

of yeasts by washed cultures of *Acetobacter* under conditions in which no bacterial growth took place.

We thank Dr. A. K. Mills for his advice.

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GENETICS

Frequency of Glucose-6-phosphate Dehydrogenase Deficiency, Red-Green Colour Blindness and Xg^a Blood-group among Chamorros

PROGRESSIVE fatal neurological diseases, such as amyotrophic lateral sclerosis, occur with exceptionally high incidence in the indigenous population of Guam and the other Mariana Islands in the Western Pacific. Recent investigations indicate that these neurological problems are not limited to the Chamorros, the indigenous population of the Marianas^{1,2}. Since extensive pedigree and epidemiological data revealed no single genetic defect which might reasonably account for such abnormalities, ancestral relationships among different aboriginal populations of the Western Pacific are being examined. If the ancestry of these groups can be defined in terms of several common genetic markers, then a comparison of the incidence of amyotrophic lateral sclerosis, Parkinsonism-dementia or other neurological diseases occurring within these groups might facilitate the separation of genetic and non-genetic disease-producing factors. This communication reports the results of a preliminary survey for three sex-linked traits: glucose-6-phosphate dehydrogenase (G-6-PD) deficiency, red-green colour blindness and Xg^a blood-group in Chamorro males. The results are summarized in Table 1.

The sample tested were males attending the only two high schools on the Island. Compulsory education of all Chamorros ensured random representation of natives from all parts of Guam by such a sampling technique. No sibship in the sample was represented by more than one sibling.

The G-6-PD determinations were carried out by the method of Motulsky³. Of 246 students tested, the blood from one (0.4 per cent) had a decolorization time of greater than 3 h on duplicate determinations. This frequency is the same which Blumberg *et al.* found in other population isolates in Micronesia⁴. These results should also be compared to the frequency of G-6-PD deficiency in Carolinians from four islands in Micronesia: Angour, 9 per cent; Koror, 8 per cent; Ifalik, 6 per cent; Ulithi, 0 per cent⁵. There is no malaria in Guam.

Table 1. FREQUENCY OF G-6-PD DEFICIENCY, RED-GREEN COLOUR BLINDNESS AND Xg^a BLOOD-GROUP IN CHAMORROS

	No. of males tested	No. positive	Percentage positive
G-6-PD deficiency	246	1	0.4
Red-green colour blindness	246	8	3.3
Xg ^a blood-group	109	71	65

246 students were tested for red-green colour blindness with American Optical Pseudo-isochromatic Plates. 8 (3.3 per cent) were colour-blind. About 4 per cent of Filipinos⁶ and Japanese⁷ are colour-blind, whereas in the United States and in Europe about 8 per cent of the male population have some type of colour-blindness.

109 Chamorro boys were tested for Xg^a blood-group by the technique of Mann *et al.*⁸. 71 (65 per cent) were positive. This result does not differ from the frequency of the Xg^a gene in Caucasians (62 per cent) and in Negroes (59 per cent).

We thank the Guam Board of Education and Mr. Ronald O. Sime, principal of Tumon and Washington High Schools, for their help in carrying out our field investigations. We also thank Drs. J. D. Mann and R. A. Caham for supplying the Xg^a anti-serum.

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VIROLOGY

Relationship between Adenoviruses and Canine Hepatitis Virus

IT was shown by Kapsenberg¹ and Heller and Salenstedt² that infectious canine hepatitis virus (ICH) and adenoviruses possessed common complement fixing antigens. Heller and Salenstedt² demonstrated five precipitin lines in Ouchterlony plates in the reaction between ICH and convalescent serum from a dog infected with ICH. Three of the antigens forming these precipitin lines were common to adenovirus type 7 which itself gave five precipitin lines with human anti-adenovirus type 7 convalescent serum. The immunological relationship between the two viruses was one-sided, as anti-adenovirus type 7 serum would react in Ouchterlony plates with ICH, but anti-ICH would not react with adenovirus type 7. Recently, Darbyshire and Pereira³ have demonstrated two antigens in the livers of ICH infected dogs which can be precipitated with dog anti-ICH. One of these antigens is precipitated by rabbit anti-adenovirus type 5 serum. In the experiments reported here it was found that ICH infected dog kidney cultures produced only two soluble viral antigens, one of which is closely similar to the A (group specific) antigen of adenoviruses types 5 and 7 and another which is specific for ICH.

Adenovirus type 5 and anti-adenovirus type 5, which was produced by infecting rabbits with adenovirus type 5 (H.G.P. strain) and used as the γ -globulin, were obtained from Dr. H. G. Pereira (National Institute for Medical Research, London, N.W.7). Anti-adenovirus type 7, which was hyperimmune serum produced in rabbits, and adenovirus type 7 were obtained from Dr. M. S. Pereira. Virus Reference Laboratory, Central Public Health Laboratory, London, N.W.9.

The adenovirus type 7 was grown on HeLa cells in Parker's Medium No. 199 containing 0.5 per cent lactalbumin hydrolysate. The HeLa cells were propagated in Parker's Medium No. 199 supplemented with 10 per cent fresh calf serum. The adenovirus type 7 used in the experiments contained $10^{7.5}$ TCD₅₀ per ml. ICH was grown on primary dog kidney cells. These cells were grown in Hanks's balanced salt solution containing 0.5 per cent lactalbumin hydrolysate, 0.05 per cent bicarbonate and 5 per cent horse serum, and were infected with virus in Parker's Medium No. 199. The virus collected was concentrated by ultrafiltration until it contained 10^8 TCD₅₀ per ml. Anti-ICH was obtained both from a dog that had been naturally infected with ICH and from one