8 (940)

Studies of the basal metabolism and its relation to the body surface in obesity, myxedema, and pituitary disease.

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The following determinations of basal metabolism were calculated by indirect calorimetry from the oxygen absorption and the R. Q., these factors being obtained by means of Benedict's unit apparatus (mouthpiece and spirometer). At least three ten-minute periods were run, and the average taken for that day's basal metabolism. In case I the calculation included the estimation of calories due to non-protein metabolism and to this was added that due to protein. In the other cases the protein metabolism was ignored. None of these cases had over 6–7 grams urinary nitrogen per day, so that the protein element would not affect the total calorie calculation by more than 1 to 2 per cent.

The body surface has been calculated by Meeh's formula and also by DuBois's.

The results are given in the table.

Cases studied were:

Case 1. Simple obesity of many years duration.

Case 2. Very marked obesity, also of many years duration.

Case 3. Sudden gain in weight in last year and a half. Sugar tolerance abnormally low. Thought to be hypopituitary. Said to have a polyuria, not noticed in ward.

Case 4. Acromegaly of long standing. Sugar tolerance now high. Thought to be going over into a hypopituitary stage.

Case 5. Typical myxedema. Never treated with thyroid.

Subject Dr. P. Normal control. Large muscular man.

In the cases studied the surface area by Meeh's formula was from 10 to 30 per cent. below that by DuBois's. In two cases of marked obesity the metabolism per square meter (DuBois) was

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Subject.	Diagnosis.	Number of Basal Metabolism Determinations.	Height, Cms.	Weight, Kg.	Age.	Body Surface, Square Meters.		Calories per Kg. and 24 Hours.	Calories per Square Meter per Hour.		Percentage Variation from Normal (34.7 Cal. per S. M. + Hour).	
						Meeh.	DuBois.		Meeh.	DuBois.	Meeh.	Du Bois.
Case I, Mrs. McK..	Obesity	19	137	103 average	48	2.703	1.859	15.0	23.9	34.8	−31%	+ 0.3%
Case II, Mrs. B.....	Obesity	2	163	179	44	3.907	2.954	14.0	26.8	35.4	−23%	+ 2.0%
Case III, Mrs. M...	Obesity	2	161	87	28	2.419	2.009	17.2	26.0	31.1	−25%	−10.4%
Case IV, Mrs. C....	Hypo-pituitary? Acromegaly	1	160	80	65	2.280	2.060	19.3	28.2	31.2	−20%	−10.1%
Case V, Mrs. D.....	Myxedema	2	153	67	57	2.039	1.621	14.4	20.0	25.2	−42%	−27 %
Dr. P.....	Normal control	6	186	94	32	2.541	2.118	19.2	29.5	35.4	−15%	+ 2.0%

normal. One case of obesity thought to be of pituitary origin was 10 per cent. from the normal average and hence may be regarded as suspicious. The case of acromegaly was also 10 per cent. below, and the myxedema 27 per cent. below.

9 (941)

The energy metabolism of infants in relation to age and nutritive condition.

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Recent studies of the heat production of infants by Benedict and Talbot,[1] Bailey and Murlin[2] and Murlin and Hoobler[3] indicate a progressive increase from birth to the age of one year, whether the metabolism is reckoned on the basis of weight or on the basis of surface area (Meeh).

On the basis of weight the average metabolism of 13 newborn infants, determined while they were sleeping, is 1.87 calories per kilogram and hour; of normal infants between the ages of two and four months inclusive, it is 2.38 calories per kilogram and hour; between 6 and 12 months the average is 2.45 calories per kilogram and hour.

On the basis of a square meter of skin surface the metabolism of the newborns (up to 14 days of age) is, on the average, 25 calories per square meter and hour; of normal infants from two to four months inclusive, 35 calories per square meter and hour; and between six and twelve months the average is nearly 42 calories per square meter and hour. These differences on the basis of surface area are based on the assumption that the surface bears the same relation to weight ($11.9\sqrt[3]{(W)^2}$) in all.

An analysis of all the observations on infants between the ages of two months and one year studied by Howland,[4] Benedict

[1] Carnegie Institution of Washington, Publ. No. 201; also *Amer. Journ. Dis. of Children*, 1914, VIII, p. 1.

[2] *Proc.* of this Soc., 1914, XI, p. 109.

[3] *Ibid.*, 1914, XI, p. 115.

[4] *Zeitschr. f. physiolog. Chemie*, 1911, LXXIV, p. 1; also Trans. of XVth Cong. on Hygiene and Demography, 1912, II, Pt. II, p. 438.