The Custom Recommendations of your

Bio-Analysis Report for

Mary D.

8/6/2010 11:33:51 AM

The Clinic

Dr. John Smith

123 Main St.
Anytown, CT 06000

860-555-1212

The Clinic

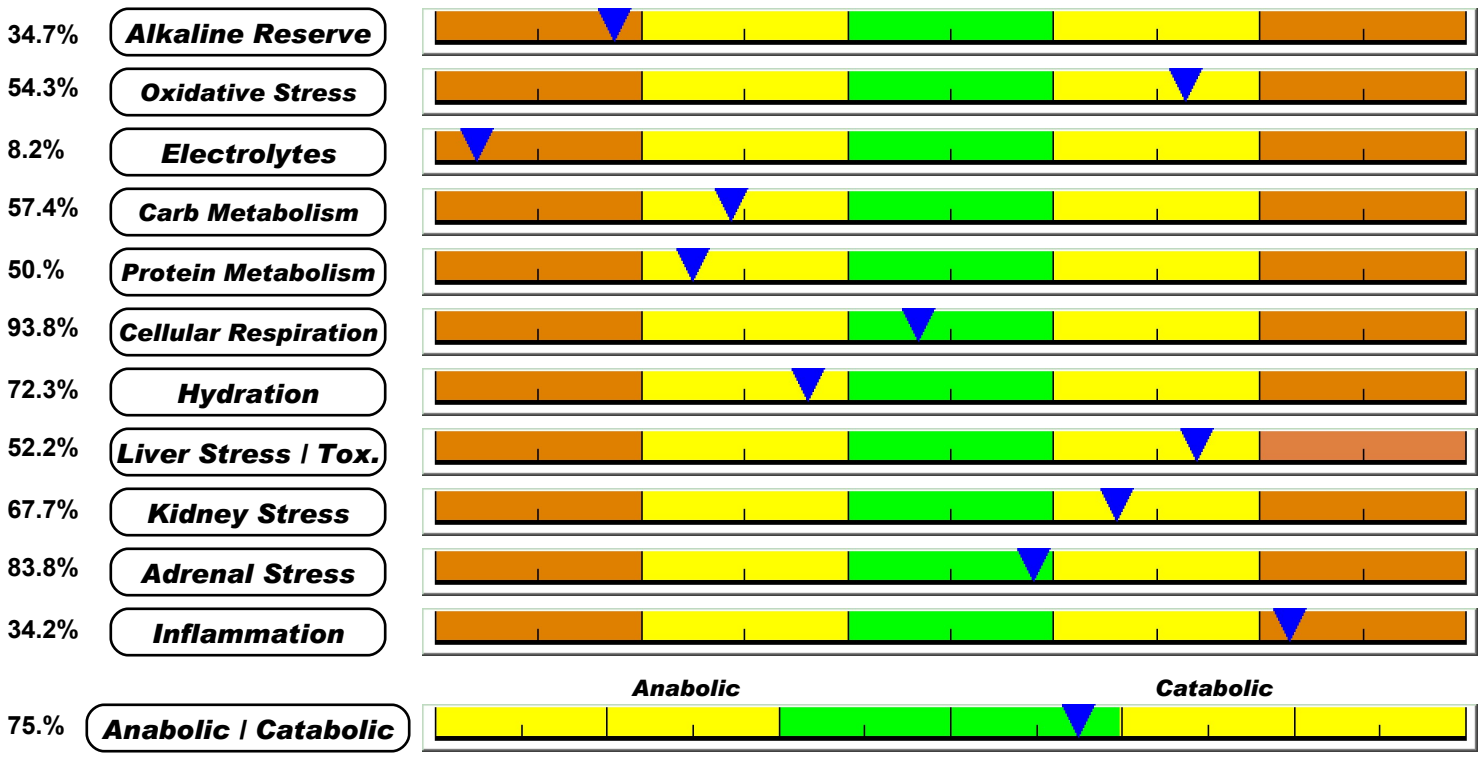
123 Main St.
Anytown, CT 06000
860-555-1212

SOLARIS

Practitioner: Dr. John Smith
Technician: Joe Tech

Patient Name: Mary D.
Phone:
Test ID: 396
Test Date: 8/6/2010 11:33:51 AM
Print Date: 08/25/10 11:32 am
Saliva collection time: 8/6/2010 11:46:01 AM
Urine Collection Time: 8/6/2010 11:46:01 AM

	Patient Results							Optimum						
	pH	rH2	r	Cond.	Nitr.	Amm.	Carb	pH	rH2	r	Cond.	Nitr.	Amm.	Carb
Saliva	6.30	26.6	382					6.5-6.75	21.5-23.5	180-220				
Urine	6.47	21.2	106	9.4	14	4	4.10	6.5-6.8	18-19	50-100	6-7	3	3	1.3 - 1.9
Avg. pH	6.36			Urea	18						Urea	6		
				Specific Gravity	1.016						Specific Gravity	1.005-1.011		



57. **Overall Score**

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Urine acid and Saliva acid

As you become more acidic, your body tries to buffer or neutralize the acid with calcium from your bones. The pattern for tissue buffer depletion is as follows:

	Health	Stage 1	Stage 2	Stage 3	Stage 4
Saliva	6.5-6.75	Alkaline	Alkaline	Acid	Acid
Urine	6.5-6.8	Alkaline	Acid	Alkaline	Acid

These specimens are showing Stage 4 buffer depletion unless the saliva is acid from acid reflux.

Recommendations:

Fundamental Greens
Fundamental Minerals
Fundamental Enzymes

ALKALIZING FOODS

VEGETABLES

Garlic
Asparagus
Fermented Veggies
Watercress
Beets
Broccoli
Brussel sprouts
Cabbage
Carrot
Cauliflower
Celery
Chard
Chlorella
Collard Greens
Cucumber
Eggplant
Kale
Kohlrabi
Lettuce
Mushrooms
Mustard Greens
Dulce
Dandelions
Edible Flowers
Onions
Parsnips (high glycemic)
Peas
Peppers
Pumpkin
Rutabaga
Sea Veggies
Spirulina
Sprouts
Squashes

FRUITS

Apples
Apricot
Avocado
Banana (high glycemic)
Cantaloupe
Cherries
Currants
Dates/Figs
Grapes
Grapefruit
Lime
Honeydew
Melon
Nectarine
Orange
Lemon
Peach
Pear
Pineapple
All Berries
Tangerine
Tomato
Tropical Fruits
Watermelon

PROTEIN

Eggs
Whey Protein Powder
Cottage Cheese
Chicken Breast
Yogurt
Almonds
Chestnuts
Tofu

OTHER

Apple Cider Vinegar
Bee Pollen
Lecithin Granules
Probiotic Cultures
Green Juices
Veggie Juices
Fresh Fruit Juices
Organic Milk (unpasturized)
Mineral Water
Alkaline Antioxidant Water
Green Tea
Herbal Tea
Dandelion Tea
Ginseng Tea
Banchi Tea
Kombucha

SWEETNERS

Stevia

SPICES/SEASONINGS

Cinnamon
Curry
Ginger
Mustard
Chili Pepper
Sea Salt
Miso
Tamari
All Herbs

ORIENTAL VEGETABLES

Maitake

ALKALIZING FOODS (continued)

Alfalfa
Barley Grass
Wheat Grass
Wild Greens
Nightshade Veggies

(fermented)
Flax Seeds
Pumpkin Seeds
Tempeh
(fermented)
Squash Seeds
Sunflower Seeds
Millet
Sprouted Seeds
Nuts

Daikon
Dandelion Root
Shitake
Kombu
Reishi
Nori
Umboshi
Wakame
Sea Veggies

Oxidative Stress Very High

Oxidative Stress Very High / High Free Radical Activity

There are many different sources by which the reactive oxygen species (free radicals) are generated. Most reactive oxygen species come from internal sources as by-products of normal and essential metabolic reactions, such as energy production from mitochondria or the detoxification reactions involving the liver. Outside sources include exposure to cigarette smoke, environmental pollutants such as emission from automobiles and industries, consumption of alcohol in excess, asbestos, exposure to ionizing radiation such as sun light, and bacterial, fungal or viral infections, nutritional deficiencies, all forms of stress, over-stimulation of the immune system, lack of exercise etc.

If after treating the high oxidative stress the level is still high, or the person is still oxidized, it is important to look for pathogens, such as virus, bacteria, fungus, and parasites

Recommendations:

Fundamental Defense
Fundamental Detox
Fundamental Greens

Electrolyte Balance Very Low

Electrolytes very low Average electrolyte levels are very low.

Electrolytes are important because they are what your cells, especially nerve, heart, and muscle use to maintain voltages (electrical charge) across their cell membranes and to carry electrical impulses (nerve impulses, muscle contractions) across themselves and to other cells. Your kidneys work to keep the electrolyte concentrations in your blood constant despite changes in your body. By maintaining the electrical charge (Zeta potential) on blood cell membranes, electrolytes improve circulation and can reduce blood pressure. Electrolytes improve stamina, athletic performance and increase energy.

Recommendation:

Fundamental Magnesium
Fundamental Potassium
Fundamental Minerals

Ketogenic (Moderately low Carbohydrate metabolism / Moderately high Carbohydrate intake)

Those with a Ketogenic imbalance are "slow oxidizers" thus have difficulty using carbohydrates for fuel (early Insulin Resistance). What little energy they can make is mostly from fat. Symptoms commonly include physical and mental fatigue, yeast infections, high or low blood sugar, depression or anxiety, overweight or underweight, high blood pressure, elevated lipids (triglycerides) and other health problems such blindness due to macular and retinal damage, diabetic ulcers, organ failure and leg amputations.

Recommendations:

The Ketogenic person should have protein at every meal. Best foods include Fish, Poultry (white), eggs, dairy products, all vegetables. Neutral foods include: beef (free range, grass fed), lamb, venison, whole grain breads, fresh fruits in moderation. Avoid foods which make their imbalance worse - bad fats such as fried food and margarine, sugars, fruit juices, meals which are mostly starch or sugars, organ meats, shrimp, lobster, clams and peanuts.

Recommendations:

Fundamental Digestion
Fundamental Omega 3

Protein Metabolism Medium Low / Protein intake high

Protein intake appears to be excessive or digestion is incomplete which can lead to pro inflammatory state. The balance between carbohydrate (40%), protein (30%) and fat (30%) in your diet is extremely important. Too much protein can lead to excessive production of pro-inflammatory eicosanoids, bilirubin, ammonia, nitrates, urea and uric acid in the liver, which can be toxic if maintained for excessive periods of time. Additionally elevated nitric oxide production can cause an increase in nitrates thus increasing the production of peroxynitrate (potent free radical).

Recommendation:

Fundamental Enzymes

Hydration Low

Drink more purified water!

Recommendation:

Fundamental Potassium
Fundamental Magnesium

Liver Stress is high

Liver Stress / Toxicity High

Liver stress appears to be moderately high. The liver is one of the most important organs of the body. All digestion by-products are passed through the liver, which detoxifies the chemicals and plant toxins in our foods. The liver is also the chief factory for making many of the structural components of our body and also the storage depot for extra carbohydrate, which can be released when blood sugar drops below normal. For optimum health the liver must be operating at optimum capacity. Liver stress at this time is an indication of weakness in liver function that can be optimized through detoxification and optimal nutrition. The liver stress test is not a substitute for uncovering major liver disease.

Recommendations to improve liver stress:

Fundamental Detox

Kidney Stress is high

The main function of the kidney is to blood in order to excrete the unwanted waste products in urine and maintain the body fluid and electrolytes composition at constant levels (this is important for many body processes). Urea is formed by the liver in the process of ridding the body of ammonia, which is built up as protein you eat is broken down. It is normally excreted in the urine. If kidney function is impaired, the urea builds up in the blood. In general, the higher the urea the worse the kidneys are functioning. The kidneys are other organs that we have for the detoxification of the body. All of the metabolic waste and toxins must be taken from the blood and filtered through the kidneys, so that they don't build up to a toxic level. When your specific conductance is high (Zeta potential is low), then toxins cannot be suspended for elimination, thus instead they precipitate out become stagnate within the body creating a more toxic environment. Clean healthy kidneys are also important to help us control high blood pressure. When they become contaminated with heavy metals or urea salts, the membranes become less porous so the kidneys excrete angiotensin (a hormone to regulate blood pressure) to make the heart beat harder in order to keep the dialysis (filtration) process going. This can lead to high blood pressure in two ways. These release of angiotensin to regulate heart function When the urea salts are high, this increases the viscosity and red blood cell agglutination contributing to the blood pressure With excessive urea salts, this not only can lead to cardiovascular complications, it can lead to kidney dysfunction as well.

Recommendation:

Fundamental Detox
Fundamental Greens
Fundamental Defense

Adrenal Stress is high w/ resulting very low cortisol

Try to reduce stress.

The adrenals are the main gland to help the body fight stress. They control both short and long term glucose levels in the blood by the release of epinephrine and cortisol. The steroids made by the adrenal gland have wide ranging activity including control of the immune system, fighting allergies, electrolyte levels, and the expression of secondary sex traits. Under prolonged chronic stress, the adrenals glands can become fatigued and produce less cortisol than normal, resulting in fatigue, lethargy, allergies, libido issues, pain and inflammation, loss of motivation, depression, and an inability to cope with common stressors. Healthy adrenals have a large role to play in how we cope and feel in our everyday life.

Recommendations:

Fundamental Adrenal

Anabolic/Catabolic Catabolic

Catabolic activity is high

In simple terms, the anabolic/catabolic ratio is the rate at which we build body tissue versus the rate at which we break it down. When we are anabolic we are building lean muscle mass, which is fine for teenagers and young adults. But for mature adults, we want to reach our ideal weight and stay there. So that would mean that the rate of building tissue would be the same as the rate of breaking down old tissue. When catabolic rate is too high we are aging at a higher rate than normal. When we are too anabolic we are increasing our weight. The ideal would be to stay in the green area as much as possible.

Recommendation:

Fundamental Detox
Fundamental Greens

Followed by:

Fundamental Omega 3
Fundamental Defense

pH overview

pH is a measure of the acidity or alkalinity of a solution, in this case of urine, blood and/or saliva, and can be an important indicator of your overall health. pH, which stands for the potential of hydrogen, measures the balance between acid-forming ions (positively charged) alkaline-forming ions (negatively charged), in body fluids. Measured on a scale of 0 to 14, the lower the pH, the more acidic the solution is, while the higher the pH the more alkaline (often called base) the solution is. When a solution is neither acid nor alkaline it has a pH of 7, which is neutral, neither acid nor alkaline. This acid base balance is very carefully regulated in the body, mainly by the lungs, kidneys, and balancing systems of the blood. This is vital, not only because all biochemical reactions are influenced by pH, but because all living cells are extremely sensitive to the pH of the body.

Saliva pH – Testing the pH of the saliva indicates the efficiency and utilization of enzymes in the body, especially of the liver and pancreas, indicating digestive function. The test can reveal how well these enzymes are permeating your tissues, and can indicate their effect on your body's systems.

Urine pH – Testing the pH levels of the urine can give an indication of how well your body is assimilating minerals, especially sodium, potassium, calcium, and magnesium. These minerals control the acid levels in the body, and so are known as the "acid buffers". When acid levels begin to increase, the body must excrete what it can, store it in body tissues, or buffer it. This is done by borrowing minerals from organs and bones to neutralize the excess acidity. Some people have what is known as "double acid" pH readings, which means both saliva and urine is too acidic for optimum health.

Most people who have unbalanced pH are acidic, not alkaline. This common situation means the body has to take minerals, including calcium, magnesium, sodium and potassium, from the bones and organs to neutralize the acid and then excrete it from the body. Long term high levels of acidity can cause severe damage to bodily systems, and yet often go undetected as there are few outward symptoms. High alkalinity levels in the body are just as serious, but are much less common.

Raised acid levels in the body, known as acidosis, are prevalent in western societies. This is due in great part to poor diet, often too high in animal products like eggs, meat and dairy, which are all acid-forming. This diet is also usually low in the healthy alkaline-producing foods like fresh vegetables. Processed foods high in refined white flour and sugar also lead to higher acidity levels, as do coffee and soft drinks. Artificial sweeteners such as aspartame (NutraSweet and Equal) are extremely acid-forming. Other factors involved in higher acidity levels are stress, chronic infections, diabetes, dehydration, and pharmaceutical drugs such as diuretics. Once a person's health is compromised, acid accumulates in the cells. Lactic acid comes from the breakdown of glucose; phosphoric acid comes from the breakdown of proteins, and ketoacids from fats. Nutritional deficiencies and a lack of oxygen (i.e. from exercise) in the cells make the problem worse, as the elimination of this acid is dependent on oxygen, vitamins, and minerals. When the pH of the body gets out of balance, then the oxygen in the red blood cells has a hard time getting into the tissue and into the cells.

The pH is a very important determinant of health status. It can give direct information about a person's hydration status, vitamin and mineral levels, enzyme function, energy production, hormonal function, cardiovascular health, digestion and oxygenation. When the pH is outside the normal range, the result is sub-optimal health.

Oxidative stress/Antioxidant status overview

The level of oxidative stress indicates the level of oxidative damage in tissues or cells, caused by free radicals. Free radicals are short-lived, highly reactive molecules containing oxygen, which have one or more unpaired electrons. They attack cells in the body, causing damage that can affect a specific cell or the entire organism.

Food energy is released via the oxidation process - a chemical reaction with oxygen. Reactive oxygen cells such as free radicals and peroxides are common by-products of this normal process, such as energy production from the mitochondria, the energy-creating engine of the cells. The mitochondria produce energy (ATP) for all our biological needs by the step-by-step removal of pairs of electrons from the food we eat (protein, fat, carbohydrate). This is how food is converted into energy.

This process also produces oxidation. During the break down of food the transfer of electrons is used to produce energy, but when a substance loses an electron, that substance becomes “oxidized”. When another substance gains an electron, it becomes “reduced”. This is the mechanism we call oxidation-reduction. When a substance is oxidized (loses an electron) it loses energy. When it is reduced, (gains an electron), it gains energy. High oxidative stress can lead to many age related health problems, degenerative diseases, fatigue, inflammation, arthritis, premature aging etc.

Other ways that free radicals are formed in the body is through detoxification processes in the liver. Outside sources are from environmental pollutants and toxins such as emissions from factories and cars, exposure to cigarette smoke, excess alcohol consumption, infections, stress, lack of exercise, and even exposure to ionizing radiation such as sun light.

> This creation of pro-oxidants (free radicals) is normally balanced by a similar rate of consumption by antioxidants. Antioxidants literally “mop up” the free radicals, by binding and inactivating them. Most antioxidants are electron donors that react with the free radicals and create harmless end products such as water. These antioxidants protect against oxidative stress and thus prevent damage to cells. Oxidative stress, therefore, is the result of an overload of free radical activity, and too little antioxidant activity to control it.

BEST SOURCES OF FOOD ANTIOXIDANTS: TOP 20 FRUITS, VEGETABLES AND NUTS (AS MEASURED BY TOTAL ANTIOXIDANT CAPACITY PER SERVING SIZE)

Rank	Food Item	Serving Size	Total antioxidant capacity per serving Size
1	Small Red Bean (dried)	Half cup	13727
2	Wild blueberry	1 cup	13427
3	Red Kidney bean (dried)	Half cup	13259

4	Pinto Bean	Half cup	11864	
5	Blueberry (cultivated)		1 cup	9019
6	Cranberry	1 cup (whole)	8983	
7	Artichoke (cooked)	1 cup (hearts)	7904	
8	Blackberry	1 cup	7701	
9	Prune	Half cup	7291	
10	Raspberry	1 cup	6058	
11	Strawberry	1 cup	5938	
12	Red Delicious apple	One	5900	
13	Granny Smith apple	One	5381	
14	Pecan	1 ounce	5095	
15	Sweet cherry	1 cup	4873	
16	Black plum	One	4844	
17	Russet potato (cooked)		One 4649	
18	Black bean (dried)	Half cup	4181	
19	Plum	One	4118	
20	Gala apple	One	3903	

Vitamin A

Broccoli	Carrots	Cheese
Chicken	Eggs	Leeks
Liver	Oyster	Peaches
Pumpkins	Red/yellow Fruit	Strawberries
Sunflower Seeds	Tofu	

Vitamin C

Apples	Artichoke	Asparagus
Bananas	Beetroot	Blueberries
Broccoli	Brussels sprouts	Buckwheat
Cabbage	Cauliflower	Celery
Cherries	Coconut	Curly kale
Fennel		

Vitamin E

Almonds	Avocado	Blackberries
Brussel sprouts	Corn oil	Cabbage
Mackerel	Mango	Nuts
Olive Oil	Palm Hearts	Rye
Salmon	Seeds	Spinach
Sunflower Oil		

Selenium

Cheese	Chicken	Eggs
Garlic	Green vegetables	Liver
Mackerel	Brazil Nuts	Cashew Nuts
Onion	Salmon	Shellfish
Sunflower seeds	Tuna	Whole grains

Apricot	**Artichoke**	**Asparagus**
Aubergine	**Bananas**	**Black currants**
Blueberries	**Broccoli**	**Brussel sprouts**
Buckwheat	**Cabbage**	**Celery**
Courgettes	**Carrots**	**Celery**
Cranberries	**Dates**	**Figs**
Green beans	**Kale**	**Leeks**
Lettuce	**Mango**	**Okra**
Olives	**Onion**	**Orange**
Peaches	**Peas**	**Papayas**
Parsley	**Passion fruit**	**Pears**
Pepper	**Plums**	**Pineapple**
Pumpkins	**Garlic**	**Grapefruit**
Green peas	**Guava**	**Lemons**
Lychees	**Liquorice**	**Melon**
Nectarines	**Peppers- green, red, yellow**	
Potatoes	**Radish**	**Raspberries**
Soya beans	**Spinach**	**Strawberries**
Sweet potato	**Tomatoes**	**Turnips**
Walnuts	**Watercress**	**Watermelon**
Wheat germ	**Whole grain cereal**	
Yams		

Electrolytes overview

Electrolyte is a scientific term for salts, specifically electrically charged ions. All the fluids of your body, your blood and interstitial fluid (the fluid between cells) are somewhat like seawater with a high level of sodium chloride (table salt, or NaCl). The electrolytes in sodium chloride are:

- sodium ion (Na^+) - cation
- chloride ion (Cl^-) - anion

As for your body, the major electrolytes are as follows:

- sodium (Na^+)
- potassium (K^+)
- chloride (Cl^-)
- calcium (Ca^{2+})
- magnesium (Mg^{2+})
- bicarbonate (HCO_3^-)
- phosphate (PO_4^{2-})
- sulfate (SO_4^{2-})

Electrolytes are vital to life because all the cells of your heart, nerves, and muscle use them to maintain the electrical charge (the voltage) across their cell membranes and to carry the electrical impulses for nerve impulses and muscle contractions. It is the job of your kidneys to keep the electrolyte concentrations in your blood constant despite all the changes that occur in your bodily processes. A good example of this is exercise; when you work out hard, electrolytes are lost in perspiration. This applies primarily to potassium and sodium, which must be replaced to keep the electrolyte concentrations of your body fluids constant.

Both muscle and neurons (nerve cells) are considered electric tissues of the body. Muscles and neurons, both of which are considered to be electric tissues of the body, are activated by electrolyte activity between the fluid outside the cell and inside the cell. The electrolytes calcium (Ca^{++}), sodium (Na^+) and potassium (K^+). determine muscle contraction. If these are insufficient, muscles become weak, or severe muscle contractions can occur.

To maintain a balance in the ions of our bodily fluids, we get electrolytes from our food and liquid, and we release electrolytes in sweat and feces. Hormones from the kidneys, adrenals, and parathyroid regulate out electrolyte levels. When electrolyte balances are severely disturbed, serious complications can occur, such as dehydration, leading to cardiac and/or neurological problems. These disturbances can be caused by adrenal problems, exercising too hard, vomiting, diarrhea, sweating, or kidney dysfunction. Under active thyroid can negatively affect electrolyte levels, as can pancreatitis, infections, or blood pressure or diuretic medications.

Recommendations for abnormal electrolytes:

- Isotonic mineral supplement
- Celtic Salt
- Rehydrate with good quality water
- Sports drink with low glucose if you are not extremely active; and for those involved in high physical activity, a drink with a higher glucose content

- Check for underlying pathology

Carbohydrate metabolism overview

Most carbohydrate in the human diet comes from plant material. However, a small amount is created from animal protein in the form of stored glucose, known as glycogen. Other carbohydrate sources are from lactose in milk products, or glucose from foods containing refined sugar.

Carbohydrates are converted in the digestion process to monosaccharides (simple sugars), which are then converted to glucose by the liver, which is primarily responsible for the conversion, storage, and distribution of all of the body's fuel.

Glucose is handled one of the following three ways:

- Broken down to produce ATP (energy) in a process known as catabolism
- Stored as glycogen (stored glucose) in the liver and in muscle
- Converted to fatty acids (fats) which are stored in adipose (fat) tissue as triglycerides

Blood sugar after a meal

After eating, there is a high level of circulating glucose, called blood sugar. When carbohydrate in the meal is digested, glucose is absorbed into the blood stream. When this occurs, the pancreas secretes insulin in response. Insulin stimulates the muscles and liver to take up glucose and converts it to glycogen (stored glucose). There is only so much storage that can take place; when the storage level is reached, the excess glucose is synthesized into fat.

Maintenance of blood glucose between meals

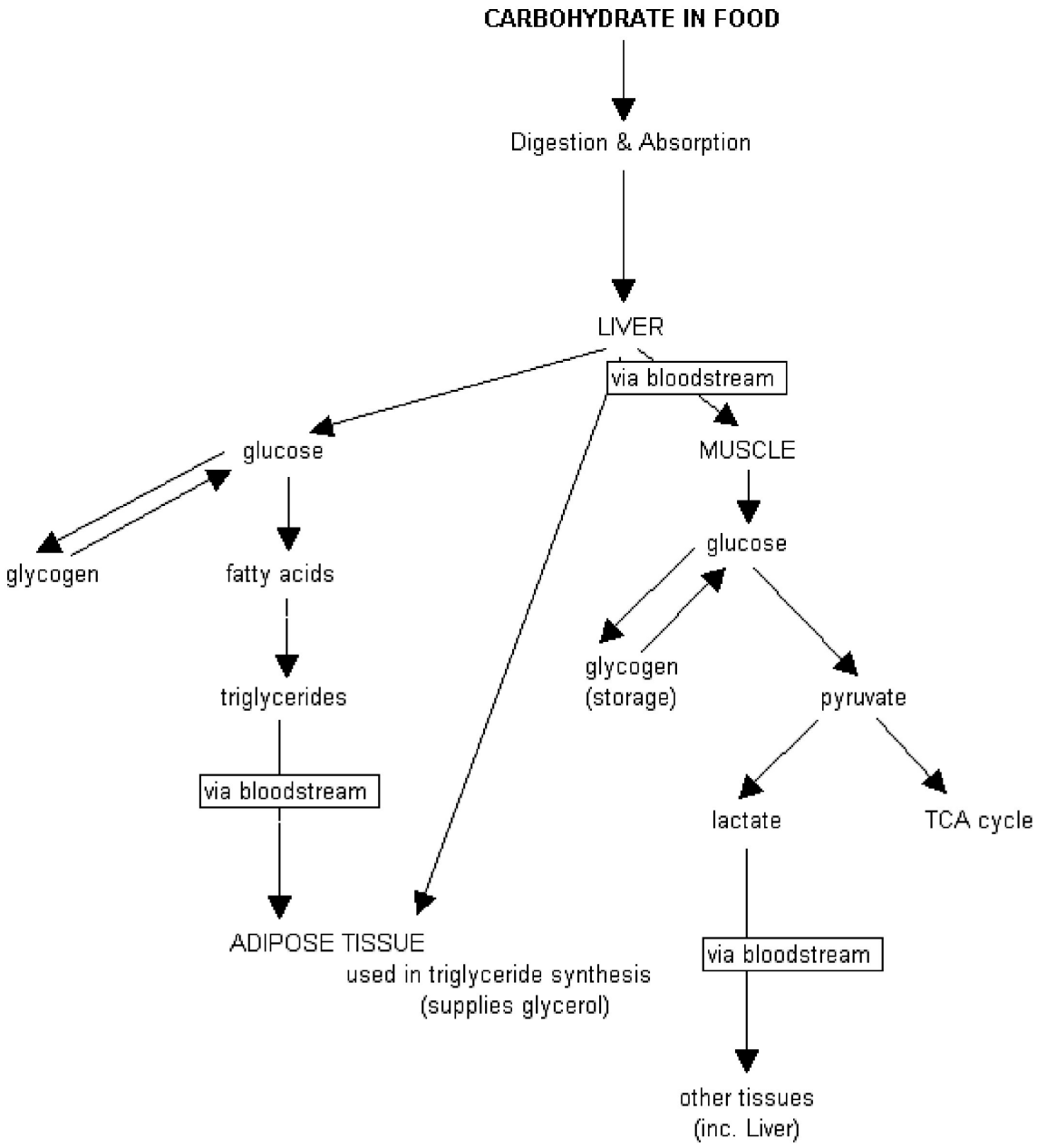
The glucose concentration in the blood must be kept constant at all times. To maintain this level, the pancreas then secretes more glucagons and less insulin. Glucagons prevents the liver from storing glucose causes the liver to increase glycogen breakdown into glucose for fuel.

Oxygen is an essential part of the glucose breakdown process; carbohydrate metabolism requires oxygen to break down glucose into energy in a process known as glycolysis. With adequate oxygenation, pyruvic acid is formed from glucose, which is then turned into ATP energy for the cells and tissues. If oxygen is in poor supply then lactic acid is formed instead. This can also be turned into energy, but pyruvic acid creates much more energy than lactic acid. Poor oxygenation can occur after strenuous physical exertion or exercise, but it can also happen with changes in our pH.

A factor that is pH dependent in this process is hemoglobin, the iron-containing red blood cell that carries oxygen from our lungs to our muscles. The binding of oxygen to hemoglobin is dependent on the correct pH, or acid/alkaline balance. If the pH is too alkaline, hemoglobin can't release the oxygen. In an effort to right this pH imbalance, if there is no oxygen, the glucose is turned into lactic acid, which makes your system more acidic.

With increased carbohydrates in the diet, the pH of saliva becomes more alkaline (elevates), and the pH of the tissues becomes more acidic (decreases). If there is improper metabolism of carbohydrates, or too high an intake of carbohydrates, waste products are released into the urine.

The pathways used in carbohydrate metabolism are shown in the following diagram:



Protein metabolism overview

Protein is essential to many processes in the body, such as growth and repair of tissues, to create enzymes and hormones, for the structure of red blood cells, and for antibodies to resist infection.

During protein metabolism, the body converts some of the available protein to glucose (blood sugar) in a process called gluconeogenesis. While carbohydrates are made out of simple sugars (carbon, hydrogen, and oxygen), protein is made from amino acids (carbon, hydrogen, oxygen, nitrogen, and sulfur). The nitrogen is a basic component, between 13-20%, protein.

The first step in protein metabolism is to break it into its constituent amino acids, which are then absorbed into the blood stream.

Amino Acids
The liver manufactures about 80% of these amino acids, but the remaining 20% of such amino acids must be supplied directly by diet, and are referred to as essential amino acids.
These essential amino acids are:

- histidine
- isoleucine
- leucine
- lysine
- methionine
- phenylalanine
- threonine
- tryptophan
- valine

The 80% or so others, manufactured by the liver, are the "nonessential" amino acids:

- alanine
- arginine
- asparagine
- aspartic acid
- citrulline
- cysteine
- cystine
- gamma-aminobutyric acid
- glutamic acid
- glutamine
- glycine
- ornithine
- proline
- serine
- taurine
- tyrosine

Amino acids function in an interrelated and synergistic fashion, and it is important that the body have a continual balanced supply of these nutrients, to maintain many processes of the body. After

protein is broken down into amino acids, these are further broken down into their constituent parts. This removes the nitrogen or amino group from the amino acids in a process called deamination.

Deamination breaks the amino group down into the "carbon skeleton", with a by-product of ammonia. (The ammonia is converted to urea, filtered through the kidneys, and excreted in urine.) The carbon skeleton, made up of carbon, hydrogen, and oxygen, is used for, energy production (ATP), protein synthesis, or converted to glucose (blood sugar).

Improper protein metabolism, or too high dietary protein, can lead to abnormal levels of ammonia, nitrogen and finally urea. Urea is non-toxic up to 72 hours; but the liver must turn the urea into soluble salts, which must be excreted by the body. If these salts are not eliminated, renal dysfunction and/or cardiovascular problem may result.

Reasons for improper protein metabolism:

- Poor pH and therefore enzymes necessary for the break down of the amino acids are impaired
- Lack of digestive enzymes
- Poor HCL secretion perhaps due to H Pylori and or parasites
- Excessive ingestion of protein

Recommendations to improve protein digestion:

- Decrease large protein intake
- Digestive enzymes
- HCL supplement
- Check for H Pylori or intestinal parasites

Hydration overview

Nearly all the bio-chemical reactions that occur in body cells depend on water and electrolyte balance (sodium, potassium, calcium, chloride, phosphorous, magnesium, etc). Maintaining this balance is not only vital to life but also to physical and mental well being and performance.

Our bodies are primarily made up of water. Water serves a myriad of functions, including the maintenance of body temperature. When muscles contract they create heat, which then must be dissipated to the body surface. Adequate blood volume is also kept constant by water level. The respiratory system must be kept moist to ensure that breathing is comfortable.

The body controls water balance by making certain that the amount of water consumed in food and drink equals the amount of water excreted. Salt cravings and thirst ensure the intake of water, and the body has several mechanisms to excrete water. Almost a liter of water is lost a day, through the skin via perspiration, through the lungs, and in feces, but the kidneys are the major site of the excretion of water. In an average day a human being loses an average of 1.5 liters (6 glasses) of water through kidney filtration (urine production) and another 0.750 - 1 liter (3-4 glasses) through the skin and respiration. This is dependent on such factors as environmental conditions, clothing, the amount of exercise taken, etc. So it is necessary to take in 8 - 9 glasses per day just to replace these losses. Water is present in fruits, vegetables, and other drinks and foods. But interestingly, alcoholic beverages and caffeinated drinks such as tea and coffee actually have a diuretic effect, and therefore may increase the need for fluids. So it is important to drink pure water, or a high quality sport drink that is not caffeinated.

Even mild dehydration can reduce muscle performance, and start to cause the symptoms of early dehydration. Even 1% of the body's fluids or approximately .75 to 1 liter of water, if lost, can lead to the symptoms of headaches, dry eyes, drowsiness, irritability, muscle cramps, fast heart rate, and loss of concentration.

It is important to know that your sense of thirst may not tell you to drink when you need to. So don't wait until you are thirsty- thirst is actually a sign of dehydration, and your performance, concentration, and over all health and well being may already be impaired by the time you feel thirst. Typical water loss figures during normal exercise:

- 1 hour of weight training = 8 oz
- 45 minutes of swimming = 10 oz
- softball game = 16 oz
- 5 mile run = 24 oz
- 45 minutes of full court basketball = 24 oz
- bicycling for 1 hour = 33 oz.
- marathon = 116 oz.

Depending on the exercise intensity or length of the exertion, or the temperature during the exercise, the need for fluids can vary. With long durations and hot environments, it is often good to drink a quality sport drink made with a glucose product such as maltodextrin and added electrolytes. This can help to avoid a condition called hyponatremia, which is caused by the loss of electrolytes and excess water intake. These beverages are better absorbed if taken cool, rather than warm or at room temperature.

Kidney Stress Overview

The kidney's main function is to filter the blood to excrete waste products in the urine. This maintains the body's fluid and electrolyte levels at constant and correct values. This is vital for many of the processes of the body.

High urea levels are an indication of poor kidney function. Urea is a product that is formed by the liver as it rids the body of ammonia, from protein metabolism. It is normally excreted in the urine, but if there is a problem with kidney function, the urea can build up in the blood.

Common causes of higher values (other than the renal failure):

- Dehydration (the most common cause)
- High protein intake
- Prolonged liver malfunction or stress
- Upper gastrointestinal bleeding
- Heavy stress load on the body, such as fever from infection, or toxic overload
- Drinking impure water

Signs and symptoms associated with high kidney stress levels:

Urea, as a marker of possible reduced kidney function, has some effects if elevated:

- Nausea
- Fatigue
- Insomnia
- Itchy skin
- Odor of urine/on breath or body
- Altered taste and/or smell

High urea levels over time can cause more serious complications such as:

- Blood pressure-induced cardiovascular complications
- Edema in the limbs
- High lipids and/or cholesterol

Common causes of low values:

- Very low dietary protein intake
- Other conditions which limit protein availability such as protein loss in the urine, or celiac disease.
- Over hydration, from too much water, which some kidney patients do thinking it will aid their kidney function

<u>Recommendations for optimal kidney function</u>:

- Drink distilled water for one week, followed by drinking purified water
- Magnesium (binds with urea salts for elimination)
- ORAC (Cranberry, blueberry, raspberry extracts)
- Reduce protein intake
- Detoxification program

Adrenal Stress Overview

The adrenals, two small pyramid shaped glands sitting above each kidney, are the main glands which help the body to handle stress, and maintaining healthy adrenals is extremely important to our ability to cope in our daily lives. When an individual experiences stress, the brain becomes highly active and needs more blood sugar to cope with demands of that particular stress.

Adrenaline, manufactured in the interior of the adrenal gland, is released in response to stimulation by nerves from the sympathetic portion of the autonomic nervous system, which regulates fight or flight. This phenomenon is part of the human body's ability to respond immediately to life-threatening situations by fighting the threat, or running from it. Adrenaline increases blood pressure and heart rate, and increases blood flow to the muscles that will need to fight or flee, and raises blood sugar to burn for energy.

Cortisol, another chemical made from the exterior part of the adrenal gland, is often called hydrocortisone. It helps the body to handle the longer-term stressful situations. This cortisol signals amino acids from muscle and fatty acids from fat tissue to be utilized by the liver to create glucose (blood sugar). Cortisol is also a natural steroid that reduces inflammation and blocks the allergic response.

Adrenaline and cortisol control blood glucose levels, help to control immune function, help fight allergies, and control body fluid balance, blood pressure, blood sugar, and other central metabolic functions. They help maintain electrolyte levels, and with the help of DHEA, contribute to the expression of secondary sex traits.

Recommendations:

- Resolve any environmental stress
- Adequate sleep
- moderate exercise
- Reduce or eliminate caffeine
- Maintain blood sugar levels through multiple meals throughout the day
- Adrenal extracts and support
- Vitamin C, E, magnesium, zinc
- B complex with B12
- Adequate intake of protein and amino acids
- Licorice root, Passion flower, Ashwagadha, Siberian Ginseng
- L-Theanine
- Antioxidants

DHEA:

DHEA is a hormone that is converted into estrogen, testosterone, and progesterone. Adrenal exhaustion, common in long term stress situations, reduces the amount of DHEA and ultimately can reduce a woman's ability to make estrogen. When a woman reaches menopause, estrogen levels drop, and the adrenals create estrogen (essential for bone health) from DHEA. If the adrenal exhaustion is left to continue, there will be sustained estrogen deficiency, and osteoporosis will be

inevitable. Therefore, the health of the adrenal glands is imperative to prevent or treat osteoporosis.

Aldosterone:

It is the job of aldosterone to increase the absorption of sodium (Na+) and the excretion of potassium (K+) in the urine. This maintains water levels in the body. Too much aldosterone can lead to a potassium depletion, and muscle weakness. Too little aldosterone, on the other hand, can lead to reduced levels of sodium which can result in lowered blood volume and dehydration. Of course the severest penalty of this is heart failure.

In cases of adrenal stress and/or exhaustion, these hormones can be reduced, and is seen as urine that is more dilute. The reduced aldosterone levels causing a loss of sodium ions, and water, making the urine more dilute. There are many reasons for adrenal stress or exhaustion:

Environmental Stressors:

Worry, anxiety, financial difficulties, anger, guilt, fear, job strains, death in the family, moving, divorce, too much caffeine, poor diet leading to deficiencies, etc.

Internal stressors:

Poor sleep or insomnia, raised blood pressure, poor digestion, diabetes, infections, constant pain from syndromes such as arthritis.

<u>Recommendations for adrenal stress</u>:

- Resolve any environmental stress
- Adequate sleep
- Moderate exercise
- Reduce or eliminate caffeine
- Maintain blood sugar levels through multiple meals throughout the day
- Adrenal extracts and support
- Vitamin C, E, magnesium, zinc
- B complex with B12
- Adequate intake of protein and amino acids
- Licorice root, Passion flower, Ashwagadha, Siberian Ginseng
- L-Theanine
- Antioxidants

Anabolic/Catabolic Overview

In simple terms, the anabolic/catabolic ratio is the rate we build body tissue versus the rate we break it down. Anabolic processes are those that direct "growth and healing", while catabolic processes are those that cause breaking down of tissues, either in "wear and tear", or for mobilization of energy. So anabolism is the building up of complex molecules, while catabolism is their breakdown. An example of this is in your muscles; when they build up they are anabolic, and there is creation of new cellular material. When they break down and/or atrophy, they are catabolic.

The ratio between the two processes decreases with illness and age. When we are teenagers and young adults, we are in a highly anabolic state, building muscle mass. Mature adults, of course, need to maintain their ideal weight. This means the rate of building tissue should be the same as the rate of breaking down old tissue. When anabolism exceeds catabolism, net growth occurs. When catabolism excesses anabolism net loss occurs. In other words, when the anabolic rate is too high we are gaining weight, and when the catabolic rate is too high we are aging at a faster rate than we should be.

Catabolism includes the chemical reactions that break down complex molecules into simpler ones- for energy, for recycling of molecular parts, or for excretion. The world of sports nutrition has recently been focusing on nutrients and training ideas that are anti-catabolic. Certain nutrients such as L-Glutamine, antioxidants, and other phytochemcials have been shown to reduce the rate of catabolism. This has the result of a higher rate of anabolism, with its faster recovery, higher sports performance, and increased growth rate.

A state of anabolism occurs naturally with good physical activity, healthy diet with optimal levels of vitamins and minerals, enough quality sleep, and normal hormone levels. The state of catabolism, on the other hand, occurs with poor nutrition, too much stress releasing such hormones as cortisol, medications, oxidation or damage from excess free radicals in the system, or internal disease.

Recommendations for improving anabolism and decreasing catabolism:

- Decrease the levels of mental and physical stress.
- Good quality exercise
- Eat a good diet with a lot of fresh fruits and vegetables
- High quality vitamins and minerals
- Focus on a neutral or alkaline diet for optimal pH
- Antioxidants - OPC's, Vitamin C, Co Enzyme Q10
- Essential Fatty Acids
- Pituitary support through amino acid therapy and glandular extracts

The pituitary secretes HGH (Human Growth Hormone), which is a hormone for the building and repair of the muscle system, and the production of sex hormones i.e. testosterone, estrogen, and progesterone

Note: After the age of forty:

- Maintenance of anabolism is important due to the fact that after forty years of age the body naturally goes into catabolism. A good balance of anabolism/catabolism is vital essential to anti-aging therapies.

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