The multiple faces of the human immune system
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Chapter 3. Lifestyle intervention

Paragraph 3.1
Chronic low-grade inflammation and insulin resistance are intimately related entities that are common to most, if not all, chronic diseases of affluence. We hypothesized that a short-term intervention based on ‘ancient stress factors’ may improve anthropometrics and clinical chemical indices. In this paragraph we investigated whether a 10-days-mimic of a hunter-gatherer lifestyle favourably affects anthropometrics and clinical chemical indices. Fifty-three apparently healthy subjects and two patients with fibromyalgia (22–69 years, 28 women), in 5 groups, engaged in a 10-day trip through the Pyrenees. They walked 14 km/day on average, carrying an 8-kilo backpack. Raw food was provided and self-prepared, while water was obtained from waterholes. They slept outside in sleeping bags and were exposed to temperatures ranging from 12-42 °C. Anthropometric data and fasting blood samples were collected at baseline and the study end. We observed median decreases (p≤0.002) of body weight (-3.5 kg), BMI (-1.1 kg/m²), hip (-3 cm) and waist (-5 cm) circumferences, glucose (-0.6 mmol/L), HbA1c (-0.1%), insulin (-4.7 pmol/L), HOMA-IR (-1.2 mmol*mU/L²), triglycerides (-0.14 mmol/L), total cholesterol (-0.7 mmol/L), LDL-cholesterol (-0.6 mmol/L), triglycerides/HDL-cholesterol ratio (-0.55 mol/mol) and FT3 (-0.8 pmol/L). Changes in anthropometrics were unrelated to changes in clinical chemical indices, except for FT4 and FT3. ASAT (11 IU/L), ALAT (6 IU/L), ASAT/ALAT ratio (0.14) and CRP (0.56 mg/L) increased, and their changes were interrelated. We conclude that coping with ‘ancient mild stress factors’, including physical exercise, thirst, hunger and climate, may influence immune status and improve anthropometrics and metabolic indices in healthy subjects and patients with fibromyalgia.
Future perspectives

Many CNCDs are considered ‘incurable’ because of a reigning ‘one cause’ dogma. This way of thinking was inspired by Louis Pasteur (1822–1895), who showed that an infectious disease originates from a single causal factor. This factor can be demonstrated and eliminated by specific treatments. However, the ‘germ theory of disease’ merely states that some diseases are caused by infectious agents. It is our believe that CNCDs will not become cured if we keep insisting on mono-etiological backgrounds. We suggest that CNCDs are caused by multi-metabolic anthropogenic risk factors, which not only include individual lifestyle factors such as smoking, lack of exercise and high calorie diets, but also more distant political, economic, social, cultural and even evolutionary risk factors. Our view is largely in line with the papers of Egger et al. (Egger 2012, Egger 2014a, Egger 2014b). With the exception of diseases with primary causes in genetics (‘inborn errors’) it seems theoretically possible that each of us is able to enjoy ‘healthy aging’ and to ultimately die from old age. However, the future does not seem favourable: the number of anthropogenic factors is likely to increase. Several of these adverse factors seem inevitable and most of us have little ability to influence them in an effective manner. We nevertheless believe that prevention remains the most effective manner to ‘solve’ CNCDs. These preventive measures may aim at resilience against the toxic triggers of modern life. The best choice would be regular exposure to hormetic triggers, as shown in our pilot intervention named the ‘Study of origin’ (Chapter 3). It is not difficult, and may even be enjoyable, to include some of these intermittent hormetic triggers in daily life. There is increasing support for the health effects of ‘intermittent living’, including intermittent fasting (Barnosky 2014), intermittent hypoxia (Duennwald 2013), intermittent sitting (Henson 2015) and intermittent heat (Laukkanen 2015). We suggest that future studies may aim at such interventions, and that funds will be made available for these aims. There is, however, one hesitation: the outcomes of these interventions may at most demonstrate that Darwin was right when he coined his view that ‘organisms adapt to the conditions of existence’. Thus what is the need to await their outcomes: the future starts today.
References


