



## seca medical Body Composition Analysis - mBCA:

An mBCA scan is used for the clinical assessment of tissue and fluid compartments in the human body. Simply explained, mBCA measures the impedance or resistance of an electrical current as it travels through the water that is found in muscle and fat. A normal distribution of tissue and fluid in the body is associated with high immunological function and longevity. mBCA is most useful in combination with dieting and exercise as it illustrates the conversion of fat body mass to lean body mass. Talk with our wellness consultant to determine if a natural medicine and/or a dental medicine consultation would be suitable for you.

### *Understanding Your mBCA results*

**Body Mass Index (BMI):** This is a measure of a person's weight relative to their height. Please be aware this classification has limitations, as it does not take frame size into account. Therefore the results should be analysed in conjunction with other mBCA parameters.

**Fat Mass (FM):** Fat mass is all the extractable lipids from adipose and other tissue in the body. It is the total amount of stored lipids (fats) in the body and consists of subcutaneous fat and visceral fat. Subcutaneous fat is located directly beneath the skin and serves as an energy reserve and as insulation against outside cold. Visceral fat is located deeper within the body and serves as an energy reserve and as a cushion between organs. Everyone needs a certain amount of fat in their body. The ideal fat % is dependent on age and gender. The basal metabolic rate is determined by lean body mass since only lean body mass metabolizes. The greater the individual's lean body mass, the greater the rate of caloric expenditure. One of the main benefits of exercise is the maintenance of lean body mass. Dieting alone may cause a reduction in lean body mass and can actually reduce the body's ability to burn calories. **The main principle of weight management is to maintain or increase lean body mass. Since this is not always possible during weight loss, the goal is to minimize reduction of lean body mass. A typical person will experience a loss of 0.45 Kg of lean body mass and 0.55 Kg of fat mass for each kilogram of weight loss while dieting without exercise. A permanently elevated FM increases the risk of diabetes and cardiovascular disease. Endothelial dysfunction, high blood pressure, sleep apnea ect... are indicators of increase risk.**

**Fat-Free Mass (FFM):** Fat-free mass, also referred to as lean body mass, is the total amount of nonfat (lean) parts of the body ( muscles, water, bones, tendons, ligaments ect...). It consists of approximately 73% water, 20% protein, 6% mineral, and 1% ash. Lean body mass contains virtually all the body's water, all the metabolically active tissues and bone, and is the source of all metabolic caloric expenditure. Lean body mass is further divided into body cell mass (BCM) and extracellular mass or extracellular matrix (ECM). Normal muscle mass can help avoid problems with the locomotor system. Skeletal muscle mass can also affect the immune system, the metabolism and the development of diabetes by means of messenger substances.

**Skeletal Muscle Mass (SMM):** This is the total skeletal muscle mass as well as the distribution in the arms and legs. You can estimate the trunk skeletal muscle mass by subtracting the limbs skeletal muscle mass from the total skeletal muscle mass. SMM is the muscles that move the body, are responsible for posture and is involved in thermogenesis (heat production). If SMM is increase it increases REE.

**Energy Stores (E):** E is the absolute amount of energy storage of the body due to intact cellular membranes. It reflects the body capacitance. A high capacitance indicates that your body stores energy effectively. A low capacitance would suggest that your cells are having trouble storing energy. E consist of the energy in the FM and FFM. The energy content in the FM is ten times higher than in the FFM.

**Resting Energy Expenditure (REE):** Also called Basic Metabolic Rate (BMR). This is the number of calories consumed and metabolized at a normal resting state over a 24 hour period. For a typical person, REE accounts for around 60-70% of their total daily expenditure. REE decreases from birth to old age.

**Total Energy Expenditure (TEE):** It is the total amount of energy you are expanding daily based on your disclosed level of average daily activity. This varies greatly. To loose or gain weight REE and TEE have to be modified. This us usually done with a combination of changes in the daily activity and diet. BIVA is a good assessment of the quality of BCM tissues.

**Body Composition Chart (BCC) :** This chart is a graphical representation of fat mass (FM) in relation to fat-free mass (FFM) in a two axis system. The fat mass is shown on the vertical axis and the fat-free mass on the horizontal axis. The values for FFM and FM allows a statement to be made about a person's general nutritional condition and fitness. The ellipses show the measuring range of a comparison group of healthy people.

**Total Body Water (TBW):** Water is contained in lean body mass. Total body water consists of two compartments - intracellular water (ICW) and extracellular water (ECW). It is the amount of water contained in the body and is a measure for evaluating basic hydration status.

**Extracellular Water (ECW):** This is a measure of the amount of water outside the cells. This water stores some nutrients and also helps to remove waste from inside the cell. Talk with our wellness consultant to determine if a natural medicine and/or a dental medicine consultation would be suitable for you.

**Intracellular Water (ICW):**  $ICW = TBW - ECW$  This is a measure of the amount of water contained within the cell. Healthy cells maintain their integrity and hold their fluid inside the cell membrane. Water is needed inside the cell to hold in water-soluble nutrients such as vitamins B and C. The optimum amount of water that should be inside the cell differs according to gender and age. A low ICW reading may be due to many things including dehydration, nutritional imbalance, hormonal imbalance or toxicity.

**Hydration:** Hydration describes the ratio between extracellular water (ECW) and intracellular water (ICW) and is expressed in percent. The normal ranges for hydration is between 50% and 80% for men and 60% to 90% for women. The ideal ratio is around 72% for men and 80% for women. Value of 100% or above are indicative of oedema (anasarca). Value below the normal range is indicative of dehydration (exsiccosis).

**Visceral Adipose Tissue (VAT) & Waist Circumference (WC):** Waist circumference allows conclusions to be drawn about the amount of body fat in the abdominal cavity. This abdominal fat, also known as visceral fat, is a risk factor for diabetes type 2 and vascular disease (arteriosclerosis) both of which can result in heart attacks and strokes.

**Women:** WC over 80cm = increased risk WC over 88cm = Greatly increased risk

**Men:** WC over 94cm = increased risk WC over 102cm = Greatly increased risk.

**Men:** VAT to 2.1 N, 2.1 to 3.8 Elevated, from 3.8 High **Women:** VAT to 1.2 N, 1.2 to 1.9 Elevated, from 1.9 High

**BioImpedance Vector Analysis (BIVA):** As part of an integrated part of the mBCA. BIVA is a simple, quick and clinically valuable method for assessing fluid status and body cell mass (BCM). This method plots the direct impedance measurements resistance (R) and reactance (Xc) as a bi-variate vector in a normogram and provide valuable information on body composition and nutritional status.

**Cardiometabolic risk:** If you provide us with recent blood test results regarding your blood lipids (triglycerides, total, LDL and HDL cholesterol) as well as blood fasting glucose levels, the results can be entered in the mBCA software along with your waist circumference and blood pressure and an assessment of your cardiometabolic risk can be made, including your 10 year risk of coronary heart disease. You can ask your GP for these blood test results.

**Health Risk - Phase Angle ( $\Phi$ ):** Phase angle is an indicator of cellular health and integrity and one of the best indicator of cellular function. It is a measure of the quantity and quality of the somatic cells. Research on humans has shown that the relationship between phase angle and cellular health is increasing and nearly linear. A low phase angle is consistent with an inability of cells to store energy and an indication of breakdown in the selective permeability of cellular membranes. Cell membranes have a high lipid content therefore this reading gives an indication of your cell lipid status. A high phase angle is consistent with large quantities of intact, healthy cell membranes and body cell mass.

A lower phase angle (under the green zone) can indicate a serious energy deficiency and is a prognostic indicator for a range of chronic illnesses including diabetes, pulmonary disease, chronic liver disease, various types of cancer and an indicator of frailty and mortality risk. A phase angle in the green zone is good, the higher the better. The Phase Angle allows conclusions to be drawn about a person's nutritional status and state of health. Women have a lower Phase Angle than men.

**Raw Impedance Data:** The raw data obtained from the mBCA at various frequencies can be provided on a report however this is more technical and research orientated. The raw data includes R ( $\Omega$ ) and Xc ( $\Omega$ ) values (see below for an explanation of what they mean).

**Resistance ( $\Omega$ ):** Resistance is the ratio of electrical potential to the current in a material. A material with low resistance conducts well whilst a material with high resistance conducts poorly. The primary conductor in the human body is water. In the human body, a low resistance is associated with large amounts of lean body mass. A high resistance is associated with smaller or low amounts of lean body mass. Resistance helps to calculate the amount of water in the body. Low resistance, indicating high conductivity, is due to large amounts of water in the body. Resistance in the body is proportional to the amount of lean body mass since water is contained solely within lean body mass as opposed to fat body mass.

**Reactance ( $\Omega$ ):** Reactance is a measure of the cells' ability to store energy. A body that stores energy easily has high reactance and a body that stores energy poorly has low reactance. Energy is stored in the cell membrane therefore this reading gives an indication of the amount of intact cell membranes in the body. Since intact cellular membranes are contained primarily within body cell mass, the reactance of the body is proportional to the amount of body cell mass. The reactance helps to calculate the proportion of the body that is metabolically active.

For specific studies on the relationship between Phase Angle and chronic diseases please see: