



## **The Significance and Relationships of Amino Acids and Protein in Chronic Disease and General Wellness**



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## The Significance and Relationships of Amino Acids and Protein in Chronic Disease and General Wellness

### 1.0 OBJECTIVE

This “White Paper” discusses the context and healthcare opportunity of a diagnostic and therapeutic concept developed by Immune System Management and referred to as Aminomics<sup>®</sup>.

The objectives of this White Paper are to:

1. Define and explain the diagnostic and therapeutic approach known as “Aminomics<sup>®</sup>”
2. Explain the principles and rationale behind Aminomics<sup>®</sup> therapeutics.

### 2.0 SUMMARY

Amino acids are the essential medium through which the human gene translates into proteins. And protein is the mainstay of human structure and chemistry. **Aminomics<sup>®</sup> is the study of the amino acid profile in an individual to determine the existence of any amino acid deficiency and the orthomolecular correction of that deficiency.** From this standpoint Aminomics<sup>®</sup> is closely related to genomics (the study of the genes in an individual) in that the genes carry the instructions of exactly how the amino acids (the building blocks of proteins) are to be metabolized into proteins. It is the genes that decide how the amino acid molecules are to be sequenced and linked to each other. This determines the structure and nature of proteins. And proteins are an integral and vital part of human function, structure and chemistry. The study of the structure and function of proteins is known as proteomics. Amino acids are the substrate of important proteins.

**Genes** → **Amino Acids** → **Proteins**  
(Genomics) (Aminomics) (Proteomics)

At a sub-molecular level the human body possesses this innate intelligence or programming, that is, DNA. Within the DNA, or the “Genomic Map”, lie the intelligence/programming that essentially instructs various body systems to manufacture protein as the fundamental building block of cells.

In other words, **everything our body does is focused upon building protein.** Protein is the resource material used to build every cell in the body and most metabolic activity. There are tens of thousands of different proteins in the human body. All protein is made from amino acids.

The Core Principles of Aminomics<sup>®</sup> as a Therapeutic Approach:

There are four core principles of Aminomics<sup>®</sup>:

*(1) A Strong Immune Response = Balance of Amino Acids & Protein*

The basic substrate of all metabolic and cellular human functioning is amino acids. When an individual possesses the optimal profile of chemistry and metabolism, that

individual is typically healthy or symptom-free. **Proteins can only be made when all the necessary amino acids are simultaneously available in the right proportions. This is a core philosophy of Aminomics® therapy.** It is an intervention to restore, at the proteomic level, imbalances in amino acids that may be the result of a wide variety of causes, including age, stress, genetic disorders, inadequate intake and/or absorption, infection, errors in metabolism or immunologic incompetence.

(2) *Nutritional Synergism:*

The synergistic impact and interrelationships of all micro- and macro-nutrients is critical to proper protein absorption, use and function.

(3) *Individuality: "Disease is as unique as the individual"*

Every human is unique, bio-chemically and metabolically. Each of us possesses a unique history of experience that culminates in our state of health. **All aspects of the Aminomics® diagnostic and therapeutic approach embrace the central concept of uniqueness or biochemical individuality.**

(4) *Zero Pathogen/ High Bio-availability*

An immune system that is already combating various pathogens needs to be supported with supplementation that is:

- Pure and pathogen-free
- Highly bio-available
- Administered in the right proportions at the right time

## 3.0 BACKGROUND TO PROTEOMICS AND GENOMICS

### 3.1 Proteomics

Protein accounts for about one-fifth of the total body weight <sup>1</sup>. In fact, next to water, protein accounts for the greatest portion of the weight of the human body <sup>2</sup>. Protein is an integral part of the human structure and chemistry. It is protein that provides the structure for all living things – from the largest animal to the tiniest microbe. And in its various forms, protein participates in the vital chemical processes that sustain life.

- In the human body, protein make up the muscles, ligaments, tendons, organs, glands, nails, hair, and many vital body fluids, and are essential for the growth of bones.
- The enzymes, hormones and neural transmitters that catalyze and regulate all bodily processes are proteins. Blood elements and antibodies are proteins.
- Proteins help to regulate the body's water balance and maintain the proper internal pH. A deficiency of protein can upset the body's fluid balance, causing edema.
- Proteins form the structural basis of chromosomes, through which genetic information is passed from parents to offspring.

The complete set of all the proteins in a given tissue, cell or organism is called a proteome – and all the information needed to make the proteome is encoded in the genes of an individual <sup>3,4</sup>. The study of the structure and functions of proteins is therefore called Proteomics.

From a medical standpoint, proteomics aims to identify those specific proteins that may be responsible for disease management and how their structure, function and expression respond to disease<sup>5</sup>. It is through proteomics that we understand that proteins are

differentially expressed in health and disease and therefore hold the potential not only for allowing for an earlier diagnosis, but also for the formulation of a patient-tailored or patient-individualized therapy <sup>5,6</sup>.

### 3.2 Genomics

A gene is the fundamental physical and functional unit of heredity. Human genes carry the instructions for making proteins, which in turn directs the activities of all the cells in the body.

A genome is a person's complete set of DNA. Genomics, therefore, is the study of all the genes in an individual, including their interaction with each other and the environment <sup>7</sup>. There are about 3 billion bases in the human genome, of which 99.9% are identical from one person to the next. Only 0.1% (or roughly 3 million bases) is different. This is what sets one person apart from the other <sup>8</sup>. This may also influence whether an individual will be less or more susceptible to a disease or to the environmental pathogens.

Genomics, therefore, allows us to study the mechanisms and interactions that lead to either health or disease, and what could be done to combat the disease <sup>9</sup>. Instructions encoded by the genes are passed on to the proteins to accomplish <sup>8</sup>. It is the proteins that do the work in our body. It is through these proteins that the genes controls how we look, how we process the foods that we ingest, detoxify poisons that enter into our system, combat certain types of organisms that cause infections and how we manage immunological events such as cancer. Simply stated, proteins are the agents that carry out the instructions encoded by the genes <sup>8</sup>.

## 4.0 AMINOMICS

### 4.1 Introduction

The process of assembling amino acids to make proteins, and of breaking down proteins into individual amino acids for the body's use, is continuous. Different types of proteins are produced as the need arises. An inadequate supply of even one of the essential amino acid can hinder the synthesis, and reduce body levels, of necessary proteins.

Further, all of the essential amino acids must be present simultaneously in the diet in order for the other amino acids to be utilized. **It is important to realize that each amino acid plays a different metabolic or biochemical role in the human body and that deficiency of one amino acid may also affect the functioning and/or the production of another.** It is worth noting that the requirements for specific amino acids are directly altered when the body is under stress <sup>10</sup>. In other words, physical (or even psychological) disorders and plasma amino acid levels bear a direct relationship to each other.

Many factors can contribute to deficiencies of essential amino acids, even if one eats a well-balanced diet that contains enough protein. Impaired absorption, infection, trauma, stress, drug use, age, and imbalances of other nutrients can all affect the availability of essential amino acids in the body.

It is to be expected therefore, that at the proteomic (and hence, the aminomic) level we are likely to observe changes that reflect those imbalances and/or deficiencies that either give rise to or results from stress, nutritional poverty, infection, inflammation, aging or cancer. Here lies the importance of profiling the plasma amino acid levels in a diseased individual that would point to a comprehensible and meaningful corrective measure. Simple nutritional assessment without assessing plasma amino acid levels is an incomplete measure – even

marginal deficiencies of amino acids are significant from the perspective of total body functions.

**Aminomics® focuses on the plasma amino acid profile of an individual.** From a therapeutic perspective, it involves the administration of a individualized amino acid and orthomolecular oral supplement tailored to the individual's needs. **The Aminomics® therapeutic protocol is intended to restore the natural defense mechanisms of the immune system, extending the individual's life or, at minimum, significantly improving quality of life.** This bolsters the patient's own self-healing metabolic and immune system capacity while avoiding the toxic side effects that often accompany conventional medical treatment (i.e., cancer radiation).

#### 4.2 The Aminomics® Protocol

1. Blood plasma is analysed for amino acids using High Pressure Liquid Chromatography.
2. Individual amino acid plasma profiles are referenced to optimal amino acid norms.
3. An individualized oral nutritional supplement is developed.

## 5.0 UNDERSTANDING AMINO ACIDS

### 5.1 Amino acids and proteins

Amino acids are the building blocks of proteins, and also play a central role as intermediates in metabolism <sup>11</sup>. Amino acid molecules are linked together (through peptide linkages) to form proteins. The kind of protein that results is dictated by the types of amino acids involved and the sequence in which the amino acids are arranged. The twenty-eight main amino acids in the human body combine in a number of ways to account for more than 40,000 proteins known to us <sup>2</sup>.

Understandably, the myriad of functions served by the proteins are, in a larger sense, functions of the amino acids themselves.

### 5.2 Amino acids and other macro and micronutrients – An interrelation

Macronutrients and micronutrients make up the nutritional landscape. Micronutrients (including vitamins, minerals, and phytochemicals) derive their name from the fact that they are needed in relatively small amounts in comparison to the macronutrients - carbohydrates, fats and oils, proteins and amino acids, and water.

There are also non-nutrient components of the diet such as soluble and insoluble fibers, which play an important role in human nutrition. Besides being the building blocks for all kinds of proteins, amino acids are inextricably linked to the utilization of micro- and macro-nutrients in the human body. **Even after absorption and assimilation, vitamins and minerals will not be as effective unless the proper amino acids are present** <sup>2</sup>.

### 5.3 Amino acid deficiency

Either an excessive or an inadequate intake of a single essential amino acid is reflected as an increase or a decrease in the plasma concentration of that amino acid <sup>12</sup>. Moreover, it has been observed that for some essential amino acids, such changes may be associated with an even greater change in their concentration in the free amino acid pool of body tissues, mainly in skeletal muscle <sup>13</sup>.

Further, all the necessary amino acids have to be supplied to the body within a 2-3 hour period; otherwise proper protein assimilation will not take place <sup>14</sup>. And even after all the amino acids are present, their assimilation will be restricted to that level which corresponds to the lowest available amino acid. For example, if the lowest level of any one of the available amino acid is at 60%, the assimilation of all the amino acids will remain restricted to only 60% <sup>14</sup>.

Indispensable amino acids are required in specific proportions. Proteins that provide amino acids in the proportions in which they are required have well-balanced amino acid patterns. Provided such proteins are readily digested, their amino acids will be used highly efficiently for the synthesis of tissue proteins. If a protein contains a disproportionately low amount of one or more amino acids, i.e., has a poorly balanced or unbalanced amino acid pattern, it will be used inefficiently for tissue protein synthesis. The greater the deviation in the amino acid pattern of the dietary protein from the pattern of amino acid requirements, the less efficiently it will be used.

An individual may be deficient in amino acids for a variety of reasons. These include <sup>15, 16</sup>:

- Unbalanced, low protein diet
- Impaired absorption
- Disease (particularly infection and malignancy)
- Physical and psychological stress
- Drug use (including chemotherapy for cancer)
- Excessive excretion (impaired kidney function)
- Imbalance of vitamins and minerals
- Trauma
- Genetic factors
- Developmental age

Deficiency of amino acids would obviously compromise all the vital functions of the human body that are served by the proteins. Aside from that, amino acid deficiency is also likely to lead to reduced energy levels, defects in metabolism, sleeping disorders, chronic fatigue, digestive problems, hair loss and skin ailments, nervous reactions, emotional upset, stress and general poor health <sup>2</sup>. Other symptoms of amino acids deficiency that could possibly be life-threatening include obesity, malnutrition, and buildup of wastes in the bloodstream <sup>2</sup>. It has also been shown that a deficiency or imbalance in the diet of the essential amino acids can result in a profound depression of the immune responses and marked changes in the immune resistance of the host to tumors <sup>17</sup>.

## **6.0 AMINO ACIDS AND DISEASE**

### **6.1 The Causes of Disease**

Disease may be defined as a deleterious or damaging change in our body in response to destabilizing factors related to as nutrition, chemicals or biological agents <sup>18</sup>. This definition points to a deficiency or an imbalance in the food and supplements we ingest, the chemicals and toxins that poison our systems or the bacteria and viruses that invade our body to give rise to a disease state.

What makes the metabolic and immune system weak and become susceptible to disease involves a multiplicity of stress factors. In cancer, these stress factors are often referred to as carcinogens. Carcinogens include: chemicals, electromagnetic energy, faulty diet, free radicals, genetic pre-disposition, toxicity, radiation, parasites, strong emotions, and viruses.

These are not so much the “causes” of cancer, as facilitators: they edge the body towards a condition of weakness, vulnerability, and immune dysfunction.

**The fundamental hypothesis that has driven the Aminomics® concept and therapeutic clinical protocol is that many chronic diseases, such as cancer, are not a “disease”, but originate as a result of repercussions from the metabolic & immune system reactions of the body to genomic and environmental variations.**

The human body is made of natural chemistry. It functions at its best when it possesses the optimal profile of natural chemistry. Our food, our environment, our air and our lives create increasing stress upon our body’s internal chemistry. The human body has incredible potential for self-diagnosis, repair, and regeneration. Those of us who are well have the requisite physiological chemistry to naturally respond to stress. Those who are unwell, do not.

Life is about balance...cellular functions must be in harmony or disease results. The key to optimal health lies originally with our fundamental genomic make-up and is then supported in turn by our metabolic and immune systems. Metabolism is the sum total of all biochemical processes going on inside the body. **The therapeutic goal should be to return balance and strength to all the body’s life sustaining functions, thereby helping to reverse cancer and other disease states or prevent a recurrence.....**

**Balance = Health**

## **6.2 Amino Acids and Disease**

Various patterns of amino acid deficiencies encountered in diverse disease conditions have been well documented in the literature. As an example:

Allergies and auto immune disorders have been linked to deficiency and/or impaired metabolism of the amino acids methionine and taurine. Depression or neurological problems in the elderly are associated with deficiencies of tyrosine, tryptophan, phenylalanine and histidine <sup>2</sup>.

In one study it was found that patients with alcoholic hepatitis had a low level of glycine, alanine, and phenylalanine while those with potentially reversible liver disease were low in glutamine, isoleucine, leucine, valine and proline <sup>19</sup>.

Depletion of protein stores in the body results during a hypermetabolic response of the body to stress such as infection, severe inflammation, trauma, burn and major operations <sup>20</sup>. Plasma concentrations of some amino acids, particularly glutamine has been observed to fall during infections and catabolic states (like burns and surgery) <sup>21-23</sup>. Some authors have reported a fall in plasma taurine concentration during trauma and sepsis <sup>24, 25</sup>. Measurements have indicated that in severe illnesses, net protein catabolism occurs because increased rate of muscle protein breakdown far exceeds overall protein synthesis by the body <sup>26, 27</sup>.

## **6.3 The Role of Amino Acids in Immune Response**

Immune response in humans is comprised of “innate” immunity and “acquired” immunity.

Innate immunity is the first line of defense against infectious agents, and includes physical barriers, soluble factors and phagocytic cells (white blood cells that ingest harmful foreign particles, bacteria, and dead or dying cells). This type of immunity has no memory and is therefore not influenced by prior exposure to an organism.

Acquired immunity, on the other hand, involves lymphocytes (the B- and T-Lymphocytes). It is highly specific, takes several days to become effective and persists for some time after the removal of the initiating antigen. It is this persistence that gives rise to an immunological memory, which is the basis for a stronger and more effective response upon re-exposure to an antigen.

The immune system acts to protect the host from pathogenic invaders that exist in the environment (like bacteria, viruses, fungi and parasites) and from noxious insults.

It has been observed that arginine, glutamine and cysteine are essential for the cells of the immune system to function efficiently. Patients in a catabolic state have exhibited compromised immune function and altered profiles of amino acids in the bloodstream <sup>20</sup>.

The immune system is considered to be an important user of glutamine. Some authors have observed that plasma and muscle glutamines are lowered by as much as 50% by sepsis, major injury, burns and following surgery <sup>21-23</sup>. Ziegler et al reported a greater number of total lymphocytes and T-lymphocytes in compromised patients after glutamine treatment <sup>28</sup>. In another study, Glutamine was found to improve T lymphocyte function where patients who had colorectal surgery were administered parenteral glutamine <sup>29</sup>. Yoshida et al have observed that patients with esophageal cancer who were being treated with radio and chemotherapy actually had higher blood lymphocyte counts and better lymphocyte proliferative responses if they consumed glutamine (30g/day) for 28 days <sup>30</sup>.

Arginine has also been found to bolster the immune system. Daly and his associates, who studied the immunologic effects of supplemental dietary arginine in patients undergoing surgery for gastrointestinal malignancy observed an enhanced response of peripheral blood lymphocytes by day 7 <sup>31</sup>. In one study that involved patients suffering from HIV it was shown that glutathione improved cell-mediated immune function <sup>32</sup>.

#### **6.4 Amino Acids and Cancer**

Cancer is a condition in which there is an uncontrolled division of abnormal cells in a tissue or organ resulting in a mass or tumor. These cells can subsequently invade and destroy surrounding tissues or spread to other parts of the body through blood or lymphatics.

The cause of cancer is multi-factorial and there are a number of reasons why an individual might get cancer. These include:

- (1) Genetic predisposition (i.e., breast and colon cancer)
- (2) Environmental exposure to carcinogenic agents (i.e., tobacco smoke, radiation, sunlight, asbestos etc)
- (3) Diet (red and processed meats, alcohol, animal fat, smoked or barbecued foods that are burnt)
- (4) Viruses and bacteria (i.e., human papilloma virus, hepatitis B virus, Epstein-Barr virus, helicobacter pylori)
- (5) Compromised immune system

Hence, focusing medical efforts on removing the tumor will most often not "cure" cancer. Many, if not most, cancer deaths result from infection by bacteria, viruses and fungi – microbes that normally would be destroyed by the immune system. We are always developing small cancers that are recognized by our immune system and destroyed. The healthy body can normally handle individual carcinogenic influences, but when they become multiple and cumulative, the body begins to weaken, and this is the point at which harmful influences may gain the upper hand. Any factor that increases the growth rate of these small cancers gives them an advantage over the immune system.

### *How are amino acids implicated in cancer?*

Every metabolic and immune function in the body is driven by protein and proteins are made of specific proportions of amino acids. Cancer is characterized by changes in metabolism of body proteins, carbohydrate and fat stores<sup>33, 34</sup>. The progression of cancer is accompanied by a disturbance in protein metabolism, which is mainly represented by increased muscle protein breakdown, decreased muscle protein synthesis and an increased utilization of amino acids to form glucose<sup>20, 35</sup>. For example, in one study, a decrease in protein synthesis in advanced gastric cancer patients was found to lead to a 50%-80% depletion of muscle mass<sup>36</sup>.

Certain non-essential amino acids such as glutamine, arginine and cysteine become conditionally essential in the tumor-bearing state<sup>20</sup>. Glutathione has been observed to be lower in the plasma of patients during cancer<sup>37</sup>. In patients with cancer of the gastrointestinal tract, plasma concentrations of the branched chain amino acids leucine, isoleucine and valine are also lowered<sup>38, 39</sup>. Plasma levels of glutamine, alanine, phenylalanine and tyrosine are elevated in cancer, and are a reflection of increased muscle proteolysis<sup>40, 41</sup>.

On the other hand, some amino acids, notably glutamine and arginine, have demonstrated elevated utilization by tumor cells. Tumor cells have been shown to obtain a high proportion of fuel for energy metabolism from glutamine oxidation, and since tumor cells cannot synthesize glutamine, they rely on systemic glutamine from the host<sup>42, 43</sup>. Methionine too, is required by tumor cells to support its proliferation, and it has been demonstrated that several tumor cell lines are dependent on methionine uptake<sup>44</sup>.

Chemotherapy and radiotherapy for cancer treatment also actually reduces our immunity by causing a drop in the number of white blood cells made in the bone marrow<sup>45</sup>. Therefore, for the vast majority of cancer patients who receive aggressive therapy, various specific amino acids may additionally be required for the bone marrow after systemic therapy, for healing after surgery, or for tissue injury in the gut<sup>46</sup>.

A study was conducted to measure the concentration of 28 plasma amino acids in patients with cancer of the breast, gastrointestinal tract and head & neck to confirm the hypothesis that patients with different cancers may have different amino acid patterns. Seven amino acids were identified as correlating highly with diagnosis. These were glutamine, threonine, histidine, cysteine, alanine, arginine and ornithine<sup>47</sup>. Gaining an insight into the metabolic alterations that lead to an altered amino acid profile in an individual, especially in the case of cancer, can contribute to the definition of amino acid formulas precisely tailored to the nutritional requirements of the neoplastic patient<sup>48</sup>.

## **6.5 The Integrated Impact of Amino Acids and Micronutrients in Cancer**

The use of micro- and macro-nutrients in the body is inextricably linked to protein functioning and hence, amino acids. And many nutrients have been directly linked to cancer. Cell level research has shown that in early stage of cancer cell development, nutrients can reverse pre-malignant cancers<sup>49</sup>. The peer-reviewed proof is irrefutable. As a small example:

- Vitamin B-12 reverses bronchial metaplasia<sup>50</sup>
- Beta-carotene, vitamin A & vitamin E reverse oral leukoplakia<sup>51</sup>
- Selenium reverses pre-cancerous mouth lesions<sup>52</sup>
- Vitamin C & calcium reverse colorectal adenomas<sup>53</sup>
- Vitamin E reverse fibrocystic breast disease (which is known to increase cancer risk by 50-80%)<sup>54</sup>
- Vitamin E & betacarotene reverse mouth cancer<sup>55</sup>

.....and the body of evidence for vitamins, minerals, enzymes, co-factors, and antioxidants goes on & on! ISM has identified 10,000+ peer-reviewed studies on nutraceuticals & cancer.

#### 40% of Cancer Patients Die from Malnutrition

- Weight loss drastically increases mortality rate for most cancer types <sup>56</sup>
- Chemotherapy and radiation therapy are sufficient biological stressors inducing malnutrition <sup>57</sup>
- Pure malnutrition (cachexia) is responsible for 22% - 67% of all cancer deaths <sup>58</sup>
- Up to 80% of all cancer patients have reduced levels of serum albumin (the leading indicator of protein & calorie malnutrition) <sup>59</sup>

## **7.0 AMINOMICS: A Therapeutic Approach**

### **7.1 The Core Principles of Aminomics<sup>®</sup> as a Therapeutic Approach**

There are four core principles of Aminomics<sup>®</sup>:

- (1) A Strong Immune Response = Balance of Amino Acids & Protein
- (2) Nutritional Synergism
- (3) Bio-individuality.
- (4) Supplementation requires extreme quality, bioavailability and timing.

#### **7.1.1 A Strong Immune Response = Balance of Amino Acids & Protein**

The basic substrate of all metabolic and cellular human functioning is amino acids. When an individual possesses the optimal profile of chemistry and metabolism, that individual is typically healthy or symptom-free. When an individual's profile deviates from the optimum, symptoms will evolve. Aminomics<sup>®</sup> therapy targets the amino acid/protein imbalances created by the genomic/proteomic and environmental variations <sup>60</sup>.

**The principle behind Aminomics<sup>®</sup> therapy is the administration of individualized amino acid supplementation tailored to the person's needs. However, it must be remembered that requirements will need to be modified according to each individual's needs and specific disease processes. Proteins can only be made when all the necessary amino acids are simultaneously available in the right proportions. This is a core philosophy of Aminomics<sup>®</sup> therapy. It is an intervention to restore, at the proteomic level, imbalances in amino acids that may be the result of a wide variety of causes, including age, stress, genetic disorders, inadequate intake and/or absorption, infection, errors in metabolism or immunologic incompetence.**

Thus, targeted Aminomic<sup>®</sup> supplementation has the potential not only of preventing the onset of a disease process, but also of accelerating the rate of its remission. Restoration of the plasma amino acid profile to the desired optimum that is conducive to normal bodily functions is also expected to result in improved health in most cases.

A stronger immune system from patient-individualized aminomic supplementation is a factor in reducing the side-effects of conventional treatment (notably of cancer chemotherapy and/or radiotherapy).

### 7.1.2 Nutritional Synergism

Nutritional Synergism, as it applies to nutrition or pharmacology, is the simultaneous action of separate biochemicals (micro- and macro-nutrients), which together have greater total effect than the sum of their individual effects. No cell in the body uses only one nutrient. No nutrient in the body acts alone. Therefore, it should come as no surprise that we need all of the nutrients in order to promote optimal cellular, organ, and overall health. The synergistic impact and interrelationships of all micro- and macro-nutrients is critical to proper protein absorption, use and function.

Infections, no matter how mild, have adverse effects on nutritional status. The significance of these effects depends on the previous nutritional status of the individual, the nature and duration of the infection, and the diet during the recovery period. Conversely, almost any nutrient deficiency, if sufficiently severe, will impair resistance to infection.

### 7.1.3 Individuality: "Disease is as unique as the patient"

Every human is unique, bio-chemically and metabolically. Each of us possesses a unique history of experience that culminates in our state of health. In today's medical world, disease tends to be managed by diagnosing and treating the symptoms. All aspects of the Aminomics<sup>®</sup> diagnostic and therapeutic approach embrace the central concept of uniqueness or biochemical individuality. **The fundamental hypothesis upon which ISM's Aminomics<sup>®</sup> methodology is founded is "patient-specific, evidence-based medicine."**

### 7.1.4 Zero Pathogen/ High Bio-availability

An immune system that is already fighting various pathogens needs to be supported with supplementation that is:

- Pure and pathogen-free
- Highly bio-available
- Administered in the right proportions at the right time

## 7.2 ISM's Aminomics<sup>®</sup> Protocol

The Aminomics<sup>®</sup> therapeutic compounds produced by ISM provide a client-individualized substrate in a high-grade, balanced and bio-available format. All compounds are formulated and manufactured in an ISO-9001, GMP (Good Manufacturing Practice) compliant laboratory. Compounds are of pharmaceutical grade. This means that it is almost 100% pure (technically no substance can be 100% pure) with no binders, fillers, excipients, dyes or any unknown substances and is 100% pathogen-free material.

Aside from the targeted amino acid supplement, the formulation also contains collateral nutrients such as appropriate anti-oxidants, vitamins, enzymes, minerals and lipotropic factors. As discussed previously, all these combine synergistically to facilitate proper and timely absorption, metabolism and immediate protein construction.

The genesis of ISM's Aminomics<sup>®</sup> therapeutic compounds involves the application of proprietary diagnostics in the form of blood plasma analysis that results in the manufacture of bio-individualized Aminomics<sup>®</sup> Therapeutic Compounds <sup>61</sup>.

Customized HPLC (High Performance Liquid Chromatography) laboratory technology is employed to "blueprint" a patient's plasma amino acid profile. This is then compared to an optimal ISM Aminomics<sup>®</sup> Profile to reveal any discrepancy in the amino acid levels in the patient's plasma.

A subsequent step involves the formulation and manufacture of what is referred to as a “balancing custom compound”. This compound is specific to the patient and replenishes the deficient amino acids and any collateral nutrients.

ISM’s Aminomics<sup>®</sup> protocol involves:

1. Initial client interview: To elicit any physical or mental complaints. Any prior diagnosis, and patient reports are also taken into consideration.
2. Analysis of the client’s plasma by HPLC: To determine existing amino acid levels.
3. Review: The individualized plasma analysis report.
4. Manufacture: A client-specific Aminomics<sup>®</sup> custom compound consisting of replenished amino acids, vitamins, minerals and lipotropic factors.
5. Compliance
6. Interval re-testing and re-engineering: Review on a regular basis new blood analysis and the Aminomics<sup>®</sup> formulation for optimal results.

### 7.3 Efficacy of Aminomics<sup>®</sup>

It is not the objective of this white paper to discuss the overall efficacy of Aminomics<sup>®</sup>. The objective is to present the rationale behind this diagnostic and therapeutic healthcare methodology. Suffice it to say that **the application of the Aminomics<sup>®</sup> approach to thousands of patients has proved to be a rational, effective and an advanced means of ensuring long term, event-free health.**

Years of clinically administering patient-specific Aminomics<sup>®</sup> therapeutic has resulted in enhanced response rates and quality of life without side effect or adverse events for hundreds of individuals. For example, **the application of Aminomics<sup>®</sup> has demonstrated significant positive response rates in disease remission, stabilization, and overall improvement in quality of life often exceeding those of more commonly available approaches in specific therapeutics such as surgery, radiotherapy or chemotherapy.**

The Aminomics<sup>®</sup> approach has proven to be beneficial in the management of collateral damage from both a prevention perspective and a treatment perspective (should a client undergo radiotherapy and/or chemotherapy).

In healthcare today, there is a “disconnect” between *What We Know* and *What We Do*. The scientific and medical community widely acknowledges the flawed model of drug development...an obsession with tumor shrinkage...a focus on individual cellular mechanisms, sometimes to the near exclusion of what’s happening in the organism as a whole. Science has its limits and often cannot give us a crystal clear picture. But this should not paralyze us. Our knowledge of the causes of and cures for cancer may be imperfect, but we have no excuse for delaying application of the nutritional therapeutic and preventive knowledge we now have, both for our own benefit in our later years, and the benefit of our children and grandchildren.

**Every element of the ISM<sup>®</sup> approach is based upon extensive and evolving laboratory and applied evidence.** Contemporary scientific and medical knowledge and evidence has been integrated with our laboratory and clinical experience as we analyze and interpret data from thousands of ISM<sup>®</sup> patient profiles.

For further efficacy information please review [www.aminomics.com](http://www.aminomics.com) .

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