ACIDITY & ALKALINITY (pH): MYTH OR SCIENCE

We appreciate that there can be a lot of confusion and misinformation about acidity and alkalinity, especially when it comes to diet. Some believe that certain foods or dietary parameters can drastically change the pH of their body, but this may actually be a myth. The truth is that the body has complex mechanisms for regulating its pH levels within a narrow range. In addition, the pH of different parts of the body vary considerably depending on their function. While diet can impact the pH of urine and saliva, it may not have any significant effect on the pH of other body fluids (such as blood). In Functional Nutrition, when we talk about acidity and alkalinity, we're discussing the science of how the body regulates hydrogen ion concentration in different regions of the body, not dietary theories.

WHAT IS pH?

Acidity and alkalinity refer to the dynamic equilibrium state of hydrogen ion concentration in different regions of the body. It's the balance between the concentration of hydrogen ions (H+) and hydroxide ions (OH-) in a solution.

pH is the measure of acidity or alkalinity on a scale of 0 to 14, with 7 being neutral, below 7 acidic, and above 7 alkaline.

The body has various mechanisms to regulate its pH levels within a narrow range to maintain optimal health and function. Different parts of the body have different pH levels depending on their function, and disruptions in the acid-base balance can cause metabolic acidosis, metabolic alkalosis, respiratory acidosis, and respiratory alkalosis, which are medical conditions that can have serious health consequences if left untreated.

WHAT IS BLOOD pH?

Arterial blood pH is critical for most body functions and biochemical reactions because many enzymatic reactions that support digestion, metabolism, and energy production are pH-dependent. The enzymes that catalyze biochemical reactions have an optimal pH range at which they function most efficiently. If the pH level is too low or too high, it can disrupt the enzymatic activity, and the biochemical reactions may not occur at the desired rate or may not occur at all. This can have serious consequences on the body's ability to carry out essential processes such as respiration, energy production, and metabolism. The body has various built-in mechanisms to regulate arterial blood pH, including the respiratory system, the renal system, and the buffering systems, to ensure that the blood pH level remains within the normal range of 7.35–7.45.

HOW DOES pH DIFFER IN VARIOUS PARTS OF THE BODY?

Different parts of the body require different pH ranges for optimal health and function. For example, the stomach requires a highly acidic pH of ~1.5 to 2.0 to break down food and kill bacteria. The skin, on the other hand, has a slightly acidic pH of 4.5 to 5.5 to prevent the growth of harmful bacteria and maintain a healthy barrier function. Similarly, the pH of the mouth, urine, and vaginal tract also varies depending on their function. It's important to note that the appropriate pH in various body regions should not be confused with blood pH, which is tightly regulated within a narrow range of 7.35–7.45. Blood pH is critical for most body functions and biochemical reactions, whereas the pH of different body regions has different roles and functions. This highlights the importance of understanding the different pH requirements in various parts of the body and the mechanisms that regulate them to maintain optimal health and function.

WHAT'S THE ROLE OF URINE pH IN THE EXCRETION OF TOXINS?

The kidneys play a vital role in filtering waste and toxins from the body, which are then excreted through urine. In general, the more alkaline the urine, the better it is at excreting water-soluble toxins. However, it is important to note that too much alkalization can also be harmful. A pH range of 7.0–7.5 is considered optimal for excreting water-soluble toxins.

DIETARY RECOMMENDATIONS FOR KEEPING pH BALANCE

It's important to note that maintaining a balanced pH in the body is not solely dependent on following an "alkalizing diet" or consuming certain foods that are considered alkaline. While diet can impact the pH of urine and saliva, it has minimal effect on the pH of the blood or other body fluids. Instead, a more holistic approach to maintaining optimal pH levels involves consuming a well-rounded, plant-powered diet that is rich in minerals such as calcium, magnesium, and potassium. These minerals help to buffer acids in the body and maintain the healthy acid-base balance that we want.

Plant-based foods are often rich in minerals and are also typically high in fiber (which can help to support a healthy gut microbiome and prevent inflammation). Consuming a diet that is diverse in fruits, vegetables, whole grains, legumes, nuts, and seeds (as tolerated) can provide the body with the necessary nutrients to maintain optimal pH levels and promote overall health.

Bottom line: Focus on consuming a well-rounded, plant-powered, mineral-rich diet rather than becoming fixated on specific "alkalizing" or "acidic" foods. This approach can support the body's natural mechanisms for regulating pH levels and promoting optimal health and function.

ADDITIONAL RESOURCES:

Mr. Bozeman video on pH biology: Acids, Bases, and pH
Uristrips