# BANTU IMMUNITY TO SCARLET-FEVER TOXIN

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Very few records of Dick tests in the native races of Africa have been published.

Kleine & Kroo (1930) found a strong scarlet-fever antitoxin content in the blood of eleven East African natives. Van Slype (1935) in the Belgian Congo found that 40 % of 45 natives aged 1 month to 2 years, 96·4 % of 56 aged 2–14 years and 84·6 % of 233 aged 1 month to 60 years were Dick-negative. He came to the conclusion that shortly after birth native children have no immunity to scarlet-fever toxin but that they rapidly acquire it, and by 2 years of age over 90 % are Dick-negative.

Dubois & Degotte (1934) carried out the Dick test on 490 natives of the Belgian Congo. Only 2 positives were found. Thirty-one of the subjects were less than 7 years of age. The authors remark that scarlet fever is practically non-existent in the Belgian Congo.

Fischer (1932) found only 7 (1·8 %) Dick-positives amongst 376 natives of various ages in East Africa. The positive reactors were all under 25 years of age.

Table 1

| | Urban | | | Rural | | |
|---|---|---|---|---|---|---|
| Age yr. | Total no. tested | Dick-positive | Percentage positive | Total no. tested | Dick-positive | Percentage positive |
| 6– 8 | 47 | 14 | 29·8 | 61 | 0 | 0·0 |
| 9–11 | 121 | 16 | 13·2 | 104 | 0 | 0·0 |
| 12–14 | 161 | 4 | 2·4 | 160 | 1 | 0·6 |
| 15–20 | 25 | 0 | 0·0 | 64 | 2 | 3·1 |
| Totals | 354 | 34 | 9·6 | 389 | 3 | 0·8 |

Table 2. *Results of throat swabs for* Streptococcus haemolyticus *in* 200 *Bantu children*

| Age yr. | Total swabs examined | *S. haemolyticus* positive | Percentage positive *S. haemolyticus* | Lancefield's group A *S. haemolyticus* | Percentage group A |
|---|---|---|---|---|---|
| 6– 8 | 48 | 11 | 22·9 | 6 | 12·5 |
| 9–11 | 42 | 10 | 21·4 | 8 | 19·0 |
| 12–14 | 110 | 42 | 38·2 | 24 | 21·8 |
| Totals | 200 | 63 | 31·5 | 38 | 19·0 |

Bormann (1936), on the other hand, in a small series of 31 natives on the west coast of Africa, found 12 certain and 21 probable Dick-positive reactions. The ages ranged from 9 months to 14 years. He concluded that the proportion of Dick-negatives increased with increasing age. He quotes the annual report of the medical and health services of Nigeria as stating that no cases of scarlet fever had occurred in natives in the preceding 10 years. The only European case occurred in a person who had just arrived from Europe.

During the course of an investigation into diphtheria amongst the Bantu (Murray, 1942) the opportunity arose to carry out the Dick test on Bantu school children in South Africa. Because of the paucity of other records it seemed worth while to record the results.

The test was carried out on 389 rural native children whose ages ranged from 6 to 20 years, and on 354 urban children aged 6–17 years. The results are shown in Table 1.

In view of these findings throat swabs from 200 of the urban children were examined for the presence of *Streptococcus haemolyticus* with results as shown in Table 2.

Unfortunately, no swabs were taken from the rural children for streptococci, but it may be noted that the carrier rates for *C. diphtheriae* were not found to differ significantly in the rural and urban groups.

It is generally assumed that scarlet fever rarely occurs amongst the Bantu. This view is expressed in the *Union Public Health Report* for 1927–8 which states 'In South Africa scarlet fever is almost exclusively confined to Europeans. Natives are practically immune and the incidence amongst Eurafricans is negligible.' The Dick test results in this series emphasize the relative immunity of the Bantu to scarlet-fever toxin. In the absence of any swabs from the rural natives no comment can be offered on the difference between the Dick-positive rates of urban and rural children.

Thomson, Glazebrook & Green (1940), investigating the Dick reaction in different classes of a European community, came to the conclusion that specific contact with streptococci undoubtedly plays a part in determining the Dick-negative state. They were not prepared to state whether or not it plays the whole part. They ascribed the different Dick-positive rates in different classes of the community to dissimilar living conditions.

Referring to coloured races, however, they suggested the possibility of an interplay of factors not yet fully investigated but stated that 'until the possibility of active immunization has been entirely excluded, it does not seem justifiable to assume that their immunity is due to normal physiological processes'.

The high incidence found of carriers of group A *Streptococcus haemolyticus*, taken in conjunction with the native mode of social life, goes far to explain the immunity of the Bantu to scarlet-fever toxin.

It seems from the carrier rates that the specific contact with streptococci stressed by Thomson and his co-workers must play a large part in determining Bantu immunity. In discussing the question of diphtheria amongst the Bantu, Murray (1942) has suggested that though specific stimulus to antibody formation by contact with *C. diphtheriae* and the conditions of native social life have a high place in the determination of the immunity of the Bantu to diphtheria, the possibility of there being a racial factor cannot be excluded. He suggested that the racial factor may reside in an ability of the Bantu to form antitoxin more rapidly than the European in response to a given stimulus by *C. diphtheriae*.

It seems that the same possibility may exist in relation to streptococcal antitoxin in the Bantu. The possibility gains some support from Van Slype's (1935) statement that the Dick-negative state occurs in natives before the age of 5 years.

Pevaroff & Hindman (1934) compared the Dick reactions of white and negro children in a congested section of Cleveland. They concluded that the negro group showed no greater immunity than the white. No attempt was made, however, to differentiate between pure-blooded negroes and those of mixed blood. We believe it important to include only pure-blooded natives when comparing European and non-European susceptibility to scarlet fever or diphtheria.

The Bantu's immunity to scarlet fever, I suggest, depends on at least three factors: (1) the presence of the specific stimulus, (2) the conditions of native social life, (3) an ability to form antitoxin rapidly as compared with Europeans.

SUMMARY AND CONCLUSIONS

1. Dick tests on 743 Bantu children aged 6–20 years showed 5·0 % positive reactors.
2. Throat swabs from 200 urban native children showed 19 % carriers of Lancefield's group A *Streptococcus haemolyticus*.
3. The basis of Bantu immunity to scarlet fever is discussed.

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