

## THE RELATIONSHIP BETWEEN SERUM PROTEIN-BOUND IODINE AND INTELLIGENCE IN A GROUP OF BANTU FROM PORTUGUESE EAST AFRICA

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It is well known that there is a relationship between intelligence and the thyroid hormone. In cretinism, where there is marked retardation of physical and mental growth, and in myxoedema, in which mental dullness, lethargy and poor memory occur, thyroid therapy is used with excellent results. The purpose of the present investigation is to determine the magnitude of the correlation which might exist between thyroid activity and intelligence in a group of Bantu.

### Subjects and Methods

This study was carried out on 63 subjects, i.e. 28 Shangaans, 18 Chopi, 13 Nyembane and 4 Tonga, between 17 and 22 years old. All were new arrivals at Durban Roodepoort Deep Mine from Portuguese East Africa. They were illiterate and had no previous mining experience. They were medically examined and declared fit for underground duty. Clinically, there was no obvious abnormality of the thyroid gland. The following determinations were carried out.

1. Serum protein-bound iodine, estimated by the method of Leffler.<sup>1</sup> This estimation gives an index of the concentration of thyroxine in the peripheral blood. It is a specific test particularly sensitive for the measurement of hypofunction of the thyroid gland.

2. A battery of psychological tests designed to measure intelligence, developed by the National Institute for Personnel Research for the occupational classification of African mine workers.<sup>2</sup> These tests were as follows: (a) Sorting test 1, (b) sorting test 2, (c) cube test, and (d) tripod test. These tests are widely used on the mines and do not depend on language for their administration. They have been found to be reliable by the split-half method.<sup>2</sup> Performance on the total test battery (4 tests) is measured in terms of Dudec. Dudec is a scale with 12 intervals. In this context it represents a range of performance on a psychological test battery from superior (Dudec 1) to inferior (Dudec 12). The serum protein-bound iodine estimations and intelligence tests were carried out independently; and only when completed were results compared.

### Results

The findings are shown in the following table:

SERUM PROTEIN-BOUND IODINE VALUES AND DUDEC RESULTS IN 63 BANTU

	Mean	S.D.	Range
Serum protein-bound iodine, $\mu\text{g}/100\text{ml}$ .	5.2	1.1	1.8—8.0
Dudec	6.9	1.8	2—11

The two low serum protein-bound iodine results found (1.8 and 2.3 micrograms per 100 ml.) were corroborated by repeat estimation.

Analysis of the serum protein-bound iodine figures and standard test battery scores for the total sample shows that there were no significant differences at the .05 level.

The mental level of these subjects was tested at Dudec 8 and 7 respectively. (In any group of 100 African mine workers 69 would be expected to possess mental ability superior to those whose test performance lay at Dudec 8. Similarly, 50 cases in 100 would be expected to possess mental ability superior to those scoring Dudec 7.)

### Discussion

The results show that there is no correlation between the serum protein-bound iodine level and the intelligence of the subject as measured by the test battery. A low level of serum protein-bound iodine does not correlate with a low level of mental ability.

In the sample of 63 Africans only 2 had low serum protein-bound iodine values (normal values: 2.5–8.0  $\mu\text{g}/100\text{ml}$ ). Psychological tests classified them as average or slightly below for intelligence (the average normal Dudecs are 6 and 7).

These low serum protein-bound iodine values are of considerable interest, particularly as similar results have been observed before (1.0, 1.8, 2.2 and 2.3  $\mu\text{g}/100\text{ml}$ ).<sup>3</sup> Such low values in the White would immediately suggest myxoedema or endocrine imbalance, and physical and mental signs and symptoms would undoubtedly be present. However, in the Bantu with very low serum protein-bound iodine levels there is no clinical evidence of hypothyroidism or diminished intelligence. It is suggested that there may be a direct relationship between iodine deficiency in their food and low serum protein-bound iodine levels. This is in agreement with Politzer and Anderson's previous study.<sup>3</sup>

It is proposed to carry out further research into the occasional low protein-bound values and their possible causes.

### Summary

1. Serum protein-bound iodine estimations and a battery of psychological tests were carried out on 63 Portuguese East African Bantu in order to ascertain whether there was a relationship between thyroid activity and intelligence.

2. The results did not support this hypothesis.

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### REFERENCES

1. Leffler, H. H. (1954): *Amer. J. Clin. Path.*, **24**, 483.
2. Biesheuvel, S. (1952): *S. Afr. J. Sci.*, **49**, 3.
3. Politzer, W. M. and Anderson, I. (1957): *S. Afr. J. Med. Sci.*, **22**, 23.