BASAL METABOLIC TESTS AS A VALUABLE AID TO THE GENERAL PRACTITIONER.

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Old practitioners of Medicine rebel against the usual up-to-date diagnostic methods and deny the value of well established and universally accepted laboratory procedures. They think that the clinical picture with its symptoms is sufficient to supply all the information needed to the entire conclusion of a given case based on clinical experience and observation. They doubt the integrity of modern laboratory procedures and disregard them. They find it very difficult to adapt themselves to the new, elaborate and time-consuming tests. It is not intended to belittle the great value of clinical observation in the diagnosis, treatment and prognosis of disease.

Metabolism is the sum of all physical and chemical processes by which a living organized substance is produced and maintained and also the transformation by which energy is made available for the uses of the organism. It is the building up and breaking down processes which are constantly going on within the human body. Basal Metabolism is usually defined as the oxygen consumed per minute by an individual, measured from 14 to 18 hours after eating, when the individual is at rest but not asleep.

Normal Oxygen consumption depends on the height and weight, age, and sex of an individual. An older person living a relaxed life requires less oxygen than a younger individual who is growing and who lives an active life. In order to obtain normal standards of O_2 consumption normal individuals have been subject to tests. All these individuals have normal physical and mental characteristics, that is, normal height and weight for their age, sex and group, such as tall, short, stout, thin or medium.

Elaborate methods have been used by such authorities as Benedict and DuBois. These consist of the determination of oxygen consumption and carbon dioxide out-put of normal individuals. Such factors as heat production and body temperature were considered carefully. They computed with great accuracy body surface and oxygen consumption per unit, and also took into consideration the height and weight and age and

sex of each individual. In this way an analytically developed formula has been derived, which gives the normal oxygen consumption of individuals different in physical characteristics.

There were two sets of normal values referred to by technicians Benedict's and DuBois' normal. These normal values are estimated values based on the results obtained by a great number of tests run on normal individuals. There are marked differences in the two sets of values:

10% minus to 20% plus in extreme cases,
0% to 5% plus in ordinary cases.

However most laboratorians and clinicians disregard these differences and consider 10% minus to 15% plus as *normal* values.

The test is run early in the morning with the patient absolutely fasting under basal conditions. By the aid of any of the standard Metabolimeters the amount of O_2 consumed in a given time is recorded on a graph. This total amount of O_2 is divided by the number of minutes or duration of the test to obtain the O_2 consumption per minute. The Barometric Pressure and temperature of the O_2 is recorded as part of the data. Corrections are then made in order to reduce the O_2 consumption to standard barometric pressure and temperature. The corrected amount of O_2 consumed per minute is compared with the normal standard as given by either DuBois' or Benedict's tables of normals. The patient's O_2 consumption is either above or below normal. This number is a plus or a minus and is divided by the number which in the tables is given as a normal for an individual of the same height and weight, age and sex. Hence the percentage either a plus or a minus is obtained. There are other methods of arriving at the same conclusions but the above described is the one method of computing most commonly used by technicians.

A Basal Metabolic Rate, when accurately determined by a dependable technician with reliable apparatus, is of great value in the diagnosis, treatment and prognosis of diseases of the thyroid gland. In most cases a careful history, the clinical finding and symptoms make the diagnosis of thyroid disease an easy matter. But, there are occasionally cases which present difficult diagnostic problems not only to the average practitioner of medicine but even to the experienced diagnostician. In such cases a normal basal metabolic rate gives the internist the absolute assurance to rule out diseases of the thyroid gland.

A Metabolic Rate should be run in all cases in which patients show an enlarged *thyroid,* unexplained tachycardia, bilateral or even unilateral exophthalmos, rapid loss of weight, nervous irritability, vasomotor symptoms (vomiting, diarrhea and sweating). It should also be taken in all cases in which patients have a retarded mentality, sluggish vitality with gain in weigh.

In other words the Basal Metabolic Rate is useful; in differentiating toxic goiter from tuberculosis, from early cardiac or myocardial involvement.

In *surgery,* it is useful to determine the effect of rest and diet to warrant a thyroidectomy and to verify and arrest the toxic condition of the patient.

In *therapy* it is of great value in cases of hypothyroidism, to warrant the administration of thyroid extract and to regulate its doses. The obesity of eunuchoidism, of big eaters and laziness show no changes in the basal metabolic rate. But in cretinism, myxoedema, and in the obesity of hypopituitarism we find a decrease in the Basal Metabolic Rate.