

A muscular man with tattoos is the central figure, shown from the waist up. He is in a gym setting, with a squat rack visible behind him. The background is a blue-tinted wall covered in various mathematical formulas and symbols, such as $E=mc^2$, $F=ma$, and θ . The overall aesthetic is scientific and technical.

REWRITING FAT LOSS

Thoughts on the evolution of human metabolism and why people fail on their quest when adhering to the "Eat Less, Move More" maxim

by Adam Bates

Rewriting Fat Loss

The human body, an outstanding evolutionary achievement, outshining even our own progressive achievements through the advancement of technology that have been witnessed from the invention of the wheel to the magnitude of technological ingenuity that surrounds our lives today, has progressed from the earliest of single celled lifeforms into a species, not only of the greatest conscious intelligence, but one that's biophysiological design is extremely well adapted to thrive in its environment.

Through its complex structure of individual, yet interdependent, systems, the human body is blessed with the most intricate ability to respond to any change that may take place to any subjugate property of any one of those systems by making subtle adaptations throughout others; much like the components of an ecosystem will adapt accordingly to restore harmony, as soon as it has been interrupted by the slightest alteration to the value of any of its individual properties. Within a particular ecosystem, if there were to be, let us say, a decrease in plant life and thus, by way of food availability and subtle changes to the atmosphere, conditions become less favourable to herbivores and consequentially their numbers will begin to fall. This decrease in the total herbivore population, propagates a consequential and corresponding decrease to the carnivore population. As this cycle transpires, with the total population of animal life decreasing, a positive effect would be witnessed to environmental conditions with regards to their suitability for plant life to thrive once more. This, a design of nature, like that of the human body, displays such precision to the tuning of its individual components, such beauty produced by their harmonic combinations, that it is beyond compare of anything produced even by the most complex of computer systems.

You see, the human body is the result of millions of years of evolution. Evolution, by its very definition is the adaptation to an environment of a living organism by way of the traits of those individuals who are most suited to that environment being the most likely of the species' genetic material that will be passed

to future generations. Thus, in an magnitude of ways, that species is in an eternally adaptive state, optimising itself by any means available to best suit its chances of survival in its environment. From the moment of inception of those earliest single celled animal life forms, we have seen a gradual adaption to, and with, an ever-changing environment that has, by necessity, brought the human body to the advanced evolutionary stage of which it has reached today. That is, an organism with an incredible ability to meet its major objective in life, ability that is the work of nature; and any work of nature is more deliberate, precise and intuitive than anything of which the human mind itself may ever wish to construct. That major objective being; the organism's survival in the environment in which it lives.

To highlight how a small change to one of the bodily systems will initiate changes throughout other systems, let us consider what happens when we are subjected to an infection. Whilst the infection itself may be restricted to a small local area, we would witness a reaction subjugated throughout the whole body by the means of the immune systems response, its corresponding chemical messengers and ensuing adaptations made to the activity of all bodily systems, in order to best suit the defence against what is perceived as the immediate threat to its survival. The increase in white blood cells, the activation of the hypothalamic-pituitary-adrenal axis, resulting in hormonal changes notably, an increasing production of cortisol, norepinephrine and epinephrine, the ensuing metabolic adaptations as every cells energy resources are impacted, see the body taking action to best fight that immediate threat. The body has evolved a wonderful means by which it is able to prioritise its resources to those biological actions deemed to command the greatest of importance in meeting this objective. Consequently, adaptations in other areas may be felt and some of these, if you like - side effects, such as a dip in energy, lower mood or symptoms of general illness, are the result of the immediate priority given to the demands of the infection as the body attempts to fight it. The feelings related to this lower energy turnover throughout the rest of the body, a desire for less activity, a greater desire for sleep and such like, result as the body attempts to create a more optimal environment for fighting the infection.

Now, let us consider the bodies response to being subjected to famine. Much like the economy of a nation state whereby spending considerations in various areas are relative to the size of its total budget, a hierarchy of importance for that spending is formed. Where a nations budget would be distributed across defence, civil services, education, infrastructure, healthcare and so on, with the amounts to each decided by way of what is deemed as the best way to ensure the survival and growth of the nation and its people, the energy that is available to the human body is distributed according to its survival needs too. When that budget becomes considerably more restricted, as would be the case for a nation during a time of war, the expenditure on sectors that are perceived to be of the greatest importance to winning that war, that immediate threat to the country's survival, will be given all precedence as the entire distribution philosophy is dictated by that war effort alone. It is of no consideration or indeed faces no justifiable appeal, despite any immediate suffering, that the sectors providing that country with the lowest value to aid in the outcome being one of victory will be subject to the greatest economic impairments. A victory, that is, to unequivocally be desired, with the lowest possible loss of life and damage to its ability to thrive, that is, its increasing ability to prevent a future threat.

These analogies, I hope, will provide the most vivacity and clarity to what shall follow; the most fundamental, yet widely perplexing, truth to consider when constructing the fat loss rhetoric. How is the human body designed to work?

Eat less, move more. The fat loss ideology that is ingrained upon society, thanks to its adherence to the law of thermodynamics, that is the law which states that if more energy is consumed than is expended then weight gain would be witnessed. It certainly is not the law that is incorrect. The error lies through its consideration, to its harmful application as the common rhetoric today; which fails to consider an overall systemic understanding of the biochemistry of the entire human body.

The heart, the purring engine that powers human and animal life, may not be what is in control of the species and its actions, but we certainly can not live without it. If the heart were to be akin to a nations people, then the brain would be the capital city or perhaps, it would be better to say its constitution and its parliament. Other important foundational aspects of any nation, such as its housing, infrastructure, commerce, education and so on, are akin to the other organs, most of which are also deemed essential. The growth of tissues in the body, that is growth of muscle tissue in particular, though even bone growth as supported by the substantial evidence of height being restricted in children who had been subjected to prolonged malnutrition, beyond what is required for the individual to survive, would be more akin to the nation displaying its power by way of extravagant spending on impressive architectural feats or to the expenditure of its people on material items. When resources do become more restricted to a nation and thus, its citizens, it is that consumer material expenditure that will be the first to drastically fall, that material consumption can be equitably related through the human bodies energy distribution hierarchy to the amount of energy that would be dedicated to tissue growth or maintenance. If, the economy becomes restricted enough, then we would start to use any savings we may have as well as sell any of our items that may be deemed as non-essential. Body fat, by definition is stored energy thus, providing us with our savings in this context and the muscle tissue akin to an expensive luxury that can be downgraded in order for us to further reduce our expenditure. Initially, it may be quite easy to survive and adapt, especially if you have a lot of savings! But if this extremely low-income status is sustained for a prolonged period, a period which continues to see less coming in than is going out, a continuous reduction to those savings witnessed, then you will soon try to tighten your grip further. The more those savings fall, the tougher the budgets you impose on yourself, the more you will attempt to cut down on non-essentials until you are adapting by any means possible in order to allow those savings to support you for as long as possible. Throughout this process our psychology naturally shifts to suit this need to survive, we need to be savvy with our finances, minimising our outgoings and thus, would not even consider looking at some of those

items that would have appealed to us previously when our financial budget was not under the same restrictions. Think about this, if you are hit suddenly by a drastic drop in income and you expect that drop to be sustained for the foreseeable future and, let us say, that after remortgaging the house you have the equivalent of 6 months' worth of income in the bank, are you going to continue the 6 holidays a year, the expensive restaurants every evening and the other luxuries you were accustomed to previously? Or, would you attempt to be wiser with your spending? Whilst it is unlikely that you would attempt to flip from a position of spending your money extravagantly to enforcing restrictions that resemble war like food rations overnight, a gradual transition would occur and as you see those savings continue to fall, you desire to spend less and less. Take a moment to imagine that this truly is a situation which you are faced with right now and then consider how you would then expect to respond as it progresses. That is, a situation where you are having to live almost entirely by the means of your limited savings. These savings may seem plentiful at first, your imposed restrictions minor, your way of life still relatively comfortable with the threat to survival seemingly in the distant future, that is to say it is not yet an imminent threat. But as the weeks and then months pass, you see those savings decrease further and further, as they do so you experience an increasing feeling of fear for your own survival and thus, an increasing desire to spend less and less. Before long, you are restricting yourself as much as you possibly can, your lifestyle completely adapted to this objective, your focus unwavering from those concerns of survival and all of your actions are taken in coherence with the predominant consideration that is, to mitigate the reduction in the amount of savings you have remaining. Go back now to the analogy I made with reference to the human body and savings, specifically in appreciating the resounding fact; your body fat is your savings. What though, if the situation changes? All of a sudden you are blessed with a monthly income equivalent to more than what was remaining in those savings, more than you were earning prior to having to restrict yourself, more than enough for the extravagances you enjoyed then and for the additional luxuries that you desire now. Firstly, you may have learnt from the experience, implemented more consideration with regards to your spending and focusing to a far greater degree on

growth and investments. Your desire to accumulate more wealth is likely to have increased as a result of the painful experience you endured, an experience that's painful emotions have, as all painful experiences do, altered your own psychology by way of adjusting your individual hierarchy of values with the value placed on material possessions reduced and the value you place on financial security becoming considerably higher. When there is more money available, we are happy to spend more and when we have experienced the pain of financial loss, we naturally take measures to reduce the chances of such a situation arising again in the future. The human body is adapted to function in this precise manner by means of not just focusing on the defeat of any perceived threat to its survival, but to also increase its aversion to future risks.

It would be wrong of me here, if I were to completely disregard consideration to the major difference between the loss of body fat and the loss of financial resources, in that one is to be desired and the other not. With this important discrepancy considered, we would be inclined to think that it supports the media narrative around fat loss, that is the maxim which encourages a person to consume less and to move more. Of course, it would be a great way to quickly lose all of your savings if you were to simply earn less and spend more! This though, is where the analogies provided previously are important, as it is the *desire* to ensure that those savings are not lost, that they are able to sustain us for as long as possible that is the important aspect and yet ,it is an aspect disregarded in the thought behind the common fat loss narrative. The body, like your mind wants to thrive, it does not want to create a struggle for survival, the mind does not want to experience those feelings of fear and pain at financial struggles and the body does not want to experience a deterioration of an individual's health that increases their chances of fatality.

That process of evolution, that outstanding achievement of design and adaption, as I referred to the evolution of the human body in the opening sentence, plays out in all its conspicuous glory when reflecting on a period where humans were, as they were for almost the entirety of their existence

subjected to climates and locations that were to dictate their dietary intake. Within our human societies today, the vast majority of us live in a different kind of world, a world where we can consume almost any food substance, from anywhere, and at any time we have a desire to do so. However, the human body, I need not point out, was not created within the last century or so, it evolved to suit an environment that for virtually all of its existence has been very different to the one where our dietary choices are not restricted by location, climate or the seasons. To understand the behaviour of the mechanisms of the human body it is indicative to look back and consider the environments that were the normality for all peoples who lived throughout the first 98% of the total time of which humans have graced this planet. By doing so, we instead look at a world where all humans were far more restricted when it came to their nutritional choices. Nutritional intake would be dependent upon what food could be sourced from the plant and animal life that existed naturally from within a persons local environment, plant and animal life that may vary considerably not just from location to location but within a particular location itself through the changing seasons.

Life was of course extremely different to today and there may have been environments where a persons habitat was full of various kinds of animal and plant life that provided readily available food anytime it is required. Others will have lived in environments where any food at all was much more scarce and whilst most of course would exist somewhere between these two extremes, in doing so it was extremely likely that the amount of food available to them would not be consistent through the year but would vary with the seasons.

The survival of the fittest, whereby fittest is deemed as the best suited to survive in a given environment isn't a resultant progression in transformational leaps from one defined stage to the next, as you would see in diagrams which show points of the progression from a much more ape like species into that of the the modern human, there is a continuum of consistent progress that is in tune with this law on every possible front. Whilst the tortoises of the Galapagos islands with their evolution in neck length and shell

shape are a wonderful example to show its concept, it would be prevalent for us to start to consider evolution in terms every attribute of every living creature, that is, not only the tip of the iceberg in the visually profound leaps that distinguish one species from the next, but also the ongoing evolution within any species itself. It would, in considering these laws be the reason for every element of a species, yes its neck length or other anatomical adaptations, but also the size and shape of organs, the brain structure and the progression of psychological capabilities that evolve with the evolving areas of the brain, their relationships with the endocrine system see each signalling an evolutionary response in another. Where there is a slight adaptation from the mean of any property of any system and that adaptation, if it increases in anyway the survival chances of those who have it even slightly, then that would mean a greater chance of that trait being passed through DNA. Fundamentally, if an environment dictates that an individual benefits from a slight variation in the way that they produce say, a certain hormone be it down to the efficiency of a particular gland due to its specific size and structure then there is a greater chance of the DNA that produces those variations being that which is passed on to future generations. Think of this a bit like the aerodynamic considerations of a car, in that it may not be able to beat all others simply because its windshield has the most efficient aerodynamic design, it will not mean it is capable of higher speeds than the car with the superior engine, but when all else is equal, no other aspects variable, then it has the edge. This improvement to its suitability to its desired objective will then be implemented by competitors too in that endless quest for anything that may give them the advantage. It is attributes that would be most prevalent by means of the survival skill of hunting, for this evolving early human, that would, unlike today, be one of the most important factors in considering its ability to survive. Therefore, those with a higher physical strength, speed, agility, endurance and even intelligence would not just be in a more advantageous position as the hunter, but those same attributes provide them with many with respect to avoiding their own predatory threats. The human that is best adapted the sourcing of its food in its environment is more likely to survive than one that does not exude these capabilities to that same degree, ie a slower, weaker and less agile human will be far more likely to struggle in times when food is

harder to come by or times when defence against their own predators is of greater importance. Those with the greatest chances of survival will be those that dictate the evolutionary direction of the species, a point which can be seen through the progression of the earliest of our ape like ancestors to an animal that is much more adept in its movement and balance when doing so via just two of its limbs, seeing its survival chances improve further by added dexterity, control and freedom of its upper limbs to carry and use weapons or other tools. Hence, in the early humans environment, the progression of these traits from their more ape like ancestor's would be witnessed in accordance with the fact that those that exhibited these traits the most were those that would have been the most likely to survive and in turn reproduce.

Another consideration that is of great importance in the hunter gather environment at times when food is less readily available would be the persons immediate need for it, that is what energy stores they have, or if you like, what savings they have available to utilise should they be subjected to a period of lower income. Let us imagine that a human did not have the ability to store any energy from its food at all and in doing so we would be imagining a species with a constant need for food consumption, whereby if the human stopped eating even momentarily, their bodily processes would quickly start to shut down completely. To avoid this need for eternal feeding, the human body, like all animals to varying degrees, has evolved an ability to store energy, immediate stores of glycogen within the liver and muscle, the muscle tissue itself by way of the release of its contained amino acids, or of course the aforementioned body fat storage. In an evolutionary context then, the ability of the human to store energy is another consideration that would play a role in improving its chances of survival. For some animals, that may mean excessive feeding through seasons where food is readily available and then a period of hibernation could be utilised through the periods where their required food is virtually non-existent. The body fat stores it has steadily built up through its active months are utilised to maintain bodily processes when it is in its hibernation period. This, you may have already noticed, is a great example of the given analogy regarding the utilisation of financial savings in a situation where financial income is taken away; the

hibernating animals bodily processes are akin to financial expenditures and the less that can be spent, the longer the savings will last and thus, the greater the chances of survival.

So, consider the human who can simply store the most energy. If they were to do so excessively and see their body fat levels rise to higher and higher levels needless to say, there would become a point above which, these increasing fat storage levels would in themselves start to become a hinderance to survival. However, the human that achieves the optimal balance between all traits relevant to its survival such as its ability to store energy, whilst maintaining optimal levels of speed and endurance and now, another consideration need be applied by way of its ability to adapt its energy expenditure by making internal adaptations. Of course, it is of great advantage to be able to earn a high income, to be able to maximise savings and to be as diligent as possible with income expenditure.

In this typical hunter gatherer environment, of varying food availability through the seasons, we can now summarise that those with greater speed, strength, agility and endurance, with stores of energy but not too greater stores that those physical attributes become negatively impacted and thus, with a great ability to be diligently resourceful with its energy expenditure are those that will have the highest chances of survival and therefore, set the course for the direction of evolution within that environment.

What then of anatomical structure? If it is perceived at face value, then an infinite increase in bone and muscle size would seem advantageous by way of increasing survival attributes such as strength and speed as long as agility is not impaired and if indeed humans were not living organisms then this would be the case. As a living organism though there is a maintenance process to consider by way of tissue turnover, a process that consumes greater amounts of energy with increasing size. That is, the greater the muscle mass, the greater the need for the consumption of the nutrients that are required to support its maintenance or further growth. When we consider those humans who may be subjected to famine, as mentioned earlier, it is the brain that takes precedence in the energy distribution hierarchy and thus, energy is not going to be allocated in order to sustain muscle mass when there are more immediate needs

elsewhere. A great deal of energy is expended through the process of protein synthesis, the process that is responsible for the maintenance of muscle tissue and thus, we will see levels of muscle mass rapidly fall as the energy resources allocated to this process are minimised.

It is though, with this understanding of the mechanisms that we not only see the huge error in the advice of moving more and eating less when applied to the goal of long term and sustainable fat loss, but can instead create an approach that uses this understanding to our advantage. Let's consider the following statement as a new maxim for fat loss:

Eat more to burn more!

Yes! That is correct, to sustain fat loss long-term, implementing a strategy that sees the body avoid its responses to times of food shortage, to avoid its slowing of bodily processes, to avoid its desire to reduce protein synthesis and lower muscle mass is what should be implemented. We want to ensure that we are increasing, to the greatest degree possible, the amount of energy our body is expending through its essential processes as in doing so we will have created a situation where the body perceives that we are in an environment where food is consistently readily available and therefore, there is no requirement to attempt to restrict the use of stored energy without a restriction on the energy coming in that would otherwise pose a risk to future survival and thus, deeming those savings, that stored energy by way of body fat, not so essential in that environment for survival.

In starting instead with a higher calorie intake, particularly if combined with adequate weight training in order to promote an environment that encourages maximal muscle tissue turnover and thus, giving an additional and increasing outlet for that extra energy being consumed, we are able to manipulate the bodies hormonal environment into the state where it is least likely to want to impose restrictions on the

use of its energy resources. So, rather than the calorific restrictions which would see the ensuing reduction in the production of leptin, thyroid hormones and testosterone all of which would aid in the slowing down of bodily processes in order to help minimise the use of energy reserves, that ever decreasing desire of the body to relinquish body fat as calorie restriction endures, we can create the reverse environment with respect to those and other hormones, an environment that encourages greater, as opposed to less, energy expenditure.

The hormonal environment that adapts to suit our energy supply and demands does so in accordance with that course of evolution that saw seasonal changes dictating the availability of food and therefore, it does not adjust from a state of prevalence to restriction within a day, or a week, it will be a gradual process that continues in line with the adjusted food intake. It is for this reason that restricting calories is shown to be an effective tool in weight loss in the short-term, we may lose a substantial amount of our stored reserves as part of that initial weight loss too, but to do so we have had to implement a forced restriction on ourselves that is not only difficult to sustain, but will quickly result in the adaption processes being initiated that will suit a growing desire to ensure that we have our savings intact as a threat to our survival is increasing. As a result of those adaptations the body will become more and more diligent in the use of its energy resources, the protection of its energy savings and thus, the creation of an environment that is opposed to the loss of body fat stores.

With a gradual increase in our energy intake though, we will see a gradual reduction in the need for energy preservation and create an environment that is now ideal to maximally relinquish body fat stores. Whilst it is still the case that once the slight calorie deficit is then imposed from this point the hormonal environment will begin adapting to a negative bias still, we are starting that deficit whilst the hormonal environment is still optimised for fat loss, that is when it is at a stage of minimal need to consider energy conservation. Once those adaptations though, towards a state of more diligent energy allocation, do begin to take effect, the higher food intake level we have started with make it possible for

us to simply create a higher deficit once more by now lowering the intake slightly, but we are doing so whilst still having a food intake level that is adequate for us to sustain.

The aspect of muscle tissue turnover can be implemented in conjunction with this process too as a tool that will aid the fat loss objective by means of its own effects on the hormonal environment. If we are subjecting the muscle to the increasing need for repair and turnover, remembering that this process is one that expends a lot of energy, then we are adding a double-edged sword into this already well-equipped attack. If there is a stimulus that is encouraging the need for increasing or at least the maintenance of the individuals muscle tissue, then a lower percentage of the weight of which is lost will, if any, come from muscle mass. In effect, we have given an appeal if you like, to the government for more of the budget to be allocated to that area than would normally be allocated as the restrictions are imposed. The other advantage of maintaining the muscle tissue whilst in this calorie deficit is that of the longer term one, without it being easily relinquished as it would, due to its lack of importance during the time of restricted resources, without the weight training stimulus, we maintain a far higher energy output thanks to the demands of that muscle tissue, than would be the case later down the line if muscle mass had become substantially reduced.

This is the truth and gospel around fat loss that is at the heart of the success of my own clients, its lack of understanding is the reason why so many fail to succeed in losing body fat long-term and why it is time to completely change what is still prevalent in the media fat loss narratives. I hope that by way of the analogies and evolutionary information I have provided with this essay that we can begin to make that change, a change that can see us eat more to lose fat!

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