genetic transformation of somatic cells, in order to modify the phenotype of cells lacking some characteristic, such as happens in genetic diseases. We believe that this approach, in line with the goals of genetic engineering, could achieve the correction of genetic deficiences. The virus-like particles prepared have immunological specificity and might be capable of transforming cells located in deep tissues of the whole animal.

The particles with Fab were planned with regard to the possibility that the complement fixation could, with the complete IgG molecules, produce cytolysis. It is well known that the Fc fraction of IgG fixes complement. Therefore, the particles formed with Fab could recognize the antigen, but, as they do not fix complement, they would be innocuous to the cell membranes.

Zusammenfassung. Experimentell hergestellte, virusähnliche Partikel, bestehend aus einem Kern von genetischem Material und einer Proteinhülle, werden in Analogie zu einer Virusinfektion in Zellen eingeschleust. Die Komplexe zwischen DNA-IgG und DNA-Fab werden beschrieben und die Partikel enzymatisch, chemisch und elektronenmikroskopisch charakterisiert.

G. Carvajal[22], Isabel Baeza[22] and Enedina J. Carvajal

Departamento de Bioquimica, Escuela Nacional de Ciencias Biologicas, Instituto Politecnico Nacional, México (D.F. Mexico), 5 March 1973).

[19] P. K. Qasba and H. V. Aposhian; Proc. natn. Acad. Sci., USA *68*, 2345 (1971).
[20] C. R. Merril, M. R. Geier and J. C. Patricciani; Nature, Lond. *233*, 398 (1971).
[21] A. G. Schwartz, P. R. Cook and H. Harris, Nature New Biol. *230*, 5 (1971).
[22] Fellowship holders of SEDIT-COFAA. Instituto Politécnico Nacional de México.

Orderly Arrangement of G-Chromosome Bands in Interphase Nuclei

It has recently been demonstrated that different treatments, with protelytic enzymes, protein denaturants, detergents, strong salt solutions or heat, produce the appearance of chromosome bands[1] grouped under the name of g-bands to distinguish them from fluorescent or q-bands and from c-bands which are representatives of the constitutive heterochromatin location in the chromosomes. The pattern of g-bands distribution in a given species seems to be constant and characteristic for each chromosomal pair. Hence, the analysis of g-bands has proved to be a iusefultool for a correct chromosome indentification.

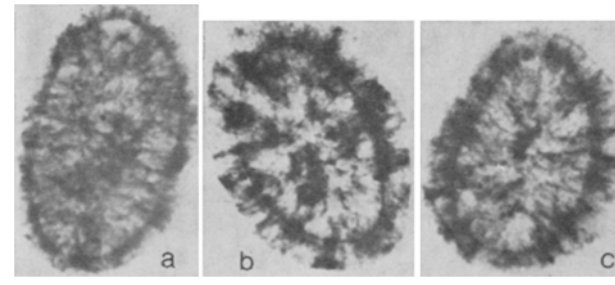
Dur ng the analysis of g-band distribution in the chromosomes of the vole mice *Akodon molinae*, we observed a characteristic morphology in the interphase nuclei of preparations treated with trypsin[2]. Accordingly, we started a series of experiments aimed at obtaining further information on this phenomenon.

Material and methods. Chromosome spreads were prepared from bone marrow tissues of *Akodon molinae* and *Akodon azarae* (Rodentia Cricetidae), spleen tissues of normal and leukemic mice (BALB strain), lung and kidney cultures from New Zealand rabbits. 3 to 5 individuals from each species were studied. Chromosome preparations were divided in groups and digested at room temperature for ½,1,2,3,4 and 5 min with trypsin (0.25%) in Hanks saline (without Ca and Mg) at pH 7.2. Slides were afterwards washed in 70% and 100% ethanol and stained for 3–5 min with Giemsa diluted 1 to 5 in Sörensen buffer at pH 6.9.

Results. The results obtained were similar in all individuals analysed. Chromosome banding was clearly noticed in slides treated with trypsin for 2 to 3 min. In ½ to 1 min treatments, chromosome digestions was slight or absent and bands did not show. On the other hand, 4 to 5 min digestions were excessive and chromosomes appeared swollen and empty. In slides showing chromosome banding, most interphase nuclei showed a radial array of dark bands starting at the nuclear membrane and converging to form a single or double ring parallel to the nuclear envelope and peripherally located. A series of fine filaments emerged from the inner part of the ring forming a network which in many cases showed a general tendency to become radially oriented toward the center of the nucleus. In perinucleolar areas, the network usually condensed, forming dark masses of chromatin (Figure 1). This characteristic nuclear morphology was not observed in preparations which, as a result of under or overdigestion, did not show chromosome banding. Thus, a correlation between chromosomal g-bands and interphase bands may be reasonably assumed.

Discussion. It has been shown that nuclear membrane preferentially associates with various chromatin types or chromosome regions. Among these associations, perhaps the most widely known is the case of the sex chromatin in female mammals[3]. However, there are several others which have also been well documented. The attachment of telomeric chromosome regions to the nuclear membrane has been demonstrated in several instances[4,5]. It has also been reported that centromeric chromosome regions rich in constitutive heterochromatin lie adjacent to the

[1] H. Kato and K. Morikawi, Chromosoma *38*, 105 (1972).
[2] M. Seabright, Lancet *2*, 971 (1971).
[3] K. L. Moore, *The Sex Chromatin* (W. B. Saunders Co., Philadelphia 1966).
[4] J. A. Sved, Genetics *53*, 747 (1966).
[5] B. R. Brinkley and E. Stubblefield, *Advances in Cell Biology* (Ed. D. M. Prescott, L. Goldstein and E. McConkey; Appleton-Century-Crofts, New York 1970), vol. I, p. 119.
[6] N. O. Bianchi, B. H. Sweet and J. Ayres, Exptl. Cell Res. *69*, 236 (1971).



Interphase nuclei treated with trypsin for 3 min. a) cultured lung fibroblast from New Zealand rabbit. b) spleen cell from normal mice, c) bone marrow cell from *A. molinae*. ×1400.

nuclear envelope in various species[6,7]. Moreover, the convergence and attachment of chromatin fibers to the annuli of nuclear membrane have been reported for mammalian, avian and insect cells[8,9]. On the light of these data, it seems reasonable to assume that rays of the wheel-like structure observed in interphase nuclei treated with trypsin represent the orderly attachment of g-bands to the nuclear envelope. Furthermore, the network of filaments and the perinucleolar masses which occupy the inner part of the nucleoplasm probably correspond to other g-bands not directly connected with the nuclear envelope.

Information regarding the mechanism of g-band production is still incomplete. However, several experiments strongly suggest that g-bands are the result of disruptions in the molecular structure of DNA-non-histone complexes[1,10]. Such being the case, it is possible to assume that some of these complexes may be specifically involved in the attachment of chromatin to the nuclear membrane[11].

Resumen. En las preparaciones cromosómicas sometidas a digestion con tripsina se observa que la mayor parte de los nucleos celulares muestran una serie de rayos oscuros que parten de la membrana celular y convergen formando un anillo. Esta imagen se hace presente en aquellos preparados que muestran bandas cromosómicas G y no se observa en aquellos casos con déficit o exceso de digestión enzimática. Estos hallazgos probablemente indican que las bandas G se hallan conectadas, ordenadamente, a la membrana nuclear durante la interfase.

N. O. BIANCHI

Centro de Investigaciones Genéticas,
Instituto Fitotécnico de Santa Catalina, Llavallol,
Provincia de Buenos Aires, Calle 526 entre 10 y 11,
La Plata (Argentina), 16 April 1973.

[7] P. M. M. RAE and W. W. FRANKE, Chromosoma *39*, 443 (1972).
[8] D. E. COMINGS and T. A. OKADA, Exptl. Cell Res. *62*, 293 (1970).
[9] P. ENGELHARDT and K. PUSA, Nature New Biol. *240*, 162 (1972).
[10] D. E. COMINGS, E. AVELINO, T. A. OKADA and H. E. WYANDT, Proc. Twelfth Ann. Meet. Am. Soc. Cell Biol. (St. Louis), J. Cell Biol. *55*, 48a (1972).
[11] This work was supported by grants from CONICET and CIC.

Aflatoxin Production in some Varieties of Soybeans (*Glycine max* L.)

Aflatoxin contamination has been extensively studied on peanuts[1]. Soybean (*Glycine max* (L) Merr.) is one of the next best sources of edible oil, and its meal is also useful as a source of proteins for consumption by humans and poultry. But information on the susceptibility of soybeans to aflatoxin contamination appears to be rather meagre, and also conflicting. Studies on aflatoxin production in several agricultural commodities such as rice, wheat, corn, sorghum, peanuts and soybeans showed that soybeans were a poor substrate for toxin production by toxigenic strains of *Aspergillus flavus*[2,3]. It was therefore interesting to investigate the toxin production in soybeans and also to examine varietal differences, if any, in toxin production. Such a study seemed important in view of the crash programme currently in operation in India to boost the production of new and promising varieties of soybeans.

Methods. Five authentic varieties of soybeans (Lee, Bragg, Semmes, Punjab-1, and JS-2) were obtained from the production units of the Agricultural Universities at Pantnagar (Uttar Pradesh) and Jabbalpore (Madhya Pradesh) in this country. The toxin production in these varieties was assessed using 2 toxigenic isolates of *A. flavus* Link (NIN 25, NIN 169) and 2 toxigenic isolates of *A. parasiticus* Speare (NRRL 2999, RIB 4002). The toxin production of these fungal isolates were first graded by growing them on a synthetic medium described by ADYE and MATELES[4]. 20 g lots of each variety of soybeans were rehydrated with just enough water, sterilized by autoclaving at 15 lbs pressure inch^2 for 15 min. The flasks were then inoculated with a uniform spore suspension of the fungal isolates and incubated at 28 °C for 7 days. At the end of this incubation period, the samples were sprayed with alcohol and dried overnight at 80 °C. The dried samples were first defatted with n-hexane and then extracted with methanol. The aqueous methanolic extracts were extracted with chloroform and chloroform extracts were processed appropriately for thin layer chromatography using chloroform: methanol (95:5) as developing system. The aflatoxin B_1 content was quantified by the method described by PONS et al.[5]. Confirmation of the chemical nature of aflatoxin B_1 was made by the method of CRISAN[6].

[1] L. A. GOLDBLATT, in *Aflatoxin, Scientific Background, Control and Implications* (Ed. L. A. GOLDBLATT; Academic Press, New York 1969), p. 1.
[2] C. W. HESSELTINE, O. L. SHOTWELL, J. J. ELLIS and R. D. STUBBLEFIELD, Bact. Rev. *30*, 795 (1966).
[3] R. W. DETROY, E. B. LILLEHOJ and A. CIEGLER, in *Microbial Toxins* (Eds. A. CIEGLER, S. KADIS and S. J. AJL; Academic Press, New York 1971), p. 3.
[4] J. C. ADYE and R. I. MATELES; Biochim. biophys. Acta *86*, 418 (1964).
[5] W. A. PONS JR., A. F. CUCULU, L. S. LEE, J. A. ROBERTSON, A. O. FRANZ and L. A. GOLDBLATT, J. Ass. off. agric. Chem. *49*, 554 (1969).
[6] E. V. CRISAN, Contr. Boyce Thompson. Inst. Pl. Res. *24*, 37 (1968).

Aflatoxin (B_1) production (in ppm) in synthetic medium and in Soybean varieties

Species/isolate	Synthetic medium	Soybean varieties				
		Lee	Semmes	Punjab-1	Bragg	JS-2
A. flavus, NIN 25	+[a]	0.125	0.125	0.125	0.5	3.125
A. flavus, NIN 169	++	0.125	1.55	0.78	0.25	1.25
A. parasiticus[b], RIB 4002	++++++	12.5	12.5	12.5	15.63	31.25
A. parasiticus, NRRL 2999	++++++	19.53	19.5	31.25	20.83	31.25

[a] + is approximately equal to 250 µg of B_1 per 100 ml medium. [b] Designated as *A. toxicarius* by MURAKAMI[15].