

ANTHROPOLOGY

Haptoglobin and Transferrin Variants in Bushmen and Some Other South African Peoples

THE recent University of the Witwatersrand-Nuffield expedition to the Kalahari desert enabled one of us (J.S.W.) to collect blood samples from Naron Bushmen, living their traditional hunting life and from Bushmen employed on farms in the vicinity of Ghanzi, Bechuanaland. The blood-grouping results on these specimens have already been reported¹. In addition, two of us (R.S. and J.S.W.) were able to obtain samples from Hottentot (Nama-speaking) subjects in the Richtersveld area of Little Namaqualand and from Cape-coloured people in the Springbok and Steinkopf regions. Since the genetical variants of the serum proteins have not previously been studied in these peoples the sera were forwarded to London by Dr. A. Zoutendyk, who also kindly provided a series of Zulu sera, collected in Johannesburg, for comparison. The sera were examined by starch-gel electrophoresis using B.D.H. potato starch hydrolysed by the method of Smithies². The discontinuous buffer system described by Poulik³ was used in routine screening. After addition of hæmoglobin to saturate the haptoglobins the sera were inserted into a wide gel on pieces of filter-paper in batches of twelve. One half of the gel was stained with amidoschwartz and the other was treated with benzidine-hydrogen peroxide reagent. Specimens in which haptoglobins were weak or apparently absent were also run by the vertical method⁴ and this was also used to compare β -globulin variants the identity of which as iron-binding transferrins was checked with the nitroso-R reagent of Smithies⁵. The results are shown in Table I.

Table 1

No.	Haptoglobin phenotypes					Gene freq.		Transferrin phenotypes		
	1-1	2-1	2-1M	2-2	Neg.	Hp^1	Hp^2	CD_1	D_1	
Bushmen										
(a) Tribal	71	7	29	0	34	1		10	1	
(b) Farms	42	5	11	0	25	1		3	0	
Total	113	12	40	0	59	2	0.29	0.71	13	1
Hottentots										
(a) Random	34	10	16	0	8	0		2	0	
(b) Related	25	8	9	0	8	0		2	0	
Total	59	18	25	0	16	0	0.51	0.49	4	0
Cape-coloured	88	17	49	0	22	0	0.47	0.53	2	0
Zulus	118	36	45	3	29	3	0.53	0.47	3	0

* Standard error = 0.05

The most striking feature is the low frequency of the haptoglobin gene Hp^1 in the Bushmen as compared with the other three South African series which are closely similar to one another in this respect. The Hp^1 frequency in the latter is however lower than that reported for West Africans⁶⁻⁸ and confirmed by unpublished Nigerian material of our own. It should be noted that the Hottentot series, which was difficult to get, unavoidably contained a high proportion of closely related subjects. In order to make the most efficient use of the data the method devised by Dr. C. A. B. Smith⁹, to whom we are grateful for advice, was used in calculating random gene frequencies. A few cases were encountered in which no haptoglobins could be detected. Since the genetical significance of this phenotype, which may be very common in West Africa^{6,10,11}, is still not clear it seemed best to exclude these cases in calculating the gene frequencies. Some typical examples of the modified 2-1 phenotype

(2-1 M)^{11,12} were found in the Zulu but not in the other populations. In the Bushmen and Coloureds however a few sera were noted in which the slower $\alpha\beta$ bands were relatively weak although the Hp^1 band was somewhat weaker than the first $\alpha\beta$ band.

A slow transferrin variant was found to be quite common in the Bushmen, and one serum which showed this variant alone was kindly examined by Dr. O. Smithies who identified it as βD_1 which was first described by him¹³ in Australian aboriginal and American negro sera and is fairly common in some West African populations¹⁴. This variant is evidently less frequent in the Zulu and Coloureds and perhaps in the Hottentots than in the Bushmen.

Information about the distribution of serum protein variants in Africa as a whole is still very limited and our own material represents only a small section of the widely dispersed Bantu, Bushman and Hottentot-derived peoples; any conclusions must therefore be tentative. In some respects the Bushmen are distinguished both in morphology and blood group frequencies^{1,15} from other Africans and it appears that their haptoglobin frequencies may also be unusual. The Hottentots are generally regarded as closely related to the Bushmen on morphological and linguistic grounds but substantial blood group differences between them have been reported¹⁶ and it seems that the haptoglobins may be another point of distinction. It is doubtful whether any sizeable Hottentot-speaking groups survive today who are free from European ancestry; intermixture, mainly with Dutch, has led to the formation of various hybrid coloured communities. From what we know of European haptoglobin frequencies¹⁰, however, this would have made them more like the Bushmen in this respect so that the earlier Hottentots may have been more distinct. The effect of intermixture with 'Malays' (Moslem Indonesians) cannot at present be assessed. Although Hottentot tribes interbred with Bantu in the eastern Cape this was not the case in the north-west. The complex of Bantu-speaking peoples who now form the Zulu nation show some evidence of former contacts with Bushmen or Hottentots in their language, but the main areas of recent biological intermixture between Bantu tribes and Hottentots are further to the south.

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