



The Metabolic Tune Up and Disease Prevention

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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 (K_m) 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 K_m 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:

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