



# INTRODUCTION TO PROTEIN

## PROTEIN: VITAL TO LIFE AND GROWTH

Protein is one of the most plentiful substances in our bodies, comprising about 18% of total body weight. Protein provides the body with the components it needs to create, maintain, and repair every cell and tissue. Protein is an important component of muscle and skin, hair and nails, blood and organs, brain and nerves, even our genes. The metabolic processes that keep our bodies running are regulated by some proteins (hormones) and catalyzed by other proteins (enzymes); still others (antibodies) protect our bodies against infectious invaders. While protein is used primarily to build and repair tissues, it can also provide heat and energy when insufficient fat and carbohydrates are available for that function.

## THE DIET MUST PROVIDE PROTEIN EVERY DAY

Our bodies cannot store protein, so we need a continuous supply from our diet. When the body receives protein, it uses only what it needs at that moment for cellular building and repair; the rest is converted to fuel for metabolic energy. Once protein has been converted into energy fuel, it is no longer available to the body as a cellular building block, no matter how great the body's need for protein.

## PROTEIN IS A STRING OF AMINO ACIDS

Protein is basically a folded string of small chemical units called amino acids. The body breaks down dietary proteins into its amino acid components and combines and recombines them to produce the protein combinations needed to form cells, body tissues, enzymes, etc.

Of the 22 amino acids involved in human nutrition, 9 are termed "essential" because they cannot be made by the body and therefore must be supplied daily in the food we eat. The rest, which the body can synthesize, are called "non-essential." Arginine is a dietary essential amino acid only for children.

### DIETARY ESSENTIAL AMINO ACIDS

Arginine*	Histidine
Isoleucine	Leucine
Lysine	Methionine
Phenylalanine	Threonine
Tryptophan	Valine

### NON-ESSENTIAL AMINO ACIDS

Alanine	Asparagine
Aspartic Acid	Cysteine
Cystine	Glutamic Acid
Glutamine	Glycine
Hydroxyproline	Proline
Serine	Tyrosine

\*Essential for children

## ALL PROTEIN SOURCES ARE NOT EQUAL

Protein comes in many forms. The ratio of the essential amino acids dictates the "quality" of a protein.

Because the body assembles available amino acids into needed combinations, a protein's nutritional value is limited by its least abundant essential amino acid. If the diet supplies an abundant amount of eight essential amino acids, but only a small amount of the ninth, the body can only construct needed proteins until the ninth amino acid is used up. For example, gelatin is 100% protein, but because it lacks the essential amino acid tryptophan, it provides little nutritional value by itself.

## MEASURING PROTEIN VALUE

The nutritive value of a protein is determined by the degree to which the protein's amino acid profile matches the body's amino acid needs. The better the match, the higher the value. This value is expressed as the Protein Digestibility Corrected Amino Acid Score (PDCAAS).

The PDCAAS is based upon human amino acid requirements. It is the official protein quality assessment method connected with the Nutrition Labeling and Education Act (NLEA) and food labeling regulations. It is a number which expresses how the protein's amino acid profile compares against that of a high-quality protein standard, and how fully the protein is digested. An excellent PDCAAS score is 1.0.

The PDCAAS is calculated by first examining the amino acid makeup of a food. Because the essential amino acid which is most limited in that food is the factor which limits protein synthesis, that same amino acid is used to represent overall protein quality.

An adjustment is then made to take the digestibility of the protein being examined into account. The result is a number score. For example, the proteins from milk sources (caseinates) — which are very high-quality protein — have a PDCAAS of about 1.0. All GNLD protein products have a PDCAAS of 1.0 or greater.

## HIGH-PROTEIN FOODS ARE OFTEN HIGH IN FAT AND CHOLESTEROL

Modern nutritional science recommends diets low in fat and cholesterol for optimum health and longevity. However, most of the foods which are highest in fats and cholesterol are also some of the best sources of dietary protein: eggs, red meat, dairy products. If we stop eating these foods to reduce the fat and cholesterol in our diet, we risk limiting our protein intake.



## GNLD'S PROTEIN PRODUCTS ARE SUPERIOR

GNLD scientifically blends protein from several natural sources to achieve superior amino acid profiles. When further enhancement of the protein's value is desired, specific free-form amino acids are added. Unlike other protein products on the market which may contain synthetic amino acids, GNLD uses only natural free-form amino acids to build superior protein supplements. The results are high-quality protein products with very little fat or cholesterol.

## THE ADVANTAGES OF GNLD PROTEIN TECHNOLOGY

### ■ The Protogard Process

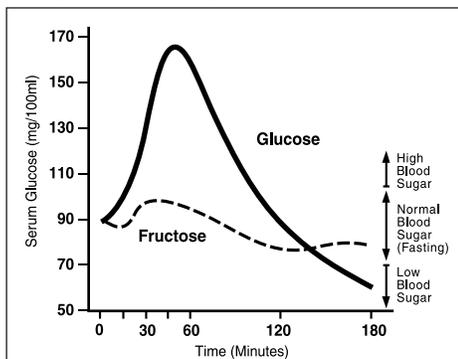
To achieve a high-quality protein, the processing method used is just as important as the quality of the raw materials selected. Excessive heat can destroy protein's structure and reduce its nutritional value. GNLD's exclusive Protogard Process protects the amino acids by blending high-quality raw materials at low temperatures.

### ■ The Glycemic Edge

GNLD's GR<sup>2</sup> Control Meal Replacement Protein Shake, NouriShake<sup>®</sup>, and Super Ease<sup>®</sup> are naturally sweetened with fructose (NOTE: Premium Protein contains NO sweeteners). Fructose is a simple carbohydrate from natural fruit sugar. Fructose provides a greater sustained energy level than do other sugars such as glucose and sucrose. In GNLD's protein supplements, fructose provides an important "Glycemic Edge" by steadily

supplying energy without the energy highs and lows associated with sucrose. As the following chart shows, sucrose provides a quick spurt of energy but also triggers the release of insulin. This, in turn, increases the depletion of

muscle energy (glycogen) and suppresses the conversion of fat into energy. The result is a burst of energy followed by fatigue and hunger. Fructose, in contrast, does NOT cause a rapid rise in blood sugar or insulin release. Fructose provides a steadier supply of blood sugar which postpones the draw on muscle glycogen. The result is improved endurance during exercise or simply more energy all day long!



*Blood sugar response to fructose and glucose. Unlike glucose, fructose does not cause marked hyperglycemia followed by a sharp decline in blood sugar level. (Adapted from Olefsky, 1980.)*

### ■ Protein Sparing

The most important need the body has at all times is for energy. If energy foods (carbohydrates and fats) are not available to supply the body's need for energy, the body will convert proteins into energy. When carbohydrates and fats ARE available, protein is "spared" and conserved for the special bodily functions of maintenance, repair, growth, and stamina. GNLD's protein supplements provide slowly absorbed, "sustained-energy" carbohydrates for this important protein-sparing action.

### ■ All 22 Amino Acids

To achieve maximum protein efficiency, GNLD protein supplements provide all 22 amino acids involved in human nutrition, allowing the essential amino acids to be utilized to their fullest for tissue building and repair, enzyme synthesis, and more. This "completeness" advantage is not found in all protein foods.