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## NUTRIENT ACQUISITION – THE FOUNDATION OF WELLNESS

Both wellness and the maintenance of health are fundamentally based on the presence of an adequate system for the acquisition of nutrients. Although this fact seems basic and simple, it is often ignored, neglected, and even taken for granted. Really, though, the only thing that any biological system (including humans) ultimately requires is an ensured way of delivering nutrients to the cells. Only when that happens can the cells maintain and perform all of the body's other vital functions, thus maintaining the biological system's health and wellness.

What is nutrient acquisition? As a glance at the two-word term "nutrient acquisition" might indicate, there are two main interrelated facts.

1. Nutrients are the basic molecules that are needed by the cells for their proper function.
2. Acquisition refers to the processing that allows those nutrients to reach the cells and thus to serve in cellular function.

The nutrients that humans require mainly consist of the following groups.

- Proteins provide essential amino acids and nitrogen, which helps to synthesize the other amino acids.
- Carbohydrates provide glucose and other simple sugars (monosaccharides) for energy and for vital moieties in some molecules (such as glycoproteins).
- Lipids provide fatty acids for energy and for structural and functional moieties in cell membranes, in glycolipids, and in lipoproteins.
- Vitamins and minerals serve as cofactors and participate in many cellular functions.

Once the body has obtained these basic nutrients, it can then synthesize all of the other various molecules that it needs for energy, reproduction, immunity, and for the maintenance and regeneration of molecules, cells, and tissues. We consume various foods in order to get these nutrients. Both our choice of foods and the nature of our consumption is often due to several reasons, such as geographical living environment, ethnic / cultural conditions, and other socio-economic factors. Even when we consistently select our foods based on the above criteria, the composition of that food still varies. However, ingested foods may be assumed to be good and complete regardless of any of those factors as long as they contain the basic nutrients (thus providing the first requirement) and as long as the system for acquisition is optimally functional (thus providing the second requirement).

For the most part, we consume food in order to provide nutrients to the body and in order to satisfy hunger. However, there are often many instances where other reasons are the cause of eating. For instance, many people only think about food for circumstantial reasons, such as a way to satisfy their tastes and desires. There are also some people who eat just because the food is available. These people are said to "eat with their eyes." Other people eat everything that they come across

because foods are not usually available to them, and so they “eat what they can get.” Under those conditions, the relative quality and quantity of nutrients in foods may be undermined. It is unfortunate that very few people eat judiciously and consciously. Most people do not take the time to properly select the types of foods that they need to eat or the amount of food that they need to ingest. However, it is very important to eat when you are hungry and to make sure that your foods contain an amount of nutrients that is adequate for the cells. The diet has to be balanced.

Contrary to some practices, one cannot only eat from one food group while rejecting another food group. Ironically, we often see people who, in the name of “eating well,” consume mostly vegetables and “forget” to include proteins, which contain essential amino acids. Biochemically, that is like paving the road to poor immunity and to the onset of diseases. Proteins are not optional. The most important ones are complete proteins (i.e., proteins with all of the essential amino acids). They need to be in the diet. The same principle applies to lipids and to essential fatty acids. Eliminating all fats for the sake of “eating right” is neglecting your body’s needs. Thus, the rule of thumb is to ensure that you get all of the essential food groups into your diet in quantities that are proportional to your biological needs. Anytime you “cut a corner,” it means that you “take a bite” out of your wellness potential.

In addition to the nutrients, foods may in many instances contain certain molecular compounds that will not have nutritious value. The presence of many of these non-nutrient compounds that are found in our food supply is the result of market needs. Namely, producers try to increase production, prevent microbial contamination, ensure organoleptic properties, and provide other convenience factors that are needed for production, consumption, and/or commercialization. Although it is known that these non-nutrient compounds that are found in the food supply are not inert, the full spectrum of their short and long-term interactions with the body is not yet fully understood.

With all of this information in mind, we see that the word “nutrient” in the term “nutrient acquisition” refers to the qualitatively and quantitatively wholesome molecules that are needed by the cells in order for them to perform all of their vital functions both individually and as a part of the whole organism.

Regardless of whether the organism is a human, an elephant, a plant, or a bacterium, it still has the same need – it must find its nutrients.

Thus, a food selection process that is both educated and informed is fundamental. Granted, you probably will not be able to avoid all of the various non-nutrient compounds and their potentially harmful effect on the body. However, that is why it is especially important to maintain a proper balance so as to avoid the needless overwhelming of the cells and their molecular machinery.

Now that we can make food selections based on the safety and composition of nutrients, we can also consider the second main requirement - the acquisition process. The word “acquisition” in the term “nutrient acquisition” encompasses at least two main parts.

1. the reduction of the nutrients to their simplest forms.
2. the uptake of these nutrients (in their simple form) by the enterocytes.

Additional activities that occur during this acquisition process include:

- the chemical and immunological sampling of the food and its molecules by the cells and molecules in the gut in order to determine what the body’s next actions should be;
- the transport of the various messenger molecules that signal both the kind of actions that need to be taken by different cells and molecules of the body and also when those actions need to be taken;
- the selection of food components that may be used for microflora consumption;
- the selection and processing of food components that need to be expelled from the GI tract;
- the protection of the cells and molecules that reside along the GI tract.

Therefore, in addition to an adequate food selection, all of these other activities that form the acquisition process need to take place efficiently and timely in order for us to maintain health and wellness. Since we have just discussed the aspects of food composition that are necessary for adequate nutrient supply, our next step is to define the system that ensures and controls health and whose effective performance ultimately guarantees wellness – the digestive system. The reason that this system is very often overlooked and taken for granted is because it is not well understood.

What is the digestive system? You remember that the first point in the nutrient acquisition process is the reduction of the nutrients to their simplest forms. This step is so critically important that it requires specialized molecular tools called “digestive enzymes” (or hydrolases). Some unfortunate assumptions are often made about the role of digestive enzymes. The following list sums up some of these mistakes.

- X There are no “felt” digestive symptoms, and so everything is fine.
- X Our diet is adequate, providing enough nutrients with no pollutants.
- X The pancreas makes all of the proper enzymes needed for digestion.
- X The digestive system always works well and there is no need to supplement it.

As will be discussed in subsequent topics, these assumptions underlie many of the health disorders and much of the poor quality of life that is experienced in our society. All cellular diseases and malfunctions are the result of an alteration or an inadequacy in the nutrient acquisition process. After learning about how the digestive system works, the role of digestive enzymes becomes much clearer. Having learned about this science, we can now take a look at a revised, corrected list of true statements.

- ✓ Many symptoms result from digestive problems.
- ✓ Our diet needs complete and balanced nutrients.
- ✓ The body needs a wide variety of enzymes from different sources.
- ✓ The digestive system can experience difficulties that require supplementation.

As the saying goes, “you are what you eat.” However, “what you eat” is dependent on whether or not the components of that food are being processed properly. The following “*Dr M’s Science Notes*” topics will focus on a basic view of digestive system biology. We will see its importance as a system and we will also discover the critical importance of its main tools, the hydrolytic enzymes.