An optimum intake of micronutrients and metabolites, which varies with age and genetic constitution, would tune-up metabolism and give a marked increase in health at little cost, particularly for the poor and elderly. 1) DNA damage. Inadequate intake of folic acid causes millions of uracils to be incorporated into the DNA of each cell, with associated chromosome breaks: a radiation mimic. Deficiencies of the metabolically connected vitamins B6 and B12, which also are widespread, cause uracil incorporation, and chromosome breaks. Inadequate iron intake (2 billion women in the world; 25% of U.S. menstruating women) causes oxidants to leak from mitochondria and damages mitochondria and mtDNA. Inadequate zinc intake (about 10% in the U.S.) causes oxidation and DNA damage in human cells and disables several zinc containing repair systems, such as p53; consequently, the cell cannot repair the DNA damage. 2) The Km concept. About 50 different human genetic diseases due to a poorer binding affinity (Km) of the mutant enzyme for its coenzyme can be remedied by feeding high dose B vitamins, which raise levels of the corresponding coenzyme; many polymorphisms also result in a lowered affinity of enzyme for coenzyme. 3) Mitochondrial oxidative decay with age. This decay, a major contributor to aging, can be ameliorated by feeding old rats the normal mitochondrial metabolites acetyl carnitine (ALCAR) and lipoic acid (LA) at high levels. They restore the Km for ALCAR transferase and the velocity of the reaction, mitochondrial function, lower oxidants, neuron RNA oxidation, and mutagenic aldehydes, and they increase old rat ambulatory activity and cognition.

References:


