

Breath and Chi

Over my 26 years of practising Tai Chi I have often pondered the connection between breath and Chi. As an engineer I have had my doubts about the metaphysical explanations that the Chinese make. The following contains information that I have gleaned from years of reading the biology articles in that excellent magazine New Scientist. I am not a biologist so I have drawn my own conclusions as to the possible linkage. The explanations are a brief overview and more detailed information can be obtained from proper biology sources.

Science has now discovered two mechanisms that link proper breathing with improved health and longevity.

It has been shown that slow, measured breathing reduces stress, resulting in a healthier, longer life. An examination of cell replication reveals how this could work. A chromosome is a structure, in all living cells, that consists of a single molecule of DNA bonded to various proteins that carry the genes determining heredity. In all eukaryotic cells the chromosomes occur as threadlike strands in the nucleus of the cell. Chromosomes have telomeres at each end, to protect the chromosomes from deterioration. As the cells divide, some telomeres are lost. Eventually the shortening of the telomeres causes faulty cell division, leading to cell death and subsequent medical problems. It has also been shown that reducing stress inhibits the shortening of telomeres, hence the connection between slow, measured breathing and improved health.

The body requires energy to enable the functioning of nerves, muscles and the brain. Scientists have determined that this energy comes from the mitochondrial process which produces Adenosine Triphosphate (ATP). ATP is a nucleotide that is the primary source of energy in all living cells. Its function is to donate a phosphate group during biochemical activities. Every cell in our body contains numerous mitochondria, making up to 10% of our body weight. The mitochondria take nutrients and oxygen from the blood then, through a complex series of reactions, produce water, carbon dioxide, heat and ATP.

In conclusion, proper breathing reduces faulty cell division and, by increasing the amount of oxygen in the blood, assists in increased production of ATP energy - Chi, and consequently a healthier person.