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## PERFORMANCE AND NUTRITIONAL ASPECTS (4)

### **In part (1) we found three major nutritional changes in our evolutionary history:**

Phase 1- WE BECAME PREDATORS ON OTHER ANIMALS 1.8 - 2.4 million years ago.

Phase 2- WE STARTED AGRICULTURE 15000 to 8000 years ago.

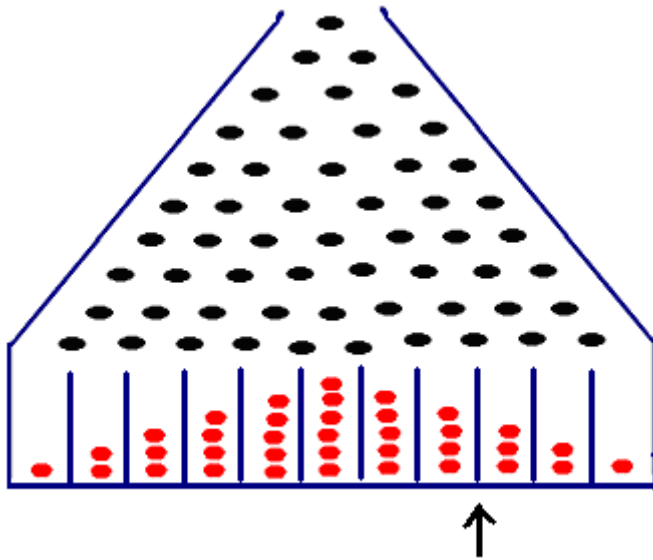
Phase 3- THE INDUSTRIAL REVOLUTION End of 19th century

### **ABOUT HOW MUCH MICRONUTRIENTS YOU NEED (and why nobody knows)**

We are all familiar with individual differences, in the way we look, in length and eg. in shoe size. These anatomical differences are common knowledge. More surprisingly is that anatomical differences like stomach size (and form variations), entrance of bile duct and pancreatic duct into the duodenum and pelvic colon form and position can make you digest the same food very different from the way your friend does (*Anson - Atlas of Human Anatomy, Grant - An Atlas of Anatomy*)

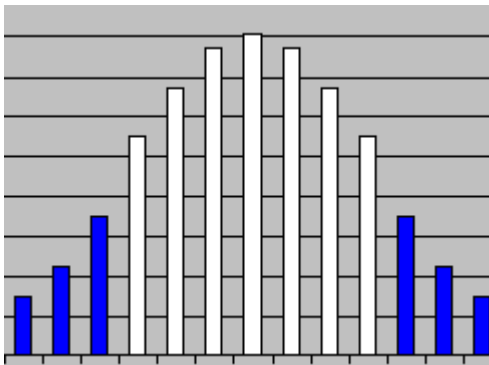
Biochemically the differences are much bigger than is often thought. There's been a lot of research in this field since the 1950s. The only thing you have to know about this is that the individual need for vitamins, minerals etc. show an average (!) of 12 fold difference between individual people of the same height and weight. And it is not like someone needs 10 times as much of *any* vitamin than someone else. You could need 12 times as much vitamin B1 as someone else and at the same time this someone needs 12 times as much B2 as you to maintain optimal health. The latter is not even concerning racial differences. We know that Asians are about 10 times as much susceptible to hypertension drugs as Caucasians. This year Bidil will be marketed. Bidil is a medicine for heart failure that only shows an effect on African Americans! For years we have been studying the results of biochemical tests on athletes. You'll understand that there is a reference value but there's no information about individual needs. Furthermore many international observations lead to *The principle of Genetic Gradients*. This means that if we see that there is a 10 to 12 fold range in vitamin need, let's say skater A needs 5mgs of vitamin X a day, and skater Z needs 60mgs, then all the possible "needs" between these two extremes *do also* exist. So skaters B up to Y who need a vitamin X intake of somewhere between 5 and 60mgs are really out there!

Now take a look at Figure 1. What we see here is a wooden board with nails (upper dots) and marbles (lower dots). Imagine we throw marbles in the upper opening as the board is tilted a little. We'll see the end distribution of the marbles in Figure 1 as well. Most marbles end up in the middle, and less of them further away from the middle. When we started throwing in the first marble it should hit the first nail exactly in the middle. Now it's all about statistics, the marble has a 50% chance of falling to the right, or left. Should we do this with one nail, we'd see half our marbles end up on the left and half of them on the right side. With more nails each marble hits a second nail and a third and so on. For every nail it's the same story. Hence, the end result as drawn in Figure 1. It's very unlikely that a marble would only jump to the right with every nail it encounters. But throw in enough marbles and some of them will end up all the way to the right (or left). You could say, if I throw in a marble, it will end up left of the arrow, and be right 83% of the time.... In the drawing there are 36 marbles and 30 of them ended up on the left side of the arrow.



**Figure 1**

Now suppose I invented a perfect skate. Of course I'd like to introduce them to the world's top skaters. First I have to know what shoe sizes are common. I found 13 different sizes, the 13 bars drawn in Figure 2. So I visit the training with sizes 3 to 11 because I discard the exceptions, the very small and very big sizes, since they are too expensive to produce... there are only very few skaters needing these sizes. This is good marketing... but... is this the ideal skate for a world record holder on the 500 meters? Clearly not!

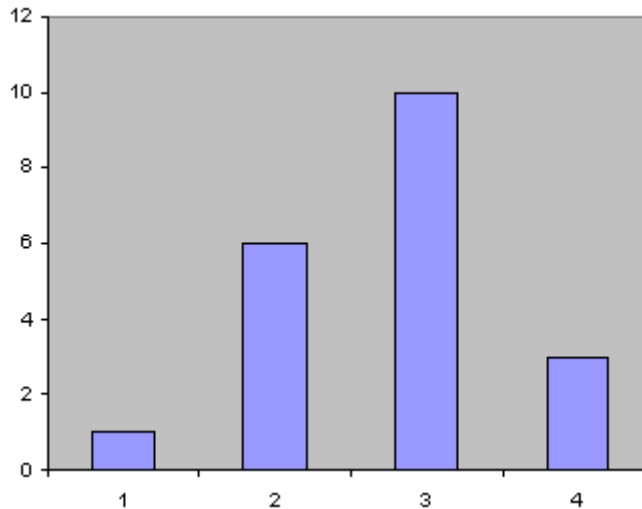


**Figure 2**

Figure 2 could also be representing a population's need for vitamin X. The highest bar (in the middle) is the average value and one could consider this value the reference value. But we use a range to be sure to "cover" a high percentage of the population. This is represented by the white bars. The reference value for vitamin X could be something like 5-10mgs p/d. 10 mgs represented by the white bar on the far right in Figure 2, and by the arrow in Figure 1! But in sports we are scouting for exceptional people.... Any of these talents' biochemical qualities could easily show up on the right side of the arrow in Figure 1 and at the right side of the white bar, in Figure 2. Could exceptional talents possess exceptional biochemical qualities? Could the world record holder need exceptional skates, considering size?

Where we'd expect to see a population's need for certain vitamins or minerals etc. represented by Figure 2, research shows us Figure 3. Each bar represents 25% of the population. 25% needs 1mg, another 25% shows a 10 fold need of 10mgs. The average value is 5mgs. 25% of the group needs twice the average amount. So there's a big chance that someone will not receive his minimum amount of vitamin X if we'd tell this group of people their intake should be something like 5mgs. Too much of most nutrients is also counter productive for optimal performance.... So what is the best way to go from here? We're back to the first article, our

evolutionary history resulted in us, the survival machines, remember? We do have a very good instinct for what we need at any one time. The ones that did not develop such instincts had far less offspring than our forbears.....



**Figure 3**

It is not just getting thirsty when in need for water or craving for carbohydrates or salty snacks. This instinct has become much more sophisticated in millions of years simply because it was crucial for surviving. With the abundance of food today you don't use your feelings and the complication is that since we are in Phase 3 anything can smell like you need it but can easily mess up your health and even weaken your performance. So stick with natural foods that offer nutrients in it's natural setting. Supplementation could be necessary to get you in a natural state, but it depends on the state you're in now...

### **Here's how it works**

1] Starting – no supplementation at all.

Determine if and what medication is used, oral contraceptive (causing specific extra need for some of the B complex vitamins) included. Determine the home (nutritional) situation and the type and amount of training that is done throughout the week (month). Age and sex count also.

2] Giving information about the caveats in modern nutrition and how to have a healthy diet.

Train the athlete's instinct and study the choices he or she makes. If necessary offer (extra) choices to obtain all fatty acids (see part I) that are needed. A healthy diet is often quite different from what most athletes are taught to think what it should be. The athlete should know that for lots of nutrients too much could lessen the effect of the training to!

3] Use supplements:

a] to correct ratios between minerals (eg. Na/K, Ca/Mg)

b] supply nutrients that are too difficult to obtain in optimal amounts through the diet eg. vitamins B12, E, C and minerals like Magnesium, Iron and Zinc

c] to get a specific effect out of the chosen type of training

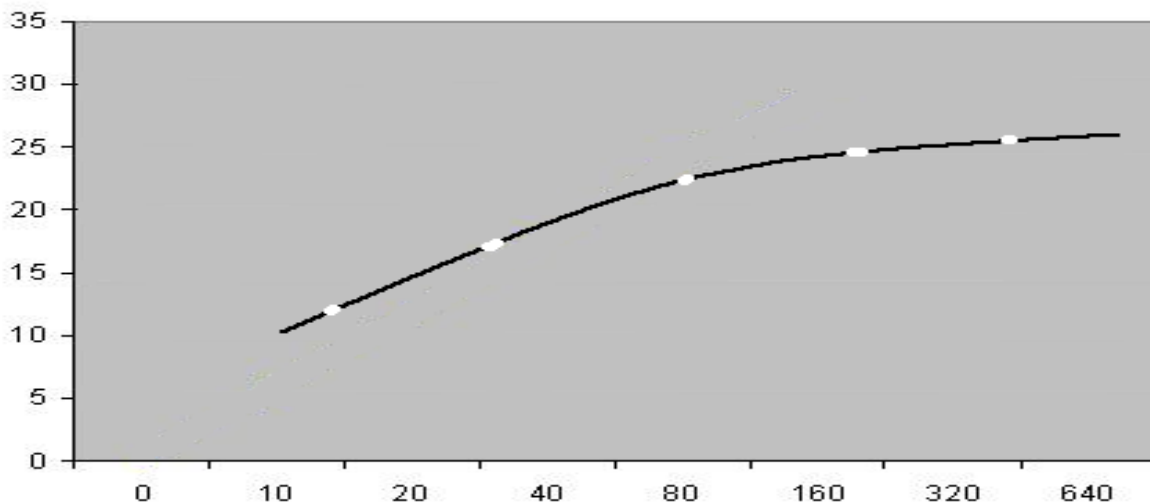
A supplementation program changes from week to week and will in time fit the individual needs and circumstances of an athlete.

### **Results**

It is difficult to know what a good program does, since I work(ed) in several other sports I found that some effects seem to be related to switching from the average modern "healthy" diet to an understanding like proposed in these four articles.

1] Quality of training improves, it's easier to handle training intensity and probably volume too.

- 2] Better recuperation. And athletes report sleeping less but getting out of bed easier.
- 3] The athlete's motivation seems to improve.
- 4] Dependency on medication changes.
- 5] Doctors suspect less injury occurrence and an improvement of the immune system



**Figure 4.** Vitamin A intake (i.u./kg/day) and growth rate (gm./wk) in rats (R.J.Williams)

The supplementation of most nutrients should be as modest as it was in Phase I and before. On the other hand it seems that the recommended daily allowances for some nutrients are far less than needed by an athlete who wants optimal training and recuperation. Figure 4 shows an example of this. It's the growth rate of rats with a vitamin A intake of 15 International Units up to 480 i.u. The graph's line shows several gaps. From left to right these represent:

- 1] 15 units normal histology
- 2] 25 units normal visual threshold
- 3] 80 units minimum liver storage
- 4] 240 units maximum growth rate
- 5] 480 units maximum production of young

This is a generalization of what is seen in research with rats (mice, apes etc. humans too), note that maximum offspring (a healthy thing to be able to) at 480 units is more than 30 times the 15 units required for "normal" functioning. The question is: What is optimal for the individual athlete?

For some nutrients like vitamin C an optimal amount is higher than can be obtained from the diet. Certain types of training and specific periods of the training process require supplementation on top of a healthy diet. But since we can only supply with extra nutrients known and/or available at the time, you need advice of a professional, preferably a biochemist. Another thing is that single isolated substances behave differently from their behaviour in their natural environment (see part I: You as part of your environment). Caffeine has a different effect isolated than in coffee. Creatin has a different effect isolated than when eating fish or meat supplying the same amount, and so on. The environment is decisive for (even part of) the action of the single entity (substance or person). This means that supplementation of nutrients can be tricky, but also can trigger effects that are impossible to obtain without them! First you'll have to understand *what* natural food is and you'll have to be on a such diet for at least 6 months. Then a clearer picture arises on what supplementation could do for you.