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HUMAN SPECIFIC ENERGY-CONSUMPTION TYPE SNP OF OBESITY GENES OCCURRED AFTER DIVERGENCE FROM APES

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PURPOSE: Obesity genes are associated with lipolysis (adrenergic receptor β genes; ADRB2 and ADRB3), thermo-genesis (uncoupling protein gene; UCP-1) or accumulation of fat (peroxisome proliferaor-activated receptor gene; PPARG). It is well known that energy-consumption or thrifty type depends on the single nucleotide polymorphisms (SNP) in these obesity genes. In human, wild type SNP in both of ADRB2 and ADRB3 genes are suggested to be energy-consumption type because of their major frequencies among ethnic populations. In order to know the wild type of the obesity genes among primates, the SNP of these genes in the non-human primates were examined by RFLP and DNA sequencing. RESULTS: Interestingly all non-human primates (38 chimpanzees, 8 gorillas, 15 orangutans, 108 macaques and 3 the New world monkeys) had thrifty type SNPs (Arg64 in ADRB3, Gly16 and Glu27 in ADRB2). The nonsynonymous changes in ADRB3 were higher than synonymous changes in human compared with chimpanzee. The SNP of other obesity gene of PPARG (the protein related to the differentiation to adipose tissues) was also thrifty type (Pro12) among all non-human primates.
Conclusion: From these results it was concluded that only human had energy-consumption type SNP of these obesity genes after divergence from apes (Trp64 in ADRB3, Arg16 and Gln27 in ADRB2 and Ala12 in PPARγ).

Keywords: Obesity gene, ADRB3, ADRB2, PPARG