

Happy and positive aging is programmed in early childhood

There is no doubt that one of the strongest prerequisites of happy aging is good health, both physical and mental. As Schopenhauer once said, 90 percent of our happiness depends on our health. Thus, older people who are fortunate to experience healthy lives are often perceived as either lucky or as wise people who have used all of their wisdom and life experiences to: 1) keep what nature has given them, and 2) enhance their health potential with appropriate life styles including physical activity, healthy nutrition, moderate drinking or even abstinence, etc. Such perceptions are supported by family doctors and official medicine in general. On the other hand, life is full of examples that tell us the absolute opposite. We see individuals with extremely high serum cholesterol paying no attention to their diet, having no signs of arteriosclerosis, while many others who are taking all possible precautions start to experience problems when they turn 50-55 years old.

The most probable reason for this contrasting experience is usually seen in genetic predisposition, which is correct, but only to a certain extent. General knowledge says that manifestation of predisposition is conditioned by environmental influences. But recent developments in human biology suggest that the environment may be a much more important factor than it was considered previously. The reason is in epigenetic marks that are imposed on our nuclear genetic material (chromatin) as the result of both parent effects and reactivity to environmental cues. The so-called parent-of-origin effects occur when the phenotypic effect of an allele depends on whether it was inherited from an individual's mother or from the father. Thus, our parents may influence many peculiarities of our body and mind beyond merely transmitting about 20,000 genes from each side, while epigenetic marks may depict their own life experiences. This may lead to programming of many functions of the organism which may be attributed as transgenerational effects.

Other recently discovered effects link together early life events with later-in-life body, mind, health and disease peculiarities. Early periods and turning points of life that are especially important are in-utero, moment of birth, and early childhood periods. The biological meaning of epigenetic marks is that the environment generates different signals (including nutrients, metabolites and stress-hormones) that can program later in life functions so that they will correspond with early life conditions. The organism is making a forecast about what conditions will be present in later life (rich or poor with food, stressful or quiet, dangerous or friendly) and provides an individual with corresponding faculties (metabolism type, fat reserve deposit, behavioral peculiarities, etc.) Thus, obesity in adulthood and older age may be the result of thrifty genes due to hunger in-utero or even the hunger of parents during their childhood. Mental health and behavioral disorders may result from early life stress, including in-utero (mother stress). There are also many signs of epigenetic and transgenerational effects of environmental hazards (including alcohol and smoking) and helpful microelements, vitamins and other biologically active nutrients.

It is interesting that in the early days of genetics as a science these views were expressed by many authors (though not supported by findings about the molecular machinery). Then, with the discovery of DNA structure, gene-centric thinking strongly prevailed, pushing thoughts about environmental impacts away as a genetic heresy. Now, one of the publications on the topic was titled "It's an environment, stupid!" So, environmental considerations really are more important.

This shift creates a new reality and new medicine. This knowledge helps us understand the importance of life conditions, life styles, healthy nutrition, positive relations, physical activity and many other conditions which are usually promoted for both children and older people. On the other hand, this understanding tells us how important it is to start in the early childhood and how much depends on the parents. Of course, a lot can be changed due to conscious activity of the individual, so far as epigenetics continues to work throughout life. Thus, good examples displayed by older people may have a strong effect on the youngest, who are willing to use this information and benefit from it.

For further reading – see attachments.

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