SYSTEMS-PREVENTION: A NEW ASPECT OF ENVIRONMENTAL HEALTH

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SUMMARY: ***Introduction:*** **In recent decades, a growing body of evidence has established that pollution of the natural environment with nonhistorical compounds results in toxic effects and endocrine disruptionon a large scale. Unfortunately these findings have not led, so far, to any noteworthy reduction of worldwide environmental pollution. Furthermore, pollution is not the only problem of civilization. In addition to the exposure to nonhistorical elements, we are suffering from a large loss of resources from our natural environment. The combined effect of these two synergistic negative aspects is the basis for many noncommunicable diseases (NCD). As a consequence, effective preventive measures require a systems-prevention approach, in which there is consideration of both personal lifestyle and different aspects of the surrounding environment in a systematic manner.** ***New scientific results as a basis for systems-prevention:*** **From the decoding of the human genome we have learnt that, rather than cell function being ruled by genes, the functioning cell uses the genes in the nuclear DNA like a library, accessing whatever genes are required at a particular time. This new concept, epigenetics, allows us to induce inheritable changes in how thegenes in the DNA are read, with the genes themselves in DNA remaining unchanged. Interestingly, quite a lot of epigenetic signaling is induced by environmental factors, e.g., the ingredients of our food like micronutrients, the influence of gravity which is not only on muscle cells, vitamin D from the UVB radiation, and the circadian rhythm generated by light and darkness. These environmental factors are needed for the highly complicated cell signaling system of our body, including the immune system, our information technology and logistic system. Meanwhile more than 20 natural resources are known to have been lost, a phenomenon we have called the nature deficit effect. Furthermore, our body is not a single being but a symbiotic community consisting of billions of human cells and trillions of bacteria, viruses, and fungi distributed all over our body and, above all, in our gut: a microcosm, organized in a unique manner, in the macrocosm of the universe. It is now no longer possible to practice medicine or prevention in a reductionist way. Instead, we are challenged to develop a new holistic approach, as is done in systems-biology, in order to understand how our highly sophisticated and efficient body works as a part of the universe. This can be done by thoroughly analyzing our environment which is composed of three different systems: 1) the ancient environment of Mother Nature; 2) the new man-made environment of civilization; and 3) the environmental system of social bonding and human culture.** ***Conclusion :*** **Along with the progress in medicine and pharmacology, the reductionist approach helped to increase life expectancy. However, despite 40 years of research, epidemics of obesity, diabetes, and cancer are growing each year worldwide, both in developed and developing countries, leading to a decrease in healthy life years. Based on the aforementioned insights, the prevention of NCD needs a new and holistic approach, like systems-prevention, taking into account the influences of the surrounding systems (the human environment) and using a multi-factorial approach to overcome the nature deficit effect from the loss of natural resources. This can be done by combining the reduction of the exposure to nonhistorical elements and by re-naturalizing the human environment according to the "paleo- or stone ageconcept," as far as this is still possible in the 21st century. If necessary, certain natural factors which are too difficult to obtain/re-introduce in the technical environment will have to be substituted for by intelligent solutions, as already occurs for physical activity, micronutrients, and vitamin D.**

Keywords: Epigenetics; Nature deficit effect; Noncommunicable diseases (NCD); Nonhistorical compounds; Preventive medicine; Systems-prevention;

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