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PERFORMANCE AND NUTRITIONAL ASPECTS (3)

In part (1) I introduced a way of thinking that was part of the process leading to the men's 1000m world record, the current world sprint titles and a host of international all round and single distance medals. This is a way of thinking about yourself as part of the environment and with respect for the millions of years in our ancestors had to survive harsh circumstances.

In part (1 and 2) 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 (West European situation) 15000 to 8000 years ago.

Phase 3- THE INDUSTRIAL REVOLUTION End of 19th century

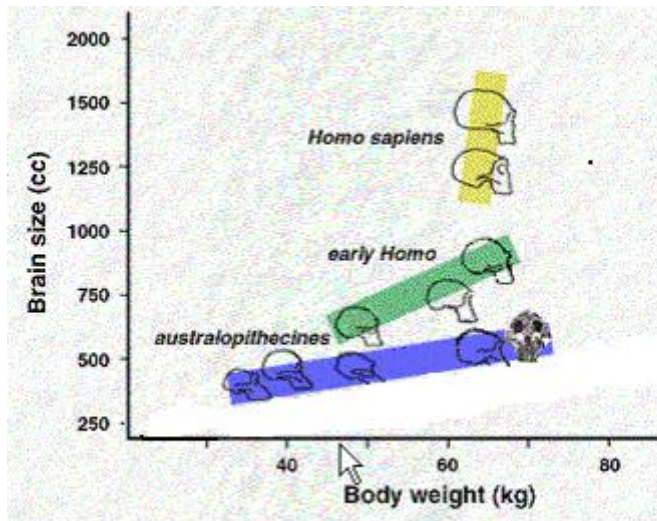
ABOUT CARBOHYDRATES

Let us first take a look at the three phases in our (evolutionary) history and see what role carbohydrates played in the average diet.

Phase I is the hunters / gatherers period in which our ancestors were nomads. As you know by now this is before they settled and the products of agriculture became an important part of the diet. This meant that animal sources of protein and fat made up to 90% of the diet.

This went on for about 2 million years and led to the homo sapiens that was very successful, in terms of survival, and had an ever increasing number of descendants. The intake of carbohydrates in this phase was low compared to what we're used to nowadays. The main source was fruits and seeds. These are very slow digesting carbohydrates.

Phase II is the period in which agriculture gradually determined the way of living and subsequently your diet. Of course hunting was still part of daily life but when certain animals became domesticated there's a gradual shift towards a diet with more sources of carbohydrates: wheat, beans etc. Even today there are tribes that plant seeds, move on but return to these places after about two years to eat the crops. So they are still nomads but also practicing some form of agriculture already. Other animal sources became available too, dairy products, with already familiar fatty acids and proteins, and a carbohydrate called lactose. Dairy products also provide calcium an element that was much more difficult to obtain before. Since the balance calcium / magnesium is relevant for health and performance it's interesting to see that the phase I paleolithic diet (rich in magnesium, poor in calcium) shifted towards the agriculture diet adding calcium. Hope you remember we talked about brain development before (see figure 1 and read part II), well calcium has become to play a big role in brain functioning. The intake of carbohydrates in phase II was still comparatively low to what we're used to nowadays and again we're talking slow digesting carbohydrates.

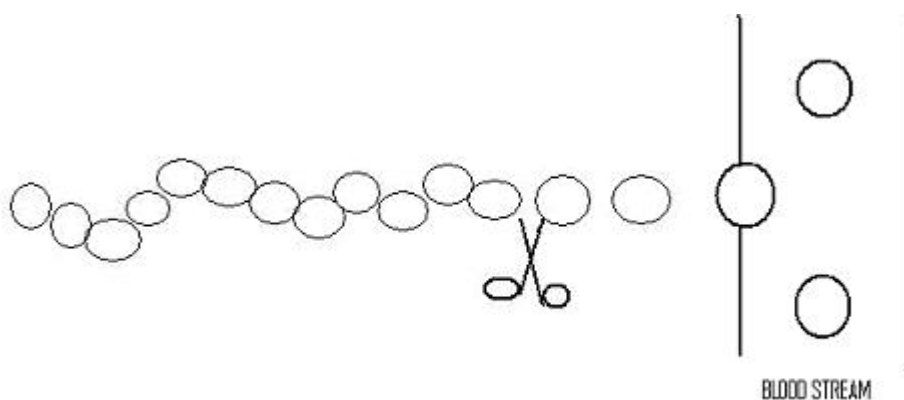


Phase III .

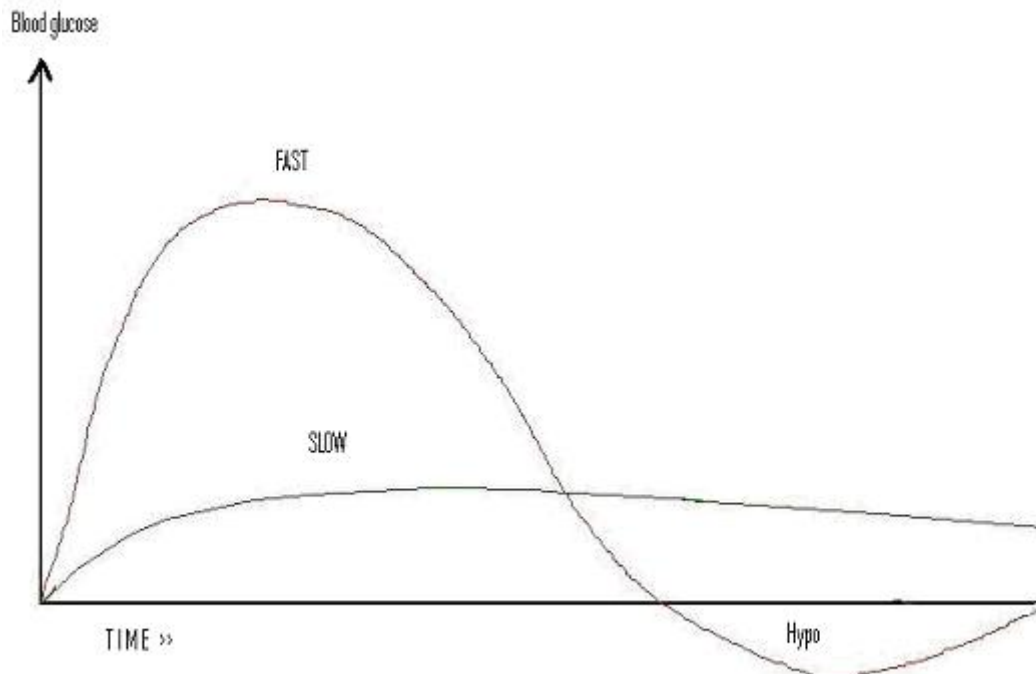
If we're talking carbohydrates than the development of modern man towards the industrial revolution is a crucial one. In the second half of the 20th century the changes in our diet happened fast. We are talking big changes in a very short period and it all happened in about one generation, the generation of our parents. Agriculture and especially the industry that uses it's products, like wheat and sugar, determined what a healthy diet should look like.... All kinds of fabricated foods entered our diet (see part II). We started to consume sugar and refined wheats etc. in increasing amounts. This time the new carbos are mainly fast digesting ones.

WHAT ABOUT DIGESTING CARBOS SLOW OR FAST?

Figure 2 shows a simplified model of how we digest carbohydrates. Any carbohydrate is like a chain of simple sugars, mainly glucose. We will focus on glucose. Digesting carbohydrates is cutting these chains, in your small intestine, into it's smaller parts. Thus the glucose can enter the bloodstream. Your blood sugar is in fact your blood glucose to be exact. Glucose is exactly where it all comes down to, this is the fuel for your muscles but also for any other organ. Now plain sugar that we all know is a very short chain of two simple sugars: glucose and fructose. The shorter chains taste sweet. In pasta's, bread, rice, potatoes etc. we find (very) long chain carbohydrates.



Carbohydrates that provide the bloodstream quickly with glucose are the ones I meant before as fast digesting carbos. You might expect that the longer the chain (of sugars) the more time it takes to digest such a carbohydrate. Slowly digesting carbos mean that the single glucose molecules enter the bloodstream slowly since it takes time to release them from the original chain. On the other hand, pure glucose (carbo chain of length 1) like in many sports drinks will deliver it's glucose into the bloodstream in no time!



Now look at figure 3. You see the blood glucose level respond to a meal with fast and another to a meal with slow carbohydrates. FAST: this is the glucose concentration that rises quickly which is registered and the pancreas gets a message to produce insulin, a mechanism to restore base levels. But since we can only store about 600 grams of glycogen (the way glucose is stored in our body) in the liver and about another 200 grams in our muscles, this means that most glucose is turned to fat..... which we store easily. SLOW: shows us the same amount of glucose entering the bloodstream slowly. The insulin response is not as aggressive as with the fast carbs. There is a release of glucose over a longer period. When you go to train after this meal you will probably still have a release of energy entering the training and during longer trainings. This means also that you won't find yourself in the HYPO-dip!!! If you use fast carbs during training, of course the glucose will be transported to the muscles that want them very much, and there is no mechanism of storing fat. You need slow carbs before training and can use (fill up the fuel tank again) fast ones afterwards. Sounds easy? Well there are some cave cats..

GLYCEMIC INDEX

Around 1980, Dr. D.Jenkins came with the glycemic index (GI). This is a value assigned to the digesting speed of carbohydrates... starting with a value of 100 for glucose. So low a GI value means a carbo that is digesting slowly. He had to come up with the GI because the former view of short chains are fast and long chains are slow was wrong. He found this out by testing for blood glucose levels after different meals for every 10 minutes or so. This way he got the curves as seen in figure 3. Ordinary sugar has a GI of 65 and some long chain carbs (bread, potatoes, rice) have much higher GI's !!! So you need to check for GI values in order to become acquainted with what is slow(er) and what is fast(er).

Dr. Jenkins' research was done for the diabetic community. Australian scientists used it to benefit sport and started to use it in the preparation of the Sydney olympics. Of course there is more to using carbohydrates in preparing for different sports, different types of training and on an individual basis. Our experience goes back to 1999. For instance the combination of certain carbohydrates with proteins that deliver either tryptophan (crosses the blood brain barrier and forms → serotonin) or tyrosine (forming → epinephrine) could be beneficial for under / over aroused skaters....

Next time: why somebody who tells you how much vitamins etc. you need... is wrong!