持久運動による若年期からの肥満予防－糖化・酸化ストレスと最終糖化産物（AGE）との関連

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Association of Advanced Glycation End-products (AGEs) in Blood with Amount of Body Fat, Glucose and Lipid Metabolism in Obese Young Subjects

by

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ABSTRACT

The present study was designed to investigate the association of serum advanced glycation end-products（AGEs）with body fat, glucose and lipid metabolism in obese young subjects and to examine the effects of instruction in improvement in diet and physical activity on the formation and accumulation of serum AGEs in 6 months. Forty-six young obese students（21 ± 3.0yr, body weight: 83.2 ± 18.1kg, BMI: 28.9 ± 5.4kg/m^2, body fat: 23.5 ± 10.4kg）were recruited into the present study. Serum total cholesterol, HDL-cholesterol, triglyceride, fasting glucose, insulin, adiponectin, leptin and reactive oxygen metabolite（ROMs）levels were determined in all participants. Insulin resistance was assessed using Homeostasis Model Assessment（HOMA）-index. AGEs（3-DG, Pentosidine, and CML）were also evaluated in plasma by immunoassay. Six months after instruction, the measurement was repeated. Positive correlations of serum CML levels with HOMA-index（p=0.029）and with reactive oxygen metabolite levels（p=0.005）were

observed. Six months after instruction, body weight, BMI, body fat, fasting glucose, plasma ROMs were significantly reduced in subjects who could be followed up（n=8）. Especially, positive correlations of decrease in CML levels with decrease in %body fat（p=0.007）were observed. These data indicate the presence of formation of circulating AGEs associated with latent insulin resistance and systemic oxidative stress in young obese adolescents without evident diabetes. And, in an early stage of life in obese subjects, life style modification（healthy diet and exercise training）might result in reduction in circulating AGEs formation accompanied with improvement in body composition and insulin resistance, possibly leading to prevention of the development of arteriosclerosis.

要　旨

46名の若年肥満学生（21±3.0歳，体重：83.2±18.1kg，BMI：28.9±5.4 kg/m^2，体脂肪量：23.5±10.4kg）に対して，Advanced glycation end-products （AGEs）成分（3-デオキシグルコソン（3-DG），ペントシジン，カルボキシメチルリジン（CML））と，体組成や糖脂質代謝，アディポサイトカイン（アディポネクチン，レプチン），活性酸素との関連を検討した．さらに，運動・栄養指導6ヶ月後の体組成の変化やAGEs成分を含めた動脈硬化への影響について検討した．血清CML濃度はインスリン感受性の指数や活性酸素量と正の相関を示した．指導の6ヶ月後には，体重，BMI，体脂肪，空腹時血糖，活性酸素量に有意な減少が認められる一方，血清CML濃度に関しては全体に減少傾向が認められた．また，血清CML濃度の減少量と体脂肪率の減少程度との間に有意な相関を認めた（p=0.007）．以上より，若年肥満者では，AGEs成分がインスリン抵抗性や活性酸素量に応じて形成・蓄積される一方，減量やインスリン抵抗性の改善に伴いその蓄積も軽減されることが示唆された．