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Proceedings of the 1st annual symposium of the German Society for Paleo Nutrition held in 2013

Abstract

Evolutionary Medicine is an emerging medical field that mainly addresses the causes of diseases under the consideration of evolutionary principles [1]. Viewing diseases through the evolutionary perspective also opens up new and innovative treatment strategies. In particular, the understanding that most of the so-called “diseases of civilization” emerge from a discrepancy between our modern, civilized lifestyle and that towards which our human species (as hunters and gatherers) has evolved, challenges the concept of these diseases being chronic and provides new treatment approaches. Examples of such approaches were provided in the first annual symposium of the recently founded German Society for Paleo Nutrition (*Deutsche Gesellschaft für Paläoernährung e.V.*, DGPE). The meeting entitled “Modern Lifestyle – Modern Diseases” took place on October 5th 2013 in Schweinfurt, Germany, and focussed specifically on nutrition in health and disease from an evolutionary perspective. This paper is a collection of abstracts of the scientific talks given at the symposium.

Keywords

Paleolithic diet, ketogenic diet, exercise

Foreword from the editor

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Evolutionary Medicine is an emerging medical field that mainly addresses the causes of diseases under the consideration of evolutionary principles [1]. Viewing diseases through the evolutionary perspective also opens up new and innovative treatment strategies. One example is the emerging theory of cancer as a metabolic disease in which tumor cells displaying a high rate of glycolysis (the *Warburg phenotype*) are predicted to outcompete their normal counterparts in conditions of varying and abundant nutrient supply [2,3]. The consequence for cancer prevention and treatment would be a focus on metabolism and its alteration, e.g. through ketogenic diets or dietary restriction [4–6]. More generally, the understanding that most of the so-called “diseases of civilization” emerge from a discrepancy between our modern, civilized lifestyle and that towards which our human species (as hunters and gatherers) has evolved, challenges the concept of these diseases being chronic and provides new treatment approaches. To give just one example, I would like to mention a German study conducted by Peter Heilmeyer et al. [7] showing that three weeks of the so-called LOGI diet (an isocaloric low carb diet invented by German dietician Dr. Nicolai Worm) allowed 19 out of 43 patients (44%) with the metabolic syndrome to reduce or discard their medication, while medication in a control group on a calorically restricted low fat diet remained nearly unchanged. Clearly this supports the notion that the excess supply of sugar and starch is an evolutionary entirely new challenge for our metabolism, and that by focusing the treatment on this insight, diseases such as metabolic syndrome can eventually be reversed.

More such examples were provided in the first annual symposium of the recently founded German Society for Paleo Nutrition (*Deutsche Gesellschaft für Paläoernährung e.V.*, DGPE). The meeting entitled “Modern Lifestyle – Modern Diseases” took place on October 5th 2013 in Schweinfurt, Germany. As chairman of the DGPE, it is my great pleasure to herewith present the abstracts of the scientific talks given at this year’s symposium. I would like to thank the chief editors of the *Journal of Evolution and Health* for providing this opportunity to present this seminal meeting for the ancestral health movement in Germany.

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(R)evolution of our health. The causal link between our lifestyle and chronic diseases of civilization in the 21st century

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Today there is a growing body of alarming evidence that modern chronic diseases like myocardial infarction, stroke, diabetes, osteoporosis, and cancer, plus neurological disorders like attention deficit syndrome, multiple sclerosis, and dementia, are promoted and may be due to modern technical achievements that have profoundly changed our environment in two ways: First, there is a massive pollution by an unprecedented growth in exposure to a large list of pesticides and toxic materials like fluoride and aluminum.

Second to endocrine disruption by the toxic material, the lifestyle changes due to technical progress have led to a serious loss of essential ingredients for good health in large segments of the population: physical exercise, micronutrients, essential fatty acids from plants and animals, and vitamin D—the “sunshine” hormone—as well as the dissipation among many people of close social bonds and of performing music and singing, to mention but a few. The deficit of

these resources results in a dysfunction of the complicated cell signaling similar to endocrine disruption and leads to heritable changes of our genes! This phenomenon is part of the new field of scientific studies in “epigenetics” research. The whole complex of interactions is called “Nature Deficit Syndrome”.

Hard to believe, but obviously true: an excellent approach to avoid or overcome various health problems is a change of lifestyle including a “simple” but effective nutritional approach like the Paleo diet, physical exercise and providing as much other natural resources as possible.

Conclusion: Non communicable, chronic diseases are the dominant health problem in the 21st century worldwide. Scientific effort should not only focus on avoiding negative factors like pesticides, fluoride and aluminum, but should also press for greater attention to compensating factors in case of inevitable exposure. This can be done by remembering and restoring the natural resources mankind has lost so extensively as a result of technical progress and lifestyle changes.

Non-alcoholic fatty liver disease (NAFLD) – epidemic of the 21st century?

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Non-alcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease in the Westernized world, with a prevalence of 25-46 % of the population in the US and Europe. NAFLD is a syndrome ranging from benign steatosis to the histologically defined more severe non-alcoholic steatohepatitis (NASH). Some of the NASH patients will develop cirrhosis and hepatocellular carcinoma. The development of NAFLD is being described as a “multiple-hit-hypothesis”, in which the first hit is ascribed to the enrichment of liver tissue with triglycerides above 5.56 % This stage of benign steatosis is the result of physical inactivity, overweight, and a positive energy balance, which leads to insulin resistance of fat and muscle tissue. This pathology triggers a high fatty acid flux to the liver as well as a significant de novo lipogenesis of carbohydrates, leading to the accumulation of triglyceride in the liver as well as a free fatty acid flux inside this organ (“lipotoxicity”). Several other hits exacerbate a benign steatosis to a more severe steatohepatitis, steatofibrosis and ultimately leading to liver cirrhosis and / or hepatocellular carcinoma: oxidative stress, lipid peroxidation products, metabolic endotoxemia, inflammatory cytokines, and other factors. The synthesis of inflammatory adipokines and hepatokines in NAFLD and even more in NASH increases the insulin resistance ultimately leading to diabetes mellitus type II.

These cytokines of fat and liver tissue trigger the development of macro- and micro-angiopathy increasing the risk for coronary heart and chronic kidney disease.

NAFLD is mostly diagnosed in clinical practice by sonography as blood levels of liver enzymes are of low sensitivity. The “gold-standard” liver biopsy is rarely used because of the known risks associated with this invasive technique. The symptoms of NAFLD are sometimes not evident or, in most cases, unspecific and of minor severity (e. g. lethargy, tiredness, temporal diffuse pain in the abdominal region). As of now there is no known effective pharmacologic therapy. Diabetes medications such as pioglitazone and metformine showed no or only minor effectiveness in clinical studies with NAFLD and NASH patients. The only effective therapy is a permanent lifestyle modification with a weight loss of 5-10 % of body weight, regular physical activity (endurance and resistance exercise) and a dietary pattern based on limiting carbohydrate intake and increasing (unsaturated) fat and protein. Some nutrients like choline, omega-3 fatty acids, taurine, and l-carnitine have shown some benefit in NAFLD patients, based on preliminary clinical studies. This makes a paleolithic-based diet pattern a promising approach in NAFLD, and clinical studies examining the influence of ancestral dietary habits in these patients are eagerly awaited.

Ketogenic diet and cancer – back to the roots?

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Being confronted with the diagnosis “cancer”, one of the most important questions of the patients is about nutrition and how to change their eating behavior in order to aid the healing process. However, the vast majority of physicians “support” the patients with the sole information to eat “healthy” or “on their preference” without providing specific recommendations that take into account the modifications of metabolism accompanying the processes induced by the tumour in its host’s body. Therefore, many patients search the internet or book shops for more information and end up confronted with a bulk of books offering “cancer cures” ranging from eating nothing to drinking only raw vegetable juice, adding several (often very expensive) miracle supplements, etc. Screening the literature, the “evidence-based” knowledge on nutrition of cancer patients is very rare due to a remarkable non-existence of good studies.

Thus, in order to provide recommendations which are based if not on “evidence” but on a scientific rationale, we have to start from the beginning of species-specific nutrition of primates and lately *Homo sapiens sapiens* and to identify the “species-specific” diet, we are genetically adapted to eat. To make the several million years lasting story short, our species-specific diet would have been based on vegetables and fruits as sources of digestible carbohydrates (dCHO) and fibres. Nuts, insects, marrow, organs and meat were sources of protein and fat, resulting in a well-balanced diet with around 100-150 g a day of glucose derived from dCHO, and the remaining calories derived from fat and protein.

Based on this scenario of food eaten over a very long period of humankind, especially in Europe, we could postulate that our metabolism is optimally adapted to a diet rich in saturated as well as omega-3 polyunsaturated fat, rich in animal protein and low in dCHO. Overall, a low insulinemic and inflammatory load was generated with this macronutrient composition which is quite opposite to the modern “Westernized” diet. The latter seems to be positively related with cancer incidence and it is known that cancer patients with high fasting insulin levels or being diabetic and/or having a high inflammatory metabolism are prone to higher rates of cancer recurrence, worse prognosis and higher death rates from malignant disease. Thus, in search for a diet avoiding high carbohydrate load (and corresponding high insulin levels) as well as low in proinflammatory mediators, the “back to the roots” Paleolithic diet might be a perfect choice.

A subtype of the “back-to-the-roots” Paleolithic diet approach is the ketogenic diet (KD) which is characterized by a very high intake of fat accompanied by very low dCHO portions. During a KD the predominant macronutrients (fat and protein) can not only cover the building blocks for ketone and glucose production in the liver, but also serve as direct energy sources for healthy cells (fatty acids and amino acids to be oxidized in the mitochondria). Ketone body formation - a perfect evolutionary mechanism for supporting the enormous energy demands of our brain during starvation - reduces the need for gluconeogenic amino acids not only in a fasting situation but especially in conditions of disease-associated muscle wasting. Cancer is one of these diseases characterized by a high systemic inflammation which often increases gluconeogenesis and hereinafter degradation of muscle. This can lead to the “circulus vitiosus” of specific muscle wasting (sarcopenia) followed by increased weakness, less appetite and food intake, higher need for gluconeogenesis, more muscle degradation etc. The resulting “Anorexia/Cachexia” syndrome is one of the leading courses of death in cancer patients.

Thus a KD should stop the muscle wasting and improve the body composition of the patient. Further, ketone bodies were discussed to be neuroprotective – which could help to fight side effects of cancer therapies and to have anti-

inflammatory properties – a mechanism to improve the situation within the patient’s body and presumably reduce the cancer promoting inflammation. More malignant cancer cells often get “addicted” to glucose for their aggressive growth, and avoiding glucose peaks after meals thus would reduce the fuel for cancer tissue. This, together with a postulated inhibitory effect of ketone bodies on cancer cell metabolism could be a further advantage of a KD for cancer patients in aiding their healing process via changing eating patterns.

In preliminary clinical observations, a stable ketosis correlates with a stable disease, with a higher quality of life and with anecdotal dramatic improvement of progress free survival. Back to the roots in our eating behavior might therefore be a serious option to be investigated in larger cohorts of cancer patients.

Long-term Effects of a Ketogenic Paleo Diet combined with High Intensity Interval Training (HIIT) for weight loss: A Case Report

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Introduction

This case report is based on a self-experiment using a ketogenic Paleo diet and HIIT workouts to reduce my body weight.

The Paleo diet I adopted was based on the dietary habits of our prehistoric ancestors during the Paleolithic era of about 2.5 million years that ended around 10,000 years ago with the development of agriculture and grain-based diets. It excluded grains, modern processed foods, legumes, dairy products, potatoes, processed oils, refined sugar and refined salt.

The ketogenic diet is an isocaloric high fat, moderate protein and very low carbohydrate diet. The diet forces the body to use ketone bodies as primary fuel derived from fats (fat metabolism) instead of glucose derived from carbohydrates (glucose metabolism).

HIIT (high-intensity interval training) is an exercise strategy with alternating periods of short intense anaerobic exercise with less-intense recovery periods.

Case Description

Past history: I had no weight problems for the most part of my life and in 2002 weighed approximately 76 kg (167 pounds, BMI of 21) at a height of 1.86 m

(6.1 feet). At this time I smoked approximately 25 cigarettes per day. In early 2003 when my Mother was diagnosed with cancer, it was a shock to me. My mother was fighting against the cancer, but unfortunately she had lost the battle and died on 31.12.2004.

After her diagnosis I stopped smoking and started to overeat on foods, in particular “junk food”, as a way to treat my emotional stress and frustration. As a consequence, my weight steadily increased until in April 2012 I ended up with a body weight of 150 kg (330 pounds), a BMI of 43 and 40% body fat.

Starting the diet and exercise program: I started with a Low Carb High Fat (LCHF) approach, in which decreasing the carbohydrates and increasing the protein and good fats in my diet was more important than food quality. The beginning was very difficult. Especially the early days of the "sugar withdrawal" (sugar and grain detox) were extreme, and choosing the right foods was a challenge. However, after 2 weeks on this altered dietary regime I already had lost 10 kg (22 pounds) of body weight and felt so good like never before in my life. I also discovered the joy of exercise doing functional HIIT bodyweight workouts using the Tabata Protocol (8 sets of 20s workload followed by 10s rest) three times a week. After 2 months, I had lost more than 20 kg (44 pounds) and after 12 months around 60 kg (132 pounds)

Starting a ketogenic Paleo diet: After 3 months on the LCHF diet I transitioned towards a ketogenic Paleo approach. It really was not easy as it took weeks to get into ketosis and to constantly adjust the diet (carbohydrates and proteins). The ketone bodies were first measured in the urine with Ketostix but later from the blood using a Ketometer which provides a much more accurate measure of “ketosis”.

Results and Conclusion

Administering a ketogenic Paleo diet for approximately one and a half years at present helped me to transition from an obese to a normal-weight person without any significant negative side effects.

Adjusting to the ketogenic Paleo diet led to subjectively noticeable health benefits:

- Significant weight loss of 70 kg (154 pounds) within 15 months
- Enhanced metabolic fat burning and gains of lean body mass
- Improved cognitive performance
- Stronger immune system
- Mental balance and general well-being

- No more food cravings
- No more heartburn
- No more snoring

The biggest difficulty was to implement my new habits into everyday life despite the social environment, which hardly accepted them. Today's environment with its supermarkets, fast food restaurants and processed foods does not make it easy for me. Nevertheless my approach worked for me because I had not to count calories and was able to enjoy unlimited amounts of natural foods that positively and noticeably influence my health.

The efficacy of weight loss programs for the treatment of obesity

Nils Pfeiffer, M.Sc., Ph.D.

A large number of empirical studies have investigated the efficacy of weight loss programs for the treatment of obesity. Several of these studies applied highly structured and comprehensive programs implementing calorie restricted diets as well as the Atkins diet. However, the evidence clearly indicates that the efficacy of these programs is very limited. Maximum mean weight reduction is around 5 kg. Dropout rates during the programs are high. Furthermore, the sustainability of the weight reduction is unclear due to the lack of long term follow-up investigations. If participants were followed-up for longer intervals and if it were possible to include dropouts to the analyses, weight loss programs might turn out to be inefficacious.

Further evidence is needed to understand the reasons for this inefficaciousness. The idea of weight reduction programs that obese individuals eat either too much or the wrong food may be correct. However, the reasons for these eating habits seem to be manifold and to extend from the society to the individual. Weight reduction programs may be subject to fail because their efforts do not and cannot extend beyond the lifestyle and eating habits of obese individuals. Changes within the society and the environment of the individual seem to be necessary for the successful treatment of obesity. The huge consequences and costs of obesity for the society seem to legitimate and push for ambitious steps and interventions at the level of the society in order to curtail the obesity epidemic.

