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BASAL METABOLISM OF OKLAHOMA CHILDREN

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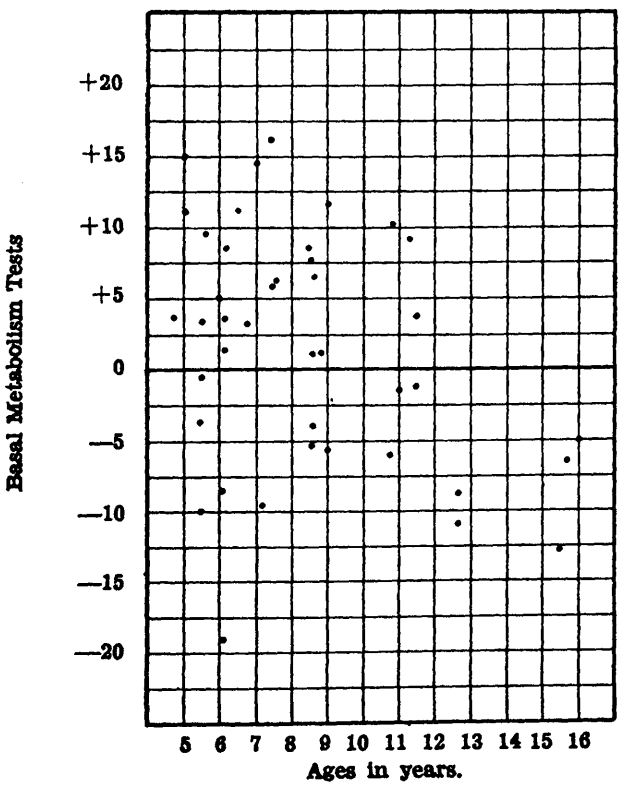
(Abstract)

The development of apparatus which permits the direct determination of basal metabolism has been one of the greatest steps forward in the study

CHART I

The Basal Metabolic Rates of Girls (42) According to Age

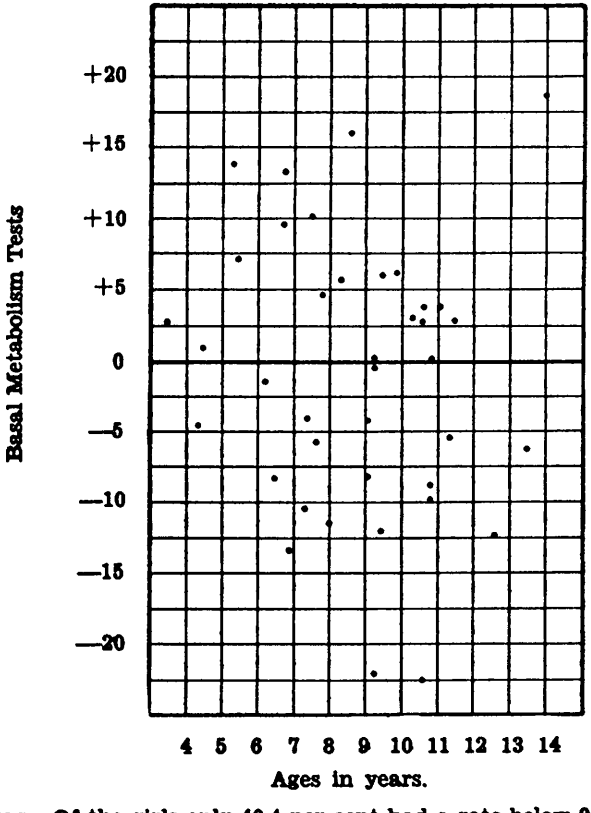


of nutrition. The mass of data so accumulated serves as a standard for comparison today. A study by Coons (1931) of Oklahoma women and by Hafkesbring and Borgstrom (1926) of New Orleans' women indicates that the basal metabolism of Southern women is lower than the standard. Forty-two boys and forty-two girls ranging in age from 3.5 to 16 years from Stillwater, Oklahoma homes are reported in this study. The basals were made as soon as possible after the children awakened in the morning and under ideal conditions, using the Benedict-Roth recording metabolism apparatus.

The basal metabolic rates of the girls and boys are plotted separately on Charts I and II. It will be noted that the girls had higher basals than

CHART II

The Basal Metabolic Rates of Boys (42) According to Age



the boys. Of the girls only 40.4 per cent had a rate below 0 with the lowest —19; 14.3 per cent were between 0 and —5 and 19 between —5 and —10. The rate of 59 per cent were above 0, the highest being +16.

Of the boys 50 per cent had rates above 0 and 50 per cent below 0. The rates of 11.8 per cent were from 0 to —5, of 19 per cent between —5

and —10 and the same per cent below —10; 23.8 per cent had rates from 0 to +5; 14.2 per cent from +5 to +10, and only 5 above +10.

Sixty-nine per cent of the girls in this study were 8 years of age or under as compared to 40 per cent of the boys.

Rothbart (1935) in Michigan, reporting on boys and girls from 9.6 to 16 years showed that 48.5 per cent of the girls and only 13.5 per cent of the boys had rates below 0.

Of the total number of girls 80 per cent had rates from —10 to +10 and 93 per cent from —10 to +15. The boys' normal rate was lower, 80 per cent having rates from —15 to +10, 88 per cent from —15 to +15 and 9 per cent from —20 to +15.

The majority of children varied from the average weight. Those who were more than 10 per cent below the average listed in Tables I (girls) and II (boys). The rates of the girls ranged from +9.6 to —10 and those of the boys from +16.3 to —23.9. The results are within the normal range.

TABLE I. *Basal metabolism tests of girls whose weight was 10 per cent or more below the average.*

Case No.	Age yr.	Age mo.	Height Ins.	Weight Lbs.	Weight Deviation Per Cent	Pulse	B. M. R. Per Cent
25	7	6	52.0	50	—21.8	86	+5.7
22	8	11	50.0	51	—12.0	72	+1.4
10	9	0	50.5	50	—13.7	87	—5.4
35	11	3	57.0	65	—20.7	74	+9.6
41	11	5	57.0	71	—13.4	84	—1.3
27	11	6	61.0	87	—17.1	70	+3.8
14	12	8	61.0	81	—19.8	80	—10.7
29	15	10	64.0	96	—19.6	75	—6.5
37	16	0	64.0	90	—25.0	74	—5.1

TABLE II. *Basal metabolism tests of boys whose weight was 10 per cent or more below average.*

Case No.	Age yr.	Age mo.	Height Ins.	Weight Lbs.	Weight Deviation Per Cent	Pulse	B. M. R. Per Cent
26	6	10	50.0	48	—17.2	86	—13.2
15	7	3	51.5	53	—13.1	90	—10.3
30	7	6	50.0	47	—18.9	74	+10.1
13	7	10	52.0	55	—14.0	82	+4.8
22	8	7	49.2	48	—12.7	82	+16.3
5	9	1	51.5	52	—16.4	82	—7.9
29	10	10	57.5	71	—15.5	76	+0.3
17	10	10	56.0	67	—12.9	80	—9.9
32	10	11	59.5	75	—14.7	76	—8.5
37	10	8	60.0	76	—15.5	82	—23.9
40	11	4	60.0	79	—18.8	78	—5.3
41	12	4	61.0	89	—11.0	76	—7.6

Only one girl's weight was more than 10 per cent above the average. This was subject number 17 who had a basal metabolic rate of —9. There were three boys, numbers 12, 38, and 21 above the average weight. Number 38, had a rate of —12, while numbers 12 and 21, had basal metabolic rates of +3.9 and +2.1. The tendency is to a low normal.

The results of the underweight and overweight children show that these factors do not change the basal metabolic rates from the normal range.

The question of heredity, as to the body build of the child affecting the basal metabolic rate has risen. Children of tall parents are plotted in Tables III and IV. The rates of these children were within normal and show the same variance as children of average sized parents. These children showed the same variance in basal metabolic rates as children of average and tall parents.

TABLE III. *Basal metabolism tests of girls from tall parents**

Case No.	Age yr.	Age mo.	Height Ins.	Weight Lbs.	Weight Deviation Per Cent	B. M. R. Per Cent
3	4	9	40.0	34	—5.6	+3.6
34	5	0	44.7	42	—6.6	+11.8
1	5	5	42.0	35	—10.3	—3.4
16	5	7	44.5	42	0	+9.4
7	6	1	45.5	43	—7.4	—19.6
8	6	2	48.0	51	—1.9	+1.6
43	6	6	47.5	46	—8.0	+11.1
2	6	10	47.0	47	—6.0	+3.2
6	7	0	49.0	54	0	+14.5
42	8	5	54.0	64	+7.2	+8.8
21	8	9	51.5	59	—7.8	+1.3
33	10	10	60.7	88	—7.5	—5.9
18	11	0	63.5	114	+3.6	—1.5
41	11	5	57.0	71	—13.4	—1.3
37	16	0	64.0	90	—25.0	—5.1

*Tall Parents:
Father 5 feet, 9 inches or taller
Mother 5 feet, 5 inches or taller

TABLE IV. *Basal metabolism tests of boys from tall parents**

Case No.	Age yr.	Age mo.	Height Ins.	Weight Lbs.	Weight Deviation Per Cent	B. M. R. Per Cent
2	6	9	47.0	45	—10.0	+9.7
35	7	5	51.0	57	—6.5	—22.0
18	7	1	52.5	64	0	—5.6
38	9	6	58.0	102	+21.4	—12.0
17	10	4	51.7	56	—9.4	+2.9
29	10	10	57.5	71	—15.5	+0.3
7	10	10	56.0	67	—12.9	—9.9
40	11	4	60.2	79	—16.8	—5.3
10	12	8	66.7	113	—12.2	—8.8
42	13	5	62.0	98	—7.5	—6.2
16	14	0	61.0	89	—10.1	+19.6

*Tall Parents:
Father 5 feet, 9 inches or taller
Mother 5 feet, 5 inches or taller

CONCLUSIONS

1. In general, the basal metabolic rates of Oklahoma children may be referred to as lower than the rate of northern children. Basal metabolic rates of the boys were definitely lower than those of northern boys. Girls above 9 years of age were also definitely lower.

2. Children who were underweight did not vary from the normal basal metabolic rates.

3. Children of tall parents did not show any marked low or high metabolic rates.

REFERENCES

1. Coons. C. M. Amer. J. Physiol. 98, 692-697 (1931).
2. Hafkesbring, R., and P. Borgstrom. Amer. J. Physiol. 79, 221-6 (1926).
3. Rothbart, H. B. Amer. J. Dis. Child. 49, 672-688 (1935).

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