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## Proceedings of the 3rd annual symposium of the German Society for Paleo Nutrition held in 2015

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# Proceedings of the 3rd annual symposium of the German Society for Paleo Nutrition held in 2015

## **Abstract**

We present the scientific abstracts of the 3<sup>rd</sup> Annual Symposium of the German Society for Paleo Nutrition (*Deutsche Gesellschaft für Paläoernährung e.V.*) which was held on July 26<sup>th</sup> 2015 in Berlin, Germany. The focus of this year's symposium was on the future challenges of human society including topics such as nutritional sustainability, the paleo-deficit syndrome or frailty of the elderly due to body composition changes

## **Keywords**

Ancestral health, anthropocene, epigenetics, high intensity interval training, non-communicable diseases, paleo, paleolithic diet, planetary health

## FOREWORD

### **The contribution of ancestral health to planetary health**

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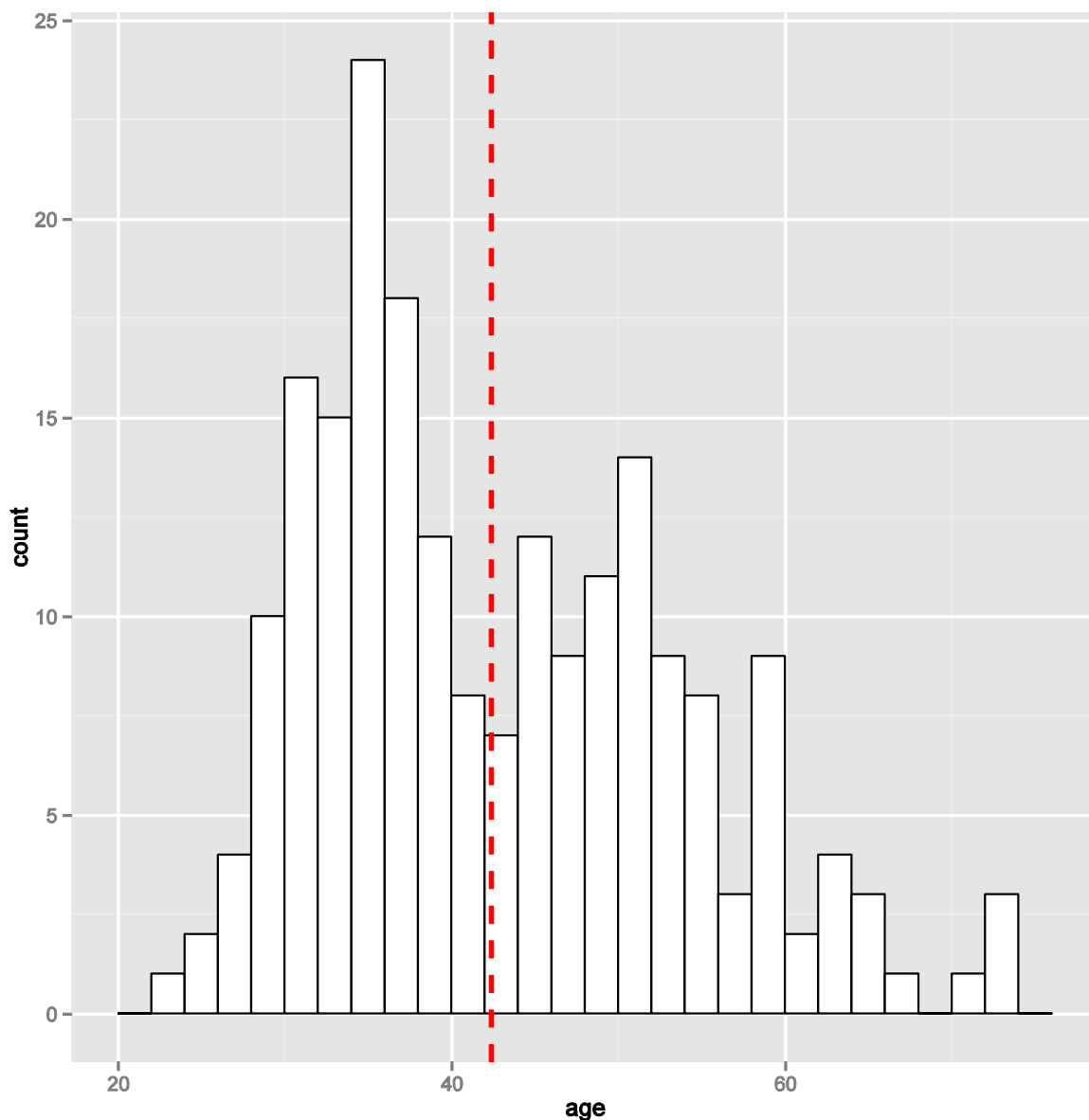
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I am delighted to present the abstracts of the 3<sup>rd</sup> annual symposium of the German Society for Paleo Nutrition which was held on July 26<sup>th</sup> 2015 in Berlin. This year it was a special honor to have Dr. Paul Jaminet as a speaker whose work has certainly influenced many “paleo people” in Germany. Speaking of these people, Figure 1 shows the age distribution of the currently 206 members of our society. The mean age is 42 years with a standard deviation of 11 years which is similar to the age distribution of American followers of a paleo lifestyle estimated from an internet survey [1]. With 59.7% the majority of society members are male, contrary to the American survey participants of which 56% were women, but still far from the stereotype of the male-dominated media image of the “modern caveman”.

Many of the talks given at this year’s symposium made it clear that the paleo diet and lifestyle are not only tools for the individual wishing to improve or maintain his own health but also for society as a whole as an aid for mastering future challenges. An aging population and the rising prevalence of chronic diseases are posing enormous problems for our social and health care systems. However, even more problematic seem to be the rapid changes in our technological, social and natural environment that threaten the future health of human civilization. The recent report of The Rockefeller Foundation–*Lancet* Commission on Planetary Health has identified three categories of challenges that must be addressed in order to guarantee the health of future generations [2]. One of them is knowledge failure such as a failure to identify the social and environmental drivers of ill health and a historical scarcity of transdisciplinary research. Evolutionary medicine and ancestral health, which recognize the mismatch between the modern-day environment and the environment that we are still adapted to [3], are attractive concepts to tackle this challenge because by integrating multiple scientific disciplines they offer natural explanations for health problems that also provide new opportunities

for treatment and – most importantly – prevention [4,5]. What is often overlooked, unfortunately, is the importance that individuals take self-responsibility for their health and that society must provide opportunities to let this happen. In this regard I am again grateful to the editors of the *Journal of Evolution and Health* for providing a platform for education and outreach and publishing these abstracts of our annual symposium.



**Figure 1: Age distribution of members of the German Society for Paleo Nutrition. The red dashed line indicates the mean.**

## **ABSTRACTS**

### **High Intensity Intervall Training**

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High intensity interval training (HIIT) is the new "hype" in the fitness and health industry. Even in performance training of athletes the method becomes more and more common. To delimit HIIT from "normal" interval training the limit of work time of 60 seconds (s) is chosen and the intensity is recommended to exceed 85% of the maximal effort that could be achieved during the working phase. Though not as modern as some people might think it is, the recommendations for its integration are overwhelming in the past few years. The lecture discusses the pros and cons of this training method and gives an overview about the expected effects. The training method has its origin in the endurance training domain, but there is some evidence for specific effects in the resistance training domain. Considering the effects of HIIT on obese people it seems wise to keep the exercise intensity high with relatively short work intervals (<30 s) and long rest intervals (>30 s). If the goal is the improvement of both aerobic and anaerobic fitness the work could increase in time (up to 60 s). While beginners will have adaptations with as little as two work intervals per week, advanced athletes have to perform a much higher volume. Up to three training sessions with up to 20 work intervals per session could be useful. The effects of the training type on different organic systems (heart, muscle, brain) will be debated and possibilities of integrating HIIT in an all-around training scheme are demonstrated at the end of the lecture.

## **Industriell zubereitete Lebensmittel - Fluch oder Segen für 7,4 Milliarden Erdenbürger?**

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Thesen des Vortrags [6,7]:

- Landwirtschaft, Lebensmittelindustrie und Handel bilden die drei Säulen der Food Chain (Stichworte: From Farm to Fork; Wertschöpfungskette).
- Rund 6000 Lebensmittel produzierende Industriebetriebe allein in Deutschland veredeln landwirtschaftliche Rohstoffe zu rund 150000 verschiedenen Produkten. Die Industrie verhält sich dabei artgerecht: sie will und muss trotz gnadenlosem Wettbewerb innerhalb des kapitalistischen Wirtschaftssystems profitabel wachsen. Viele Verhaltensweisen lassen sich dadurch erklären. Und der Konsument fordert nicht nur legales Verhalten, sondern auch legitimes. Die Industrie kann sich nicht von einer Mitverantwortung für Fehlentwicklung bei der Ernährung freisprechen.
- Veredelte, also zubereitete, inhaltlich veränderte Lebensmittel sind trotz berechtigter Kritik aus vielen Gründen unverzichtbar: Haltbarkeit, Verdaulichkeit, Genießbarkeit, Convenience, Außer-Haus-Verpflegung, Economies of Scales-Effekt bei Preisen, Interesse an ständig Neuem, Sporternährung, Astronautennahrung usw. sind ohne tiefgreifende Verarbeitung der Rohstoffe nicht denkbar.
- Unreflektierte Verwendung industriell zubereiteter Lebensmittel kann zu ernährungsphysiologischen Problemen führen. Der mündige, informierte Verbraucher steht im Gegensatz zum kritiklosen Konsumierer, der durch staatliches „nudging“ geschützt werden soll. Auch hier macht die Dosis das Gift.
- Die besonders kritisierten Zusatzstoffe (E-Nummern) werden dank neuer Technologien zunehmend überflüssig. Beispiel: Färbende Lebensmittel anstatt zugesetzter Farben oder physikalische Methoden zur Haltbarkeitsverlängerung an der Stelle chemischer. Stichworte: Clean Label; free from.
- Der Einzelne kann sich bei entsprechender Lebensweise/Planung grundsätzlich problemlos ohne zubereitete Lebensmittel ernähren. Die in den kommenden Jahren Fuß fassende Industrie 4.0 entwickelt sich



parallel zur Ernährung 4.0, die Elemente der historischen Ernährung (1.0 und 2.0) aufgreift; beide 4.0-Modelle sind geprägt durch starke Individualisierung. Die menschliche Ernährung wird immer vielfältiger, die Industrie flexibel bis hin zur Einzelfertigung.

- Ohne Lebensmittelindustrie werden die derzeit 7,4 Mrd. Menschen – im Jahr 2050 sind 9,3 Mrd. prognostiziert – kaum ernährt werden können, schon gar nicht preisgünstig. Im industriellen Maßstab lassen sich Rohstoffe vollständiger verwerten und Verschwendung besser vermeiden.

## **Circadian Rhythms and Human Health**

**Paul Jaminet**

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Circadian rhythms have a huge impact on human health: good entrainment adds about 6 years to life expectancy, and disruption is associated with nearly every human disease. Clocks are important for human biology for the same reason they are essential to computer chips: they facilitate coordination between cooperating elements. Circadian hormones act like prices in an economy, efficiently transmitting information and guiding cellular actions. The five major zeitgebers (time-givers) to the circadian system – light exposure, ambient temperature, social interactions, physical activity, and meal timing – are each individually important for health, and I discuss the optimal management of each. The optimal circadian rhythm entraining lifestyle turns out to look very much like the natural lifestyle of wild animals or Paleolithic humans.

## **Changes and Impact of Body Composition with Age**

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Throughout our lifespan, the body is in a continuous and dynamic state of construction, modification and degradation. Together with other factors, such as age, nutrition and physical activity, these modifications determine our body's composition. Various methods and devices allow the assessment of body composition, ranging from the widely used bioelectrical impedance analysis to dual energy X-ray absorptiometry. The method of choice depends on practicability, cost and aim of the analysis. All methods are generally suitable for all age groups and allow the characterization of body composition in different phases of life. Body mass index (BMI;  $\text{kg}/\text{m}^2$ ), as a ratio of body weight to height, does not consider body composition. Nevertheless, BMI is widely used to classify underweight, normal weight, overweight and obesity; however, there is a greater risk of mortality for older adults at the lower end of the normal weight BMI range of 18.5 – 24.9 [8,9]. Thus, age-dependent BMI categories should be considered. In aging, there is an increase in fat mass and decrease in fat-free mass, including muscle and bone mass. The reduction in metabolically active cell mass results in a reduction of energy requirements [10]; nevertheless, nutrient requirements remain the same or are increased, for example, due to reduced digestive efficiency. Age-associated loss of muscle mass, known as sarcopenia, is associated with impaired function and physical disability and contributes to the frailty syndrome [11]. Novel cut-off values using appendicular lean mass related to body mass index identify patients at risk [12]. Further risk factors associated with aging include physiological changes, physical impairments, dental health, and changes in social environment as well as cognitive and financial status. Taken together, these risk factors contribute to the development of malnutrition, which is known to negatively impact quality of life [13] while significantly increasing health care costs [14]. In the light of our aging population, adequate nutrition and physical activity play a key role in the maintenance of a favorable body composition, physical function and strength and, with that, independence and quality of life in older age.

## **The big picture of Paleo – From a personal diet to environmental recovery**

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A Paleolithic nutrition seeks to omit foods that were introduced through the neolithic. Even though it is often claimed to be low in carbohydrates, the anthropological evidence shows a wide range of macronutrient ratios in the remaining hunter-gatherer cultures [15].

It is proposed that the cause of neolithic diseases involves at least insufficient micronutrient availability. This reduction of micronutrients is in part likely due to industrialized agriculture and concentrated animal feeding [16]. The industrial process of both reduces animal and plant nutrition to a small number of chemicals that are time-tested to yield larger quantities of meat and produce without respecting animal and plant composition and health, which was termed „NPK mentality“ by one of the forefathers of organic farming, Sir Albert Howard [17].

The natural cycle of nutrients flows from the soil to plants and animals, then humans, and from these three back to the soil. With modern agriculture and livestock management, this cycle becomes interrupted. This inevitably leads to nutrient depletion of the soil, unfavorable changes in the physical, chemical and biological structure of the soil, soil erosion, loss of biodiversity and in semi-arid and arid regions of the planet to desertification; desertification is a cause of climate change, not vice versa [18]. The end result is equally disastrous for the planet's ecosystems and humans.

The circle can be reconstituted through methods of farming that have evolved in the past 100 years, mimicking nature. Systems for restorative sustainable agriculture and livestock management for semi-arid and arid areas through permaculture techniques [19], ancient farming methods [20] and use of grazing animals [18] as well as methods of rainforest reforestation [21] are already used and deserve public promotion and further scientific research.

In conclusion, thinking about „paleolithic“ nutrition should always include thinking about the nutrient cycle between soil, animals and plants; health is proposed to be derived from intact nutrient cycles [22], which can only be ensured by following the ways nature evolved for its constituent parts.

## **Palaeolithic environment – the key factor in understanding health and disease in the 3rd millennium**

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Looking at the big picture of evolution, a new age has come up: the Anthropocene. While there is still an ongoing discussion as to whether the term is correct and when it actually started, there is no question that the Anthropocene changed the face of earth, our natural environment for billions of years. In addition, there is no question that changing our environment has changed and will change the global conditions on our planet earth – possibly leading to a variety of catastrophes: warming of the climate, melting of polar and glacier ice, extension of deserts, increasing hurricanes and tsunamis – to mention just a few. Of course, all this may also threaten our health in the future [2].

Astoundingly, there is a complete lack of perception in the public discussion that altering the environment directly influences the health conditions of all beings living in this environment – man included. This relation becomes plausible if we look at the damage done by a natural catastrophe: the greatest damage always results at the centre of the catastrophe. As man is at the middle of the environmental changes induced by himself, he will have to bear the greatest effects. This means that in the centers of civilization (metropolitan areas), where the natural environment is changed to the highest degree, the highest health risks will occur. We call this the “Nature-Deficit-Effect” (NDE) [5]. Even though there is abundant experimental literature about the effects of the environment on the physical and mental health of animals, the next logical step of transferring this knowledge to the health situation of man in the Anthropocene has, so far, not been done on a large scale.

In Western countries, along with the technical progress of civilisation, the results of a reductionist approach in medicine and pharmacology helped to overcome acute diseases and to increase life expectancy. However, despite decades of research, epidemics of obesity, diabetes, depression, cancer, and

other non-communicable diseases (NCD) are growing worldwide each year, both in developed and developing countries, leading to a decrease in healthy life years [23].

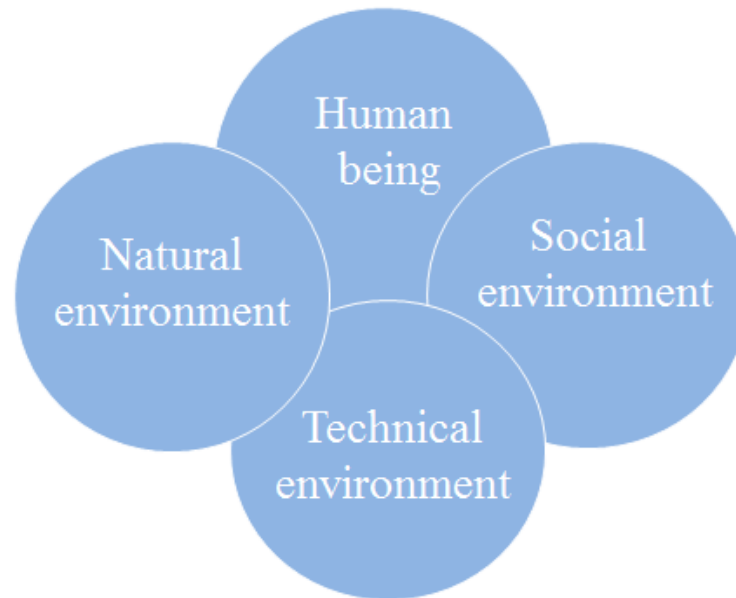


Figure 2: In the third millennium the human environment is composed of different systems. Man has left/altered his natural environment and created a new technical as well as a new social environment. Looking at evolution, the environment may be regarded as a permanent uterus providing the necessary resources for the beings living in this environment.

Mental illnesses are now experienced by a growing number of children and a new approach for their management involves exposing affected children to a natural environment in order to provide them with additional mental resources [24]. The beneficial effect of even a relatively short stay in such a natural environment on the behaviour of these children is clear but unfortunately this approach has, so far, focussed only on the mental aspects of health.

Based on the aforementioned insights, the prevention of NCD needs a new and holistic approach, a systems-prevention taking into account the multiple influences of the surrounding systems (the human environment, Figure 2) on our body and using a multi-factorial approach to overcome the NDE. Compared with the stone-age, we have identified more than 20 different factors (natural resources) which have been lost by the technical progress of civilization within recent decades (Table 1, second to fourth columns). These deficits result in a reduction of organ function, accelerated aging, and a broad range of diseases (NCD) by sabotaging the perfect system of information and logistics in our body – the immune system included.

Non Historical Elements (NHE)	Physical Factors	Nutritional Factors	Social Factors
Herbicides	Gravity	Micronutrients	Meaningful work
Pesticides	Magnetic fields	Minerals	Social bonding
Gen-modified plants	Sunlight	Protein/Amino-acids	Singing, dancing, and music
Xenobiotics	Oxygen	Carbohydrates	Meditation
Toxic metals	Water	Fatty acids	Awareness
Small matter particles	Circadian rhythm	Symbiosis with bacteria and viruses	Senses and perception
Antibiotics	Silence	Fasting	Recreation

**Table 1:** Anthropocene environment: exposure to non-historical elements (NHE, first column) and lost natural resources (Nature-Deficit-Effect, second to fourth columns).

In addition to this NDE, we have to take into account the parallel process of exposing both our environment and ourselves to a growing number of non-historical elements (NHE, Table 1, left column). The exposure to these NHE is leading not only to toxic reactions within our cells but also to similar reactions produced by the missing natural factors: endocrine disruption, disturbed logistics, and epigenetic programming as well as a compromised immune system – to name just a few [25,26]. In consequence, both changes of our environment – the exposure to NHE and the loss of natural resources (NDE) are adding up to the health problems of NCD. This huge epidemic of diseases already exists and is the real environmental catastrophe.

What can be done in this situation? Abandoning all technical progress will not be possible. Instead, we have to use the growing knowledge about the prerequisites for bodily homeostasis to re-introduce and unfold the unparalleled evolutionary capabilities of our human bodies. This can be done by systematically reducing the exposure to NHE in our environment as well as re-naturalizing our environment as much as possible, i.e., according to the “paleo-concept” [3]. If necessary, certain natural factors which are too difficult to obtain/re-introduce in the existing technical environment will have to be substituted for by intelligent solutions – as it has been shown for physical activity and Vitamin D.

### **Conclusion:**

The huge and worldwide epidemic of non-communicable diseases is the real environmental catastrophe and it has already occurred. As man is living in the centre of the environmental changes induced by himself, he has been hit hardest by the consequences. The driving factors of the disaster are the pollution of the environment with non-historical elements and the abundant loss of natural resources, both sabotaging the highly sophisticated logistics and information technology of our body – the immune system included.

As a matter of fact, all beings are dependent on the resources of their environment. Changing the environment has a huge impact on our health. So we suggest that the environment should be regarded as the permanent uterus of all living beings – the human being included. If we change this environment by technical means —as we have done since the Paleolithicum—we have to take care not to destroy the basic requirements for the health and wellbeing of our own species.

## **Eating for the epigenome: How food regulates our genes**

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Our body consists of 70 trillion cells each containing approx. 25.000 genes which encode for proteins that form our body. As both absence of required and presence of no longer required proteins may negatively affect our metabolism, coordinated regulation of gene expression is of pivotal importance for our physical health. Epigenetic mechanisms regulate which genes will or will not be expressed in a specific cell at a specific time. These mechanisms did not affect DNA-sequence, are reversible and inheritable over at least two generations. As has been reported in the Dutch famine study [27], women who were pregnant during the 'Hunger Winter 1944/45' gave birth to significantly smaller children. Interestingly, grandchildren were also significantly smaller, although they have been sired in times with sufficient food suggesting that their genetic material carries information from their grandparents.

The interaction between food and gene expression has been demonstrated by Wolff and coworkers [28] reporting that genetically identical mice show a

different phenotype depending on the mother's diet during pregnancy. While offsprings from Agouti-viable-yellow (Avy) mice with normal diet become obese and diabetic and were prone to cancer during adulthood, mice receiving a diet supplemented with various B-vitamins gave birth to healthy littermates. Subsequently, it has been demonstrated that a folate-deficient diet of the paternal mice has also negative effects on the offsprings [29]. This is in line with data from our research suggesting that sperm at fertilization transfers not only genetic information to the oocyte, but also epigenetic marks which serve as a kind of manual for the oocyte how to handle sperm chromatin [reviewed in 30].

Currently, the best-studied epigenetic mechanisms comprise methylation of DNA and various modifications of histones. DNA methylation solely occurs at cytosine that is followed by guanine (CpG-island) within gene promoter regions and is always associated with gene silencing. Methylation, acetylation and phosphorylation of DNA-binding histones, in contrast, have both activating and repressing potential on gene expression depending on the type of modification and the number of amino acids affected. While B-vitamins act as methyl-group donors which are involved in epigenetic gene regulation, secondary plant metabolites (e.g. carotinoides, glucosinolates, polyphenols, sulfides) represent another major player with anti-oxidative, anti-microbial, anti-inflammatory and anti-cancer potential [reviewed in 21–25]. Most metabolites studied so far affect enzymes which transfer chemical groups to DNA and/or histones, e.g. DNA methyl-transferase (DNMT), histone acetyl-transferase (HAT) and histone deacetylase (HDAC). Interestingly, modulation of gene expression is possible even during adulthood, as has been demonstrated in men with low-risk prostate cancer [36]. Within only three months, a consequent change in nutrition and physical activity resulted in up-regulation of 48 genes and down-regulation of 453 genes within the prostate tissue. These data demonstrate that everyone can become active for his/her health until old age.

## REFERENCES

- [1] Schwartz DB, Stapell HM. Modern Cavemen? Stereotypes and Reality of the Ancestral Health Movement. *J Evo Health* 2013;1:3.
- [2] Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, Ferreira B, et al. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. *Lancet* 2015;S0140–6736(15)60901–1.
- [3] Logan AC, Katzman MA, Balanzá-Martínez V. Natural environments, ancestral diets, and microbial ecology: is there a modern “paleo-deficit disorder”? Part I. *J Physiol Anthropol* 2015;34:1.



- [4] Klement RJ, Albers T, Kämmerer U, Konefal PM, Pfeiffer N, Spitz J. Proceedings of the 1st annual symposium of the German Society for Paleo Nutrition held in 2013. *J Evo Health* 2013;1:5.
- [5] Klement RJ, Gonder U, Orsó E, Paul S, Schilling F, Spitz J. Proceedings of the 2nd annual symposium of the German Society for Paleo Nutrition held in 2014. *J Evo Health* 2013;1:6.
- [6] Hamatschek J. *Lebensmittelmanagement*. 1st ed. Stuttgart: UTB GmbH; 2013.
- [7] Hamatschek J. *Lebensmitteltechnologie*. 1st ed. Stuttgart: UTB GmbH; 2015.
- [8] Andres R, Elahi D, Tobin JD, Muller DC, Brant L. Impact of age on weight goals. *Ann Intern Med* 1985;103:1030–3.
- [9] Winter JE, MacInnis RJ, Wattanapenpaiboon N, Nowson CA. BMI and all-cause mortality in older adults: a meta-analysis. *Am J Clin Nutr* 2014;99:875–90.
- [10] Bosy-Westphal A, Eichhorn C, Kutzner D, Illner K, Heller M, Müller MJ. The age-related decline in resting energy expenditure in humans is due to the loss of fat-free mass and to alterations in its metabolically active components. *J Nutr* 2003;133:2356–62.
- [11] Janssen I, Heymsfield SB, Ross R. Low relative skeletal muscle mass (sarcopenia) in older persons is associated with functional impairment and physical disability. *J Am Geriatr Soc* 2002;50:889–96.
- [12] Spira D, Buchmann N, Nikolov J, Demuth I, Steinhagen-Thiessen E, Eckardt R, et al. Association of Low Lean Mass With Frailty and Physical Performance: A Comparison Between Two Operational Definitions of Sarcopenia--Data From the Berlin Aging Study II (BASE-II). *J Gerontol A Biol Sci Med Sci* 2015;70:779–84.
- [13] Norman K, Kirchner H, Lochs H, Pirlich M. Malnutrition affects quality of life in gastroenterology patients. *World J Gastroenterol* 2006;12:3380–5.
- [14] Müller MC, Uedelhofen KW, Wiedemann UCH. *Mangelernährung in Deutschland*. Munich: 2007.
- [15] Cordain L, Miller JB, Eaton SB, Mann N, Holt SHA, Speth JD. Plant-animal subsistence ratios and macronutrient energy estimations in worldwide hunter-gatherer diets. *Am J Clin Nutr* 2000;71:682–92.
- [16] Davis DR, Epp MD, Riordan HD. Changes in USDA food composition data for 43 garden crops, 1950 to 1999. *J Am Coll Nutr* 2004;23:669–82.
- [17] Howard SA. *Agricultural Testament*. Oxford: Oxford University Press; 1943.

- [18] Savory A. *The Grazing Revolution: A Radical Plan to Save the Earth*. TED Conferences; 2013.
- [19] Birnbaum J, Fox L, Hawken P. *Sustainable Revolution: Permaculture in Ecovillages, Urban Farms, and Communities Worldwide*. North Atlantic Books; 2014.
- [20] Jeska A. *Der Mann, der die Wüste aufhielt: Die Geschichte von Yacouba Sawadogo*. 2nd ed. Adlerstein-Verlag; 2014.
- [21] Smits W. *How to restore a rainforest*. TED Talks; 2009.
- [22] McCarrison R. *Nutrition and health being the Cantor lectures delivered before the Royal Society of Arts, 1936, together with two earlier essays*. London: Faber and Faber; 1961.
- [23] Vos T, Barber RM, Bell B, Bertozzi-Villa A, Biryukov S, Bollinger I, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;386:743–800.
- [24] Louv R. *The nature principle. Human restoration and the end of nature-deficit disorder*. 1st ed. Chapel Hill; 2011.
- [25] Trasande L, Zoeller RT, Hass U, Kortenkamp A, Grandjean P, Myers JP, et al. Estimating Burden and Disease Costs of Exposure to Endocrine-Disrupting Chemicals in the European Union. *J Clin Endocrinol Metab* 2015;100:1245–55.
- [26] Rosenblum MD, Remedios KA, Abbas AK. Mechanisms of human autoimmunity. *J Clin Invest* 2015;125:2228–33.
- [27] Lumey LH, Stein AD, Kahn HS, Van der Pal-de Bruin KM, Blauw GJ, Zybert P a., et al. Cohort profile: The Dutch Hunger Winter families study. *Int J Epidemiol* 2007;36:1196–204.
- [28] Wolff GL, Kodell RL, Moore SR, Cooney C a. Maternal epigenetics and methyl supplements affect agouti gene expression in Avy/a mice. *FASEB J* 1998;12:949–57.
- [29] Lambrot R, Xu C, Saint-Phar S, Chountalos G, Cohen T, Paquet M, et al. Low paternal dietary folate alters the mouse sperm epigenome and is associated with negative pregnancy outcomes. *Nat Commun* 2013;4:2889.
- [30] Schagdarsurengin U, Paradowska A, Steger K. Analysing the sperm epigenome: roles in early embryogenesis and assisted reproduction. *Nat Rev Urol* 2012;9:609–19.

- [31] Link A, Balaguer F, Goel A. Cancer Chemoprevention by Dietary Polyphenols: Promising Role for Epigenetics. *Biochem Pharmacol* 2010;80:1771–92.
- [32] Choi S-W, Friso S. Epigenetics: A New Bridge between Nutrition and Health. *Adv Nutr* 2010;1:8–16.
- [33] Sharmila Shankar, Dhruv Kumar and RKS. Epigenetic Modifications by Dietary Phytochemicals: Implications for Personalized Nutrition. *Pharmacol Ther* 2014;138:1–17.
- [34] Heerboth S, Lapinska K, Snyder N, Leary M, Rollinson S, Sarkar S. Use of epigenetic drugs in disease: An overview. *Genet Epigenetics* 2014;1:9–19.
- [35] Shukla S, Meeran SM, Katiyar SK. Epigenetic regulation by selected dietary phytochemicals in cancer chemoprevention. *Cancer Lett* 2014;355:9–17.
- [36] Ornish D, Magbanua MJM, Weidner G, Weinberg V, Kemp C, Green C, et al. Changes in prostate gene expression in men undergoing an intensive nutrition and lifestyle intervention. *Proc Natl Acad Sci U S A* 2008;105:8369–74.