

SERUM LIPID LEVELS IN NORMAL HEALTHY WHITE SOUTH AFRICANS AND CAPE COLOURED ADULTS LIVING IN THE CAPE PENINSULA*

V. WOLFE, M.B., CH.B. (PRET.), M.MED. (PATH.) (STELL.) AND A. W. VAN RIJSWIJK, M.T., DIP. CLIN. PATH.,
Department of Chemical Pathology, Karl Bremer Hospital, Bellville, CP

Recently there has been an upsurge of interest in fat metabolism and its relation to atherosclerosis in general and coronary artery disease in particular. Differences in the various racial groups of Africa have commanded special attention.¹⁻⁶ The procedures adopted for chemical investigation have not always been consistent, and any laboratory interested in serum lipid studies should establish its own normal values which may be used as a baseline for further studies, and in order to compare the results obtained with those published by other workers. This is especially desirable in the case of Cape Coloured subjects because of the scarcity of available data. We therefore decided on a study of the serum lipid pattern of the two major racial groups in the Cape Peninsula.

METHODS AND MATERIALS

Clotted blood specimens were obtained from a total of 120 normal, healthy subjects between the ages of 18 and 30 years. No particular form of selection was employed. The 60 White subjects were drawn mainly from medical students, medical laboratory technologists and other hospital personnel. The Cape Coloured females were all on the nursing staff of the Karl Bremer Hospital, the Coloured

male volunteers being in the employ of a large industrial concern close to the hospital. All volunteers were requested to fast for a period of 12 - 14 hours before blood sampling.

The lipid parameters investigated were: total serum cholesterol, by the method of Pearson *et al.*;⁷ serum triglycerides, using a modification of the method of Carlson;⁸⁻¹⁰ and total serum lipids, by the method of De la Huerga *et al.*¹¹ Phospholipids in serum were measured by the method of Zilversmit and Davies,¹² while beta-lipoprotein levels in serum were estimated by the immunochemical procedure as described by Heiskell *et al.*,¹³ using a specific antiserum supplied by Hyland Laboratories.

RESULTS

Values obtained for the 5 lipid parameters are set out in Table I and Figs. 1 - 5.

Total Lipids

A statistically significant difference was found in the mean values of the White and Cape Coloured males, the total serum lipids in the Whites being higher ($P < 0.0005$). The slight differences between the White and Cape Coloured females proved insignificant ($P < 0.15$).

*Date received: 30 July 1968.

TABLE I. SERUM LIPID VALUES IN WHITE AND CAPE COLOURED ADULTS

Constituent	Whites						Coloured					
	Males			Females			Males			Females		
	Mean	Range	ISD	Mean	Range	ISD	Mean	Range	ISD	Mean	Range	ISD
Total lipids (mg./100 ml.)	765	525-1150	146	721	460-980	123	559	435-650	52	690	385-865	114
Cholesterol (mg./100 ml.)	192	121-332	53	196	139-268	36	166	112-212	24	176	98-214	27
Beta-lipoproteins (mm.)	2.4	1.2-4.8	1.0	2.1	1.2-3.3	0.5	1.9	1.0-2.9	0.4	2.0	1.0-3.4	0.6
Triglycerides (mg./100 ml.)	87	29-170	30	65	33-123	19	64	23-119	25	32	10-58	12
Phospholipids (mg./100 ml.)	269	200-370	42	230	102-326	48	212	131-321	43	202	120-286	44

Cholesterol

This fraction was found to be significantly higher in the White than in the Coloured males ($P < 0.05$). A significantly higher value was also found in the White when compared with the Coloured females ($P < 0.0125$).

Beta-lipoproteins

The mean value for this fraction was found to be significantly higher in the White than in the Coloured males ($P < 0.01$). No significant difference could be detected between the White and Cape Coloured female groups ($P > 0.2$).

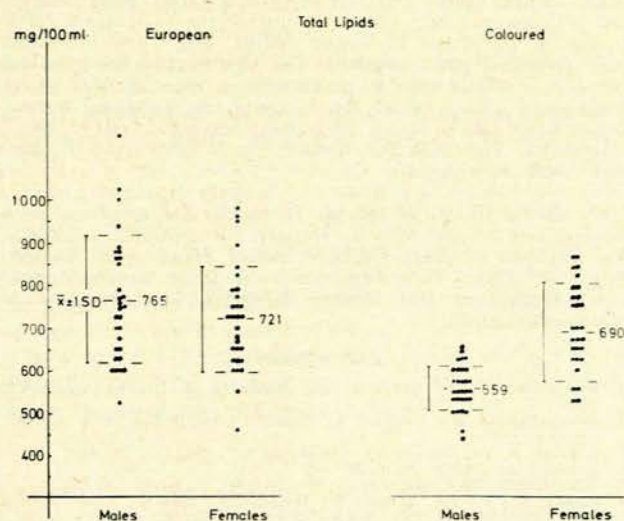


Fig. 1. Total lipids.

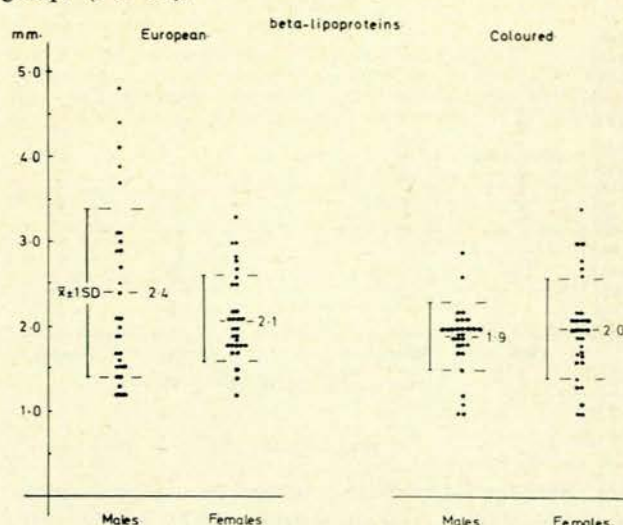


Fig. 3. Beta-lipoprotein.

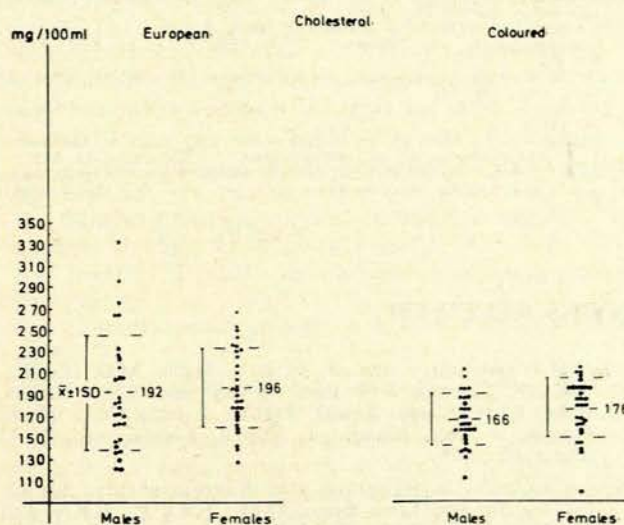


Fig. 2. Cholesterol.

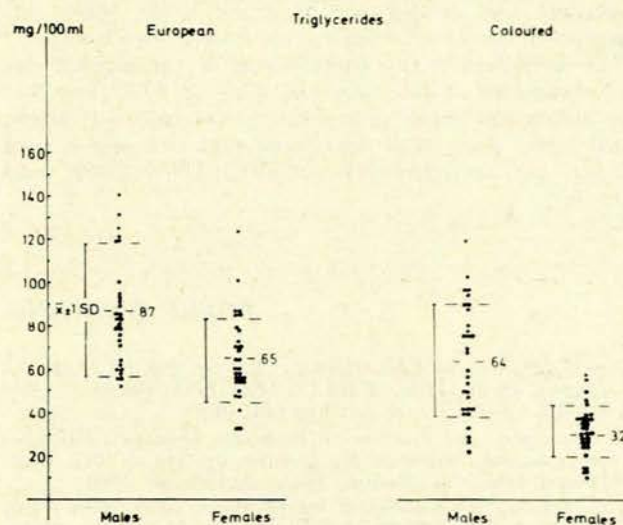


Fig. 4. Triglycerides.

Serum Triglycerides

The mean value for this fraction was found to be significantly higher in the White male when compared with the Coloured male ($P < 0.0025$). There was also a significant difference in the mean value between the White and Coloured females ($P < 0.05$), the latter being lower.

Phospholipids

A statistically significant difference between the mean values for the White and Coloured males could be demonstrated. This fraction was markedly higher in the White male ($P < 0.0005$). The value for White females also proved to be significantly higher than that for the Coloured females ($P < 0.0125$).

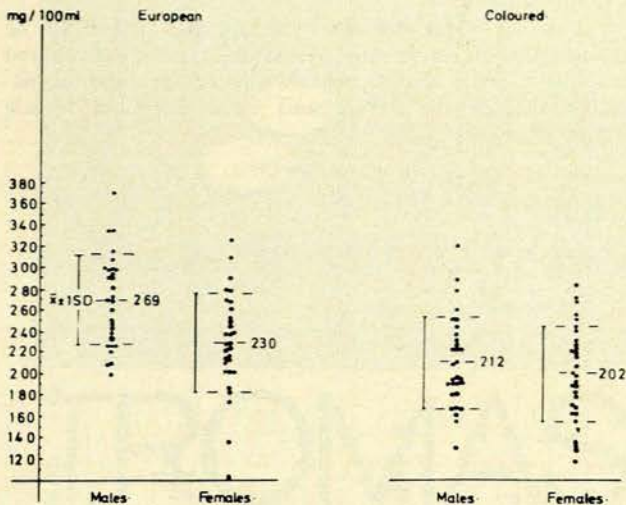


Fig. 5. Phospholipids.

DISCUSSION

Any laboratory providing a routine biochemical service, or one engaged in research, should establish baseline levels for all chemical investigations undertaken. This is especially true in the case of serum lipids, where differences in the various racial groups are known to exist.^{7,14} That differences in this study would be encountered was not unexpected. A feature of the study, however, was that the differences were so marked at virtually all levels, particularly when it is considered that estimations were carried out on apparently normal, healthy young individuals.

As we set out to establish normal serum values for the various lipid parameters to be used as a reference for evaluating clinical and research material reaching our laboratory, no particular form of dietary regimen or restriction of any sort was resorted to. Reviewing the sampling of our series in retrospect, certain fundamental aspects emerge and can be briefly noted. None of the subjects in this series was obviously overweight and all were under 30 years of age. It is interesting to note that although significant differences for serum cholesterol, phospholipids and triglycerides were obvious, no patent differences could be demonstrated between White and Cape Coloured females with regard to total serum lipids and beta-lipoprotein levels. This requires further investigation, as also the very low total serum lipid values found in the Coloured males. All individuals in this study appeared healthy and free from pathology predisposing to elevated serum lipid values.

SUMMARY

Total serum lipids, triglycerides, cholesterol, phospholipids and beta-lipoprotein levels in serum of the two major racial groups in the Cape Peninsula, White and Cape Coloured, were estimated and compared. The significantly lower values found in virtually all the parameters in the Coloured group investigated, clearly show the necessity for compiling normal serum lipid values for a laboratory serving a mixed racial community. The need for further comparative lipid metabolism studies is stressed.

We should like to thank Mr B. Neitler for assistance with the illustrations and Mrs R. Hodgen for technical assistance. We also wish to thank Dr C. P. Retief, Head of the Department of Chemical Pathology, and Dr R. L. M. Kotzé, Medical Superintendent of Karl Bremer Hospital, for permission to publish this article.

REFERENCES

1. Bronte-Stewart, B., Keys, A. and Brock, J. F. (1955): *Lancet*, **2**, 1103.
2. Bronte-Stewart, B., Antonis, A., Eales, L. and Brock, J. F. (1956): *Ibid.*, **1**, 521.
3. Antonis, A. and Bersohn, I. (1963): *S. Afr. Med. J.*, **37**, 440.
4. Brock, J. F. (1965): *Ibid.*, **39**, 835.
5. *Idem* (1967): *Ibid.*, **41**, 739.
6. Joubert, F. J., Van Bergen, A., Bersohn, I., Walker, A. R. P. and Lutz, W. (1962): *S. Afr. J. Lab. Clin. Med.*, **8**, 10.
7. Pearson, S., Stern, S. and McGavack, T. H. (1953): *Analyt. Chem.*, **25**, 813.
8. Communicable Disease Center, Atlanta: Lipid Standardization Medical Laboratory Section Broadstreet.
9. Carlson, L. A. (1963): *J. Atheroscler. Res.*, **3**, 334.
10. Van Handel, E. and Zilversmit, D. B. (1957): *J. Lab. Clin. Med.*, **50**, 152.
11. De la Hueraga, J., Yesinick, C. and Popper, H. (1953): *Amer. J. Clin. Path.*, **23**, 1163.
12. Zilversmit, D. B. and Davies, A. K. (1950): *J. Lab. Clin. Med.*, **35**, 155.
13. Heiskell, C. L., Fisk, R. T., Florsheim, W. H., Tachi, A., Goodman, J. R. and Carpenter, C. M. (1961): *Amer. J. Clin. Path.*, **35**, 222.
14. Keys, A. and White, P., eds. (1956): *World Trends in Cardiology and Cardiovascular Epidemiology*, pp. 146 and 180. New York: Hoeber.