Understanding the Discovery of the Ideal Amino Acid Pattern for Human Nutrition

Not long ago, a remarkable discovery was made in the field of human nutrition.

And yet, it was hardly noticed.

But its importance is so profound, that when fully understood, it will be considered one of the most important nutritional discoveries of our time.

The following overview provides some background information to help facilitate the understanding of the significance of this development.

What Does the Life Process Depend Upon?

Amino acids…… correctly assembled.

By the Creator himself, ions ago, in that primordial soup, the "building blocks" of life were strung together, like beads on a chain, to form the required proteins of the body. And there was life.

These proteins are the major functional and structural component of all the cells. They make up enzymes, and polypeptide hormones to direct and regulate metabolism in the body. In muscle, they make up the contractile proteins that permit movement. In bone, the protein collagen, forms a framework for the deposition of calcium phosphate crystals. In the bloodstream, proteins such as hemoglobin and plasma albumin shuttle molecules essential to life, and as immunoglobulins to destroy infectious bacteria and viruses. In short, proteins display an incredible diversity of functions.

Thus an adequate supply of dietary protein is essential to maintain cellular integrity and function, and for health and reproduction.

The Beginning

The scientific discoveries related to proteins and their constituent amino acids began about 1820 when the essential amino acid leucine was discovered.

In 1935, William C. Rose *(1887-1985)* completed the identification of the eight essential amino acids with the discovery of threonine.

By 1946 three important concepts had been recognized:

1. There are daily essential amino acid requirements.
2. The nutritional value or quality of a dietary protein depends on its amino acid profile.
3. For protein synthesis to occur, all eight essential amino acids must be available simultaneously at the sites of the body's protein synthesis. *(If one amino acid is missing protein synthesis will not take place.)*

In 1946 Rose was the first to estimate the daily essential amino acid requirement. Unfortunately, amino acid formulas based on this estimate had a poor nutritional effectiveness, and the adverse effect of the increased Blood Urea Nitrogen *(B.U.N.)* caused the medical community to be disillusioned.

The Nutritional Failure of Amino Acid Formulations

The nutritional failure of amino acid formulations generated, among the scientific community, even more discrepancies and confusion about basic questions, such as:

a. How many amino acids are essential for human nutrition?

b. What is the "ideal" combination of amino acids for human nutrition?

c. How can the daily requirement of amino acids be calculated?

d. Should an amino acid mixture provide only the essential or also the non-essential amino acids? And in what proportion?

Years later, these questions were finally answered and confirmed after approximately two decades of research. Shortcomings of the previous research methodologies were found and remedied. The result:

The discovery of the ideal amino acid pattern for human nutrition.

This pattern is comprised of unique proportions of essential amino acids.

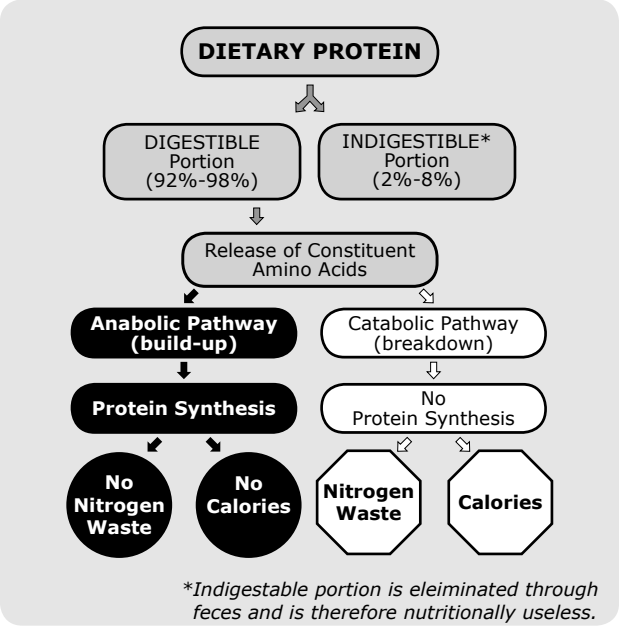
As a result, for the first time in medical history, it is now possible to provide protein nutritional support that releases virtually no nitrogen waste or calories.

Understanding Protein NutritionalValues

From a nutritional point of view, the most important aspect of proteins is their amino acid composition.

Amino acids from a dietary protein or an amino acid supplement are absorbed in the small intestine. Those amino acids then can follow either the anabolic pathway *(build-up)* or the catabolic pathway *(breakdown)*. To illustrate *(see next page)*:

PROTEIN METABOLISM CHART



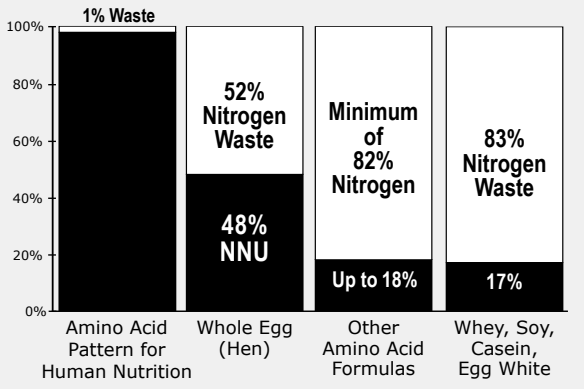
**Indigestable portion is eleiminated through feces and is therefore nutritionally useless.*

When dietary amino acids follow the catabolic pathway, they act only as a source of energy and not as "building blocks". Throughout the catabolic pathway, amino acids release unwanted nitrogen catabolites.

On the other hand, when dietary amino acids follow the anabolic pathway, they act as precursors or "building blocks" in the body's protein synthesis. Throughout the anabolic pathway, amino acids do not release any nitrogen catabolites *(metabolic waste)* or energy.

The percentage of the total amino acids in a dietary protein or amino acid formula that are used as "building blocks" represents the protein nutritional value and is known as **Net Nitrogen Utilization** *(NNU)*.

Compare Protein Nutritional Values



Net Nitrogen Utilization (NNU)

- NNU represents the nutritional value of a dietary protein or an amino acid formula.
- NNU is the percentage of the total amino acids that act as precursors or "building blocks" in the body's protein synthesis.

What Determines Which Pathway Amino Acids Follow?

Only essential amino acids available in the correct proportion follow the anabolic pathway.

This proportion is very specific. Even the slightest change in the proportion of the amino acids in a dietary protein or amino acid formula can affect its nutritional value.

Each species in the animal kingdom has its own specific nutritional amino acid pattern.

To better understand why a minimal change in an amino acid pattern can be significant, consider that a tree, bird, or human being are composed of amino acids. However, each is different in accordance with its own amino acid pattern.

The amount of the correct proportion is also important. There is no storage mechanism for amino acids analogous to that for lipids or carbohydrates. If the amino acids are not in the correct proportion or if there is an excess, then the amino acids are metabolized with their carbon skeletons converted to glucose or to fat, and their amino groups converted to ammonia.

Why is Understanding Protein Nutritional Value so Important?

A nutritional formula based on the amino acid pattern for human nutrition if properly manufactured, has a 99% NNU.

This means that it would be safer and 400% to 500% more nutritionally effective than other amino acid formulas or protein isolates from whey, casein, or soy.

Although this research is new to North America, over 12,000 medical physicians in Europe and their patients have been benefiting from it.

The "Nutritional Dilemma" Solved

As people age, inadequate nutrition in quantity or quality becomes more common and can compromise protein synthesis.

To date, many health disorders have been misinterpreted as "natural" consequences of the aging process.

In reality, it is not the aging process itself but the inadequate nutrition associated with it that can cause many health challenges.

During the aging process, the lean-body mass *(the living-cell mass that makes up muscles, organs, skeleton, antibodies, enzymes, etc.)* usually decreases (up to 25% in the average 70-year-old individual). During the same period, fat-body mass usually increases *(up to 100%)*.

Until now, achieving adequate nutrition during the aging process has been a nutritional dilemma.

During the aging process, kidney function decreases. As a result, average 70-year-old individuals may retain only 30% of their juvenile kidney function. Under these circumstances, even an adequate daily protein intake could be contraindicated because it could provoke an increase of nitrogen catabolites such as ammonia or

Blood Urea Nitrogen *(B.U.N.)*.

It is now possible to provide protein nutritional support that releases virtually no nitrogen waste. As a result, individuals at any age can safely meet their daily protein requirements without stressing kidney and liver functions.

Maintaining Normal Protein Turnover Rates

Proteins in the body are not static *(they are synthesized and degraded)*.

The rate of turnover of proteins varies widely. For example, some proteins such as digestive enzymes and plasma proteins, are rapidly degraded, having half-lives measured in hours or days. However, structural proteins, such as collagen, are metabolically stable and have half lives measured in months or years. The rate of turnover of proteins tends to follow their function in the body, i.e., proteins whose concentrations must be regulated *(e.g. enzymes)* or that act as signals *(e.g., peptide hormones)* have relatively high rates of synthesis and degradation as a means of regulating concentrations. On the other hand, structural proteins such as collagen and myofibrillar proteins or secreted plasma proteins have relatively long lifetimes.

There must be an overall balance between synthesis and breakdown of proteins. *(Balance in healthy adults who are neither gaining nor losing weight means that the amount of nitrogen consumed as protein in the diet will match the amount of nitrogen lost in urine, feces, and other routes.)*

Inadequate Protein Synthesis

Proteins are synthesized in all cells of the body from amino acids. Chains of amino acids fold in different ways to create the structure or shape of the different types of proteins that make up the body.

The shape of a protein determines its biological activity or function.

On the basis of their three-dimensional structure, proteins can be classified as fibrous proteins *(long, linear, pleated sheets)* or globular proteins *(roughly spherical shaped)*.

Inadequate protein synthesis can affect any of the types of proteins or the structures they form. For example:

FIBROUS PROTEINS:

a. Structural

F Collagen:

Type I – skin, bone, tendon, blood vessels, cornea

Type II – cartilage, intervertebral disk, vitreous body

Type III – blood vessels, fetal skin

Type IV – basement membrane

F Elastin: trachea, lungs, large blood vessels, elastic ligaments and joints

F Keratin: skin, hair, nails

b. Movement

F Actin & Myosin - muscle cells

F Microtubules - cilia *(respiratory tract, fallopian tubes)*

GLOBULAR PROTEINS:

a. Enzymes
digestive enzymes *(amylase, protease, peptidase)*, antioxidant enzymes *(peroxidase; e.g. glutathione peroxidase used in detoxification)*

b. Transport
hemoglobin, K^+ Channel

c. Hormonal Function
insulin, growth hormone, calcitonin, glucagon, luteinizing hormone, thyro trophin-releasing hormone, antidiuritic hormone, oxytocin, ACTH, gastrin, angiotensin I & II

d. Neurotransmitters
endorphins, enkephalins

e. Immunity
antibodies, complement proteins

f. pH Buffer
albumin

The Protein Buffer System

For proteins to function properly, stable pH and temperature are required. The delicate shapes of proteins can be affected *(or denatured)* by excessive fever or excessive pH *(to acidic or basic)*.

Amino acids can accept or donate hydrogen ions, making them excellent buffers.

Since proteins are made up of amino acids, proteins themselves can act as buffers. *(Amino acids have a central carbon group with four groups off of it:*

a. a carboxyl group (COOH)

b. an amino group (NH2)

c. a hydrogen atom

d. an R group

The carboxyl group and amino groups are what enable proteins to act as buffers.)

Proteins are found in very high concentration in intracellular solutions and in blood and of the three important buffering systems in the body:

1. bicarbonate buffer system,
2. phosphate buffer system and
3. protein buffer system,

the protein buffering system is considered the most powerful.

Maintaining Normal Protein Synthesis

Proteins play a role in all physiological processes and all process can be affected by inadequate protein synthesis.

With the discovery of the amino acid pattern for

human nutrition it is the first time that all individuals regardless of age or health status can safely meet their protein requirements without stressing kidney and liver functions. This means that individuals can now safely, easily, and more effectively maintain normal protein synthesis, especially as they age.

The loss of lean-tissue begins around the age of 25 and usually becomes noticeable by the age or 45. This process can occur even in the absence of weight loss or illness. *(Muscle is the major source of protein for functions such as antibody production, wound healing, and white blood cell production during illness. If the body's protein reserves are already depleted, there is less to mobilize for illness.)*

The degree of the loss of lean-tissue will vary among individuals and its effects can range from a mild loss of tissue firmness, skin elasticity and stamina to a significant loss of tissue integrity and function.

A loss of body protein means a loss of function.

It is important to help individuals understand the relationship between inadequate protein synthesis and a diminishing quality of life.

Inadequate protein synthesis affects ability to:

- maintain adequate immune function
- build sufficient hormones and enzymes
- build neurotransmitters that affect mood
- maintain firm skin and muscle tone
- maintain heart and bone cell turnover rate
- maintain normal red blood cell production
- rebuild or build body components *(organs, muscle, cartilage, tendons, etc.)*
- maintain ideal fluid balance *(osmotic pressure)*
- maintain ideal pH balance

The value of simply maintaining normal protein synthesis cannot be overstated for anyone at any age.

In fact, one's life depends upon it.

Yet in clinical practice, for various reasons, we rarely see this occur. Thus it is easy to see that for optimum health and longevity the addition of the amino acid combination that has the ideal pattern for human nutrition to one's daily routine, would be the best prevention one could recommend.

Additional information and references are available at **www.bodyhealth.com**.

BioBuilde™ *– a 100% natural dietary supplement based on the discovery of the ideal amino acid pattern for human nutrition is now available. It contains the patented profile of essential amino acids in a highly purified, free crystalline form. BioBuilde has a 99% NNU the highest of any known supplement or food. For more information please contact: BodyHealth.com Inc., 877-804-3258, or www.bodyhealth.com.* ◆