosome 2 and in the other sex chromosomes and chromosome 3 are united – and a pair of long dots (fig., a). The present analysis showed the presence of extra chromosomes. Their number ranges from 1 to 3 (fig., b–d). They are the smallest elements in the karyotype. They resemble the basic dot chromosomes of other *Drosophila* species. Within an individual, the number of supernumerary chromosomes remains constant in all the cells. The relative frequencies of karyotypes in the strain under investigation with the normal complement and with one, two and three supernumeraries are 33%, 36%, 26% and 5% re-



A Normal karyotype of *D.n.albomicana; B, C* and *D* karyotypes of *D.n.albomicana* with one, two and three supernumerary chromosomes (arrows).

spectively. The presence of supernumeraries cannot be detected in the polytene chromosomes. Most probably they will be incorporated into the chromocenter. The adaptive significance, if any, of these extra chromosomes is yet to be explored.

In the evolution of the *nasuta* subgroup, the karyotype of *D.n.albomicana* is thought to be the most recent product[10]. In the contemporary genetic system of *D.n.albomicana* there exists exuberant inversion polymorphism[11], and there are reports of centric fusion[12], pericentric inversion[13] and chromosome 4 variation[14].

To this gamut of chromosomal variation, the present findings add yet another pattern of karyotypic diversity. To the authors' knowledge, among *Drosophila, D.n.albomicana* is probably the only species which has revealed the occurrence of so many different types of chromosomal variations.

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Pseudomonas lectin PA-I detects hybrid product of blood group AB genes in saliva

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Summary. Pseudomonas aeruginosa galactophilic lectin PA-I exhibits an outstanding affinity for soluble hybrid oligosaccharide products of human A and B genes in saliva of heterozygous AB individuals. Neither A nor B salivas, nor an artificial mixture of them, inhibit PA-I hemagglutinating activity to the same extent as saliva from heterozygotes. Other lectins examined do not exhibit this property.

Key words. Pseudomonas aeruginosa; lectin PA-I; saliva, AB genes.

Since the discovery of the ABO(H) blood groups by Landsteiner in 1900, the biochemistry and genetics of these antigens have been thoroughly investigated[1-4]. They have been found on blood cells, on various other cells and as soluble molecules in secretions[1-4]. Their presence in secretions facilitated the elucidation of their carbohydrate structure and mode of production. The A and B genes, which determine the respective antigens, are responsible for the production of specific enzymes which transfer the immunodominant sugar from UDP to the central precursor chain exhibiting H blood group specificity. N-acetyl D-galactosamine is the dominant sugar of A antigen and D-galactose is the dominant sugar of B antigen. Both are transferred from UDPX to form an α1–3 linkage with D-galactose, which already bears L-fucose as the immunodominant sugar of the H blood group[4]. The presence of ABO(H) blood antigens in secretions as well as on cell surfaces is further dependent on the Se gene[2]. This gene determines the presence of a fucosyltransferase (which forms the soluble precursor H antigen) in the secretory organs[5,6]. A large majority (80%) of the human population possess the Se gene and thus contain AB or H antigens in their secretions (always according to their blood group type). These are known as 'secretors'. The remaining 20% ('nonsecretors') are of the genotype sese. Their secreted glycoproteins or saccharides lack A, B or H specificity. The ABO blood groups are of interest for biochemical genetics since they are a result of single genes and because there is considerable knowledge about their chemical and serological properties. The distinct specificity of the A and B antigens could result in heterozygotes with AB antigens either on the same or on different molecules. Wiener and Karowe[7] suggested the assumption that in group AB individuals, the molecules would possess dual (A and B) specificity. They could not prove this. Their assumption was examined by Morgan and Watkins[8] using precipitation of the specific AB group substances from secretions of heterozygotes by anti-A or anti-B precipitating sera or lectins. Their results showed that the removal of precipitate with either anti-A or anti-B led to a complete loss of both A and B activity. When similar experiments were performed with artificial mixtures of A and B substances, only the compatible antigen was precipitated with the anti-A or anti-B reagent, while the activity of the other antigen was found in the supernatant fluid. They concluded that in secretions of the heterozygous AB individuals there is a hybrid molecule which results from the interaction of the A and B genes which differs

Table 1. Inhibition of the lectin hemagglutinating activity (original titer: 128) by saliva from the different donors

Lectin	Saliva donors, blood groups and secretion (Se)					
	10*-A (sese)	14-A (Se)	6-B (sese)	7-B (Se)	8-0 (NE)	11-AB (Se)
Con A	8–16**	2–4	8–16	4	2–4	4
PA-II	4–8	8–16	8–16	8	4–8	2–4
SBA	64–128	64–128	64–128	64–128	64–128	64–128
ECA	64–128	64–128	64–128	64–128	64–128	64–128
PA-I	64–128	64–128	64–128	64–128	64–128	0–2

*No. of the saliva donors from each blood group. **Residual hemagglutination activity (last dilution^{-1}). NE, not examined.