

Sepp PORTA

Magnesium-Catecholamine Interaction in Stress

Abstract

Magnesium availability in food gets more and more restricted because acidic rain depletes it from the upper strata of the soil, so that its uptake by plants gets smaller. This seems to create a limiting step in glycogenolysis and gluconeogenesis in man and animal, whereby increased sugar demand in stressful situations is only slowly met, because Mg is necessary for most of enzymatic catalyses in those processes. A field experiment should underline those assumptions:

Since we could show (Porta et al. 1997), that some effects of catecholamines, like changes in base excess, are linearly proportional to catecholamine levels, we used them as screening parameters. By measuring 10 different, stress related parameters, we were able to get a whole pattern of the effects of stresses of different intensity and duration in the more or less immediate past, underlining the important role of Mg in stress.

Material and methods: Of 26 young volunteers on national service 50 µl of capillary blood were taken just after light gymnastics and 3 minutes of jogging. Bicycle ergometry up to 200 watts (post stress provocation test, Porta et. al. 1993) was superimposed immediately, followed by a second blood sampling for determination of electrolytes, blood gases and lactate. A group of 20 more volunteers who did not undergo immediate previous stress, but sleep depriving night exercises followed by a field combat maneuver some hours beforehand, underwent the same procedure.

Most important results and conclusions: Ionized Mg was low in the first group and much higher in the second group, a feat not due to diet but to previous stress. Linear correlation between the parameters were the more plentiful, the higher the intensity of accumulated stress has been. Moreover, characteristic stress related interparameter correlation pattern (ICP) evolved, whereby Mg played an important role. Consequently, we formed 3 new subgroups, regardless of the previous workload, only characterized by the fact, of an increasing or decreasing or stable reaction of ionized Mg to the ergometric test. Average values, correlation numbers and ICPs pointed to the fact, that the increasing Mg group consisted mainly of subjects in a significant better bodily shape than in the decreasing group.