metabolic balance

Dr. Wolf Funfack

Nutrition basics

Introduction to the success program

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METABOLIC BALANCE®
is not a diet!

Are you struggling with your weight? Are you skipping meals and cutting calories? Are you watching everything you eat? Are you eating a low-fat or low-calorie diet? Do you sometimes feel tired and no longer quite able to keep up with the pace of modern life? Do you often have cravings for sweets, for alcohol, or for nicotine? These are all signs that your metabolism is no longer in balance.

Overweight and especially obesity are modern-day epidemics. They can lead to elevated blood pressure, increased levels of fats in the bloodstream, and diabetes. Those changes are summarized in the term *metabolic syndrome* and inevitably result in circulatory disturbances that can lead to heart attack or stroke. For many years, these abnormalities in the blood vessels have ranked as the leading causes of death in industrialized nations.

Searching for causes

In February 2010, researchers from Lund University in Sweden presented their findings from a survey study at an international congress in Copenhagen. In the survey, one-third of the respondents stated they were increasingly worried about today's food supply. Seventy percent said a nutritional plan designed specifically for them would improve their quality of life.

Eating well and eating properly

During recent years, a number of different diets have been devised to solve this problem. The Greek word *diet* means *way of life*. Thus, it is not limited to nutrition alone but instead implies

changes related to exercise and mental and social equilibrium. The English word *diet* has negative connotations because it implies such notions as avoidance, strict discipline, and tasteless food. Diets can help only in the short run, since most of them cannot be maintained over a longer period of time. During these brief dietary adjustments, people feel worse, because the food is not as appetizing and because great willpower is required. Dieters often feel hungry—even if that feeling is associated with a positive sense of doing the right and proper thing during this period. However, such positive feelings are only transient, because the dieter soon starts to break the diet and fall right back into old eating habits. What ends up happening is a perpetual pendulum swinging between phases of clear conscience but feeling lousy and phases of guilty conscience but enjoyment of food. What's missing in all of this is a middle ground, where there is a state of equilibrium.

METABOLIC BALANCE® PROVIDES EQUILIBRIUM

metabolic balance® provides a balanced way of eating that places the participant in a truly stable and balanced middle ground, thereby preventing the yo-yo effect. The effectiveness of the method is attested to by several hundreds of thousands of individuals who have participated in the program and successfully lost weight during recent years. I owe them a special debt of gratitude, for they have given me the energy and motivation to continue improving the metabolic balance® method so that it will work even more successfully.

Dr. Wolf Funfack

Exercise and diet long ago

Our ancestors who were still living as hunters and gatherers covered 15 to 20 miles every day on foot. We aren't speaking here about casual strolls, for they sped along quite briskly. Either they were running *after* something to eat, or they were running *from* something that wanted to eat *them*. In both cases, they were physically very active and remained so throughout their lives.

After dinner, rest a while; after dinner, walk a mile! Our ancestors had already walked that mile before their dinner, and they had used up in advance every calorie they ate as they ran through the forests. The ratio between calories used and calories ingested was reasonably balanced. If it was out of kilter, it was more likely because they used more calories than they were able to take in. The average person in the Western world these days covers about 550 to 660 yards daily and of course hardly needs to consume additional calories in order to secure daily meals. Typically, a person sits at a computer and orders the next freezer-full of food from the "table-set-yourself.com" company, which brings supplies right to the house and, if the buyer is especially fortunate, even sorts them neatly in the buyer's freezer. Long ago, the foods consumed by our hunter-gatherer ancestors were purely natural products—100% organic even without the USDA Organic seal, and a certification of a kind we can only dream about. In today's supermarket, we typically find only industrially processed foods and meals prepared in advance. Whether there are truly natural products behind all the different organic certificates is not easy for consumers to determine, and in addition, they

must pay quite a bit extra for these allegedly special organic foods.

Our ancestors' diet

From prehistoric bone artifacts we can now be certain that the diet back then consisted of 60 to 70% animal protein. This is also confirmed by studies of native peoples nowadays who still nourish themselves by being hunters and gatherers. They too live on 60 to 70% animal protein. This distribution of basic nutrients is similar in all regions regardless of their distance from the equator. Likewise, the difference in the proportion of carbohydrates consumed by peoples living in the Northern Hemisphere compared with their southern neighbors living near the equator is much smaller than one might imagine!

Protein-rich foods include eggs, milk, yogurt, and cheese.

Is your weight affecting your health?

It is an unfortunate fact that excessive body weight paired with lack of exercise can lead to health problems. In today's society we have food available at all times. With increasing frequency, though, people are becoming too fat, and over the course of time they develop a number of different illnesses. It makes sense to begin by determining the degree of overweight.

How can you recognize whether you're overweight or obese? For example, if you weigh 220 lbs (100 kg), does it mean you're too heavy? If you consider only weight without including height, it is impossible to come to any conclusion about whether you're overweight or normal weight. For this reason, the body mass index (BMI) has been established as the accepted standard measure for determining whether someone is overweight or not.

Body mass index

To determine body mass index, the individual's body weight is divided by the height squared. For example, a person weighing 100 kg who is 2 meters tall has a BMI of 100 divided by 2 squared (= 4), and thus 100 divided by 4, which is 25. A BMI of 24.9 is normal; a BMI of 25 to 29.9 is classified as overweight; and a BMI of 30 or over is classified as obese. This corresponds to the World Health Organization definition; also see the table on page 9.

$$\text{BMI} = \frac{\text{Body weight (kg)}}{(\text{Height in meters})^2}$$

$$\text{BMI} = \frac{\text{Body weight (lbs) x 703}}{(\text{height in inches})^2}$$

Body weight, BMI, and risk of illness

World Health Organization criteria (WHO)

Classification	BMI	Risk of illness
Underweight	Less than 18.5	Elevated
Normal weight	18.5 to 24.9	Average
Overweight	25 to 29.9	Elevated
Obesity Grade I	30 to 34.9	High
Obesity Grade II	35 to 39.9	Very high
Obesity Grade III	40 or over	Extremely high

Even though the body mass index is generally applied as a measure of overweight and obesity, it cannot be used for every individual. There are three exceptions. The body mass index should not be used for the following groups of individuals:

Pregnant women, who may have an elevated body mass index but not because they are too fat
Children and adolescents, who have their own standard values, which are not comparable to those used for adults
Body builders, such as Arnold Schwarzenegger, who certainly has an elevated body mass index not on the basis of excessive fat but, rather, from excessive muscle tissue

Thus the disadvantage of the body mass index is the absence of any consideration of muscle tissue or the determination of the percentage of body fat. Body composition also plays a role in distinguishing between normal and excess weight.

Bioimpedance analysis

Bioimpedance devices (body composition devices) have proved very useful to determine the proportion of body fat or body water.

These devices use low-frequency electrical currents to measure the body's resistance to penetration by electricity. To perform this test, the person to be examined stands barefoot on the two electrodes on a body fat scale. A low-frequency current is passed into the body through one foot, and when it emerges from the other foot, its strength is measured. Water is an excellent electrical conductor.

The more water there is in the body, the greater the electricity that will be detected. Hence, this method actually measures the quantity of water in the body, and the quantity of fat is then calculated based on the water content. As a result, this is an indirect method of measuring fat. For example, the results will vary depending on whether the individual tested has a full or an empty bladder. Since the resistance differences measured are due to differences in water content, the measurements of body fat content will also be different! Therefore, it is essential, to conduct this measurement at the same time of day. Furthermore, to ensure consistent testing conditions, be sure that the person has had nothing to eat or drink for two to three hours preceding the test. In measurements performed only through the feet, the results apply only to the fat content of the lower body.

Waist circumference measurement

A very simple and yet quite reliable method of measuring body fat is to measure waist circumference. To do this, one simply uses a tape measure to determine waist circumference at the level of the navel. It is important to be sure to hold the tape parallel to the floor surface and not to hold one's breath or inhale very deeply. It has been shown to be quite helpful to perform this measurement while the person is lying down, especially for severely overweight individuals.

- A normal-weight man has a waist circumference of less than 37 inches (94 cm), and a normal-weight woman, less than 31.5 inches (80 cm).

- Slight overweight is associated with waist circumferences of 37 to 40 inches (94 to 102 cm) in men and 31.5 to 34.5 inches (80 to 88 cm) in women.
- Significant overweight requiring treatment exists when those measurements are exceeded.

Waist circumference in relation to height

To obtain a more accurate determination while still keeping the process simple, you can divide waist circumference by height (WHtR = waist-to-height ratio). Even though this is a very simple method of measurement, it has proved to have the greatest reliability of any measurement with regard to overweight and overweight's resultant illnesses, and it is even more accurate than the BMI!

$$\text{WHtR} = \frac{\text{Waist circumference (cm)}}{\text{Height (cm)}}$$

The calculated value should be under 0.5 through age 50 and is the same for men and women. A man with a height of 71 inches (180 cm) and a waist circumference of 35.5 inches (90 cm) has a WHtR level of 0.5. A woman with a height of 63 inches (160 cm) and a waist circumference of 31.5 inches (80 cm) has the same WHtR level of 0.5. Neither individual is overweight. This value is age dependent, and in individuals over 60 years of age, it may be as high as 0.6 before the individual should be considered overweight.

Why must we eat at all?

Anyone can easily answer that question. We eat so we don't starve. In infants and children we can most clearly observe the reason we must eat: we eat to provide our bodies with an adequate supply of the nutrition needed so we can grow. In this process, foods go through countless metabolic pathways to supply our bodies with everything they need day in and day out.

A newborn baby weighs 7.7 lbs on average. It doubles its birth weight in six months and triples it by its first birthday. Normal weight for an adult is about 154 lbs and thus 20 times the average birth weight. In order that all our organs, our skin, and our bones may grow and increase in weight, we must supply our bodies with sufficient raw materials. Even later, as adults, we have to continue eating, because our body cells are continuously being replaced. It's noticeable that after a vacation in the sun and once we're only 14 days back home, we already begin to lose our suntan. The cells in the skin's outer layer that produced a large amount of the coloring pigment melanin protect us from the sun's ultraviolet rays. Those suntanned cells have been replaced by new cells, even though they were only two weeks old.

Our metabolism

Another reason we eat is to supply our bodies with the energy they need to perform daily tasks. The entire range of processes that take place in our bodies—including ingesting and breaking down our food into small components, assembling and transforming these tiny components into human protein, and ultimately

excreting the waste substances our bodies cannot use—is known as metabolism. When we take in foreign substances such as animal or vegetable protein, their characteristics get altered, and we transform them into our own human protein. Carbohydrates, manufactured by plants using sunlight and water, are required so we can burn them in our bodies and thus liberate the energy to propel all of these metabolic processes.

The components of food

There are three basic nutrient groups available to us, which are classified as macronutrients: proteins, fats, and carbohydrates. In addition, we need water, minerals, vitamins, trace elements, and secondary plant substances. The oxygen required for oxidation is obtained through our lungs as we breathe.

Natural reflexes

The body has provided us with wonderful tools so each of us can determine the quantities of food we need as we feel hungry or full. Appetite and food aversions help us seek out the particular nutrients that our bodies need at any given moment and help us avoid those that might harm us. Thus, the body has finely tuned regulatory mechanisms to help us determine the quantities and kinds of foods we need to eat by means of (1) appetite and (2) food aversions. In a body with a balanced metabolism, these processes mirror each other marvelously and do not need any additional external influence to maintain their equilibrium.

It begins with baby food

Sadly, in our industrialized society we can obtain ever-smaller quantities of truly natural foods, and instead, our food is almost entirely industrially processed and adulterated. At an early age, our children become accustomed to certain flavoring substances that are present in our foods. Those substances imitate the aromas of apples, pears, bananas, meat, or vegetables, even

As the body again recalls its old internal signals after completing a metabolic adjustment of the kind provided by metabolic balance®, it soon becomes able once again to seek out foods for itself that it truly needs.

though none of those foods may actually be present in the foods we've purchased. This throws the finely tuned interactions between gut and brain into total confusion. The gastrointestinal tract contains nearly as many nerve cells as the brain and on this account is sometimes referred to as the second or "gut" brain.

Strawberry yogurt minus the strawberries

Using the gut brain, our bodies are able to seek out precisely those substances that they actually need in the food mixtures that are rolling past us. The cerebrum might thus develop a craving for strawberries—which contain large amounts of potassium and magnesium—when there is a need for those two elements. The person gets up right away and heads for the supermarket to look for foods that *look* like strawberries, *smell* like strawberries, and *taste* like strawberries. The person might then happen on a strawberry yogurt with a beautiful picture of strawberries on the package, open it up, and inhale the intense aroma of strawberries. The person tastes it, and the taste is likewise quite reminiscent of strawberries. Yet sadly, this fruit yogurt often contains no strawberries at all but only aromatic and flavoring substances that fool us into thinking it contains strawberries.

Often, the flavoring substances smell considerably stronger of strawberries than the real fruits themselves, and thus, we get tricked. Our brain is happy and thinks, "I've sought out and found something that looks like strawberries and tastes like strawberries." Yet unfortunately, this strawberry-free yogurt contains neither the potassium nor magnesium that real strawberries would provide. Thus, over time, our gut brain becomes less and less able to rely on our cerebrum or, more specifically, on the hypothalamus, located in the diencephalon.

We are less and less able to purchase foods on the basis of our own inner signals and according to what our bodies really

need. Instead, we rely on external signals, and we purchase by fragrance, by taste, because of an advertisement, or because the food happens to be on special offer.

Hormones regulate satiety and hunger

In our bodies, hormones are primarily responsible for regulating hunger and satiety. There are hormones that make us feel hungry and others that make us feel full.

Ghrelin

One of the many hormones that make us hungry is known as ghrelin, a hormone produced primarily by the gastric mucosa. Its production increases sharply when the stomach is empty and the stomach walls hang loosely and there is nothing present in the stomach. The stomach walls produce a large amount of ghrelin when the stomach is empty. Ghrelin production begins to slow down as soon as the stomach slowly begins to fill. This explains why it's possible to fend off brief hunger attacks, which might occur during the five-hour pauses between meals in the metabolic balance® program. In those cases, simply drinking water will briefly stretch the stomach walls, slowing down the production of this hunger-inducing hormone.

Leptin

Another very important hormone in this regulatory cycle is leptin. The word *leptin* stems from the Greek *leptos* and means *thin*. Leptin is produced by distended fat cells, especially in abdominal fat, and evokes a feeling of satiety in the brain. The fat cells swell, there is no longer a sense of hunger, and the body feels satiated. In normal-weight individuals, this regulatory mechanism works wonderfully well. A normal-weight person who eats enough feels satiated and stops eating.

Overweight persons have very high leptin levels because of the large numbers of enlarged fat cells in their abdominal fatty tissues. However, they are no longer responsive to the signal that leptin sends to their brains. As a result, they cannot stop eating as long as there is anything left to eat on the plate. A thin person stops eating when full, but an overweight person stops eating only when there is no more food left to eat. One reason for this is that overweight individuals have developed resistance to the satiety hormone leptin.

Nutrients and their effects

All forms of life on Earth, including human beings, obtain their fuel and building blocks for daily life from three groups of nutrients. Carbohydrates, proteins, and fats are the macronutrient groups we must continuously supply our bodies with–simply to survive and to regenerate our organs. Like a finely tuned clockwork mechanism, our metabolic pathways then remain in equilibrium.

Proteins

Protein is a substance composed of thousands of small amino acid molecules linked to each other, which our bodies require to build up their own human proteins. Whenever we ingest animal or vegetable protein, our digestive systems must break down very long amino acid chains into individual amino acid units. Only the individual amino acid molecules are small enough to pass through the intestinal wall and reach the bloodstream on the other side. Once the amino acids have entered our blood, we can truly say they are inside the body. While they remain in the intestinal tract, they are still quasi outside the body and can rapidly be excreted from the body through the rectum and anal passages.

The ultimate function of the digestive system is to liberate amino acids from these long protein chains so they may be absorbed into the bloodstream. Next, the amino acids are transported to the liver and other organs, where they can be transformed into human protein. The reason we need to consume so much protein becomes evident when we recall that we cut our nails about once a week, and we go to the barber or hairdresser to have our hair cut about once a month. We need to eat protein

so that sufficient materials are on hand to regenerate our nails and our hair. There are cells in our body that live for only two to three days—like the cells in our intestinal lining, which must be continuously replaced using new protein. White blood cells live for four to five days, while red blood cells have a life span of 120 days. Over the course of the entire year, the body is constantly replacing itself. From this, we can deduce that every seven years, the whole body gets completely regenerated. The good news is that nobody has any organs that are more than seven years old!

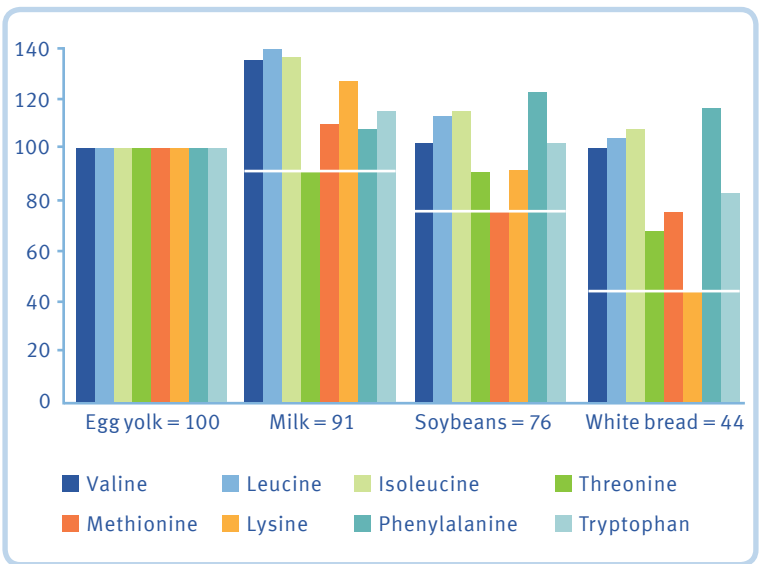
It's all about quality

The word *protein* comes from the Greek *proteos*, meaning *first one* or *most important one*. Protein is truly the body's most important building block. Our life takes place in proteins, and we store vital information in proteins. When we learn something, it happens by changes in protein structures. When we propagate our genes and pass them along to the next generation, that, too, takes place through proteins. We grow, we change, and our entire lives occur in proteins. There are only 21 different amino acids from which all animal and plant proteins on Earth are constructed. Eight of those 21 amino acids are known as essential amino acids, because the body is incapable of synthesizing them. Consequently, we must obtain those eight amino acids through diet. Therefore, it's not the *quantity* of protein that is critical for metabolism but, rather, its *quality*—and the nature of its constituent amino acids.

The more a nutrient protein resembles our own body's protein, the better are its proportions of essential amino acids. Thus, the higher is its so-called biological value. This term expresses the extent to which the protein in a particular food can be transformed into human protein. To accomplish this, the body requires all eight essential amino acids to be present in a predetermined ratio. The proportion of the scarcest amino acid determines the overall value of the protein. When we combine

different proteins, the value of the combination is determined by the amino acid present in the smallest quantity. Amino acid breakdown products produced from those amino acids cannot be used. Furthermore, this may lead to overacidification of the body. Egg yolk contains the ideal ratio of amino acids, and thus, 100% of the protein in egg yolks can be transformed into human protein. Cow's milk contains only 91% of one of the eight essential amino acids—threonine—and as a result, only 91% of the remaining amino acids can be used for building human protein. Hence, milk has a biological value of 91. Combinations of different proteins are best avoided, since this may reduce their total biological value.

Biological value



Fats

Fats (lipids) occupy an intermediary position among the three major macronutrient groups. Whereas proteins can be used only as building blocks and carbohydrates can be used only to provide energy, fats have a dual function: as both building blocks and energy sources. Stored beneath the skin, they protect us from the cold.

Many organs are embedded in fat to protect them from injury, and energy is stored in fat depots for difficult times, such as winter, when nature provides us with little or no edible food. All cell membranes—the "walls" that surround our cells—are composed of a double lipid layer. Cholesterol is embedded in this double lipid layer to help stabilize it. Our nerves and our brains are composed almost 80% of lipids.

Synthesis of fats

Like proteins, fats are synthesized from smaller components. Whereas amino acids represent the smallest units of proteins, the smallest units of fats are the fatty acids. Just as with other macronutrients, the digestive tract must first break down fats into their smallest components before they can be absorbed through the intestinal wall into the bloodstream. The latter can then transport them throughout the body to be reassembled into body elements, including cells, hormones, and lipids. Fats are divided into two groups. Saturated fats are primarily animal fats, and they are solid at room temperature. However, there are vegetable fatty acids, such as palmitic acid from coconut oil, that consist of saturated fatty acids, which are also solid at room temperature. Those fatty acids referred to as unsaturated fatty acids are of particular importance. There are two types: monounsaturated fatty acids and polyunsaturated fatty acids. In our diet, the proper ratio should be one-third saturated fatty acids, one-third monounsaturated fatty acids, and one-third polyunsaturated fatty acids.