

Effective applications of bio-markers predicting subnormal metabolic/ health status in human subjects for the outcome research of intervention studies towards personalized nutrition/ drug usage

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To establish the society of longevity with full physical activity and quality of life, novel and effective measures to support the people to select their own appropriate lifestyle are desired, with an appreciation of individualized food choice and dietary practice, combined with considered drug usage. We have been conducting a systematic approach to seek effective bio-makers that should indicate metabolic/health status of a subject and predict a risk for lifestyle-related diseases, and thus enable us to evaluate the outcome of the measures for health promotion/ disease risk reduction. The validity of such bio-markers will be established only after comprehensive clinical researches which take into account the individual variations of health-related profiles including diet history, eating behavior, physical activities, and genetic polymorphisms.

Comprehensive search for postprandial hyperglycemia-related biomarkers by microarray analyses of blood cell transcriptomes in rodent models of diabetes and obesity revealed that postprandial hyperglycemia was closely associated with the increases in the expression of the genes coding inflammatory cytokines and chemokines, such as IL-1 β and IL-6. A cross-sectional study conducted in collaboration of community health check-up programs and a health evaluation/ promotion center showed that both IL-1 β and IL-6 levels in the plasma are good indices of subnormal blood glucose and insulin resistance, while plasma adiponectin level is a good predictor of obesity and hyperinsulinemia in middle-aged men. Analysis of single nucleotide polymorphisms (SNPs) of the subjects showed that the subcutaneous and abdominal fat areas are affected by SNPs of UCP2 and adiponectin genes, respectively, but these effects were prominent only in the groups who consumed a large amount of fat. A recently conducted randomized controlled trial for the impact of personalized nutrition counseling supported the notion that plasma adiponectin level is a good predictor of risk reduction for metabolic disorders related to abdominal obesity.