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Laughter up-regulates the genes related to NK cell activity in diabetes

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ABSTRACT

To elucidate the sustainable effects of laughter on gene expression, we recruited type 2 diabetic patients who were in-patient for receiving self-management education and examined time-dependent regulation for gene expression by laughter. Two-day experiment was performed. On one day, the patients watched comic video and laughed together with hospital staffs. On the other day, they participated in an inpatient diabetes educational program. Blood samples were collected before and 1.5, 4 h after watching comic video or spending lecture time, and changes in gene expression were comprehensively analyzed by microarray technique. Of the 41,000 genes analyzed, the laughter relatively up-regulated 39 genes, among which, 27 genes were relatively increased in the expression for all the observation period after watching comic video. By functional classification of these genes, 14 genes were found to be related to natural killer cell activity. No genes were included that are directly involved in blood glucose regulation, though successive suppression of postprandial blood glucose levels was observed. These results suggest that the laughter influences the expression of many genes classified into immune responses, and may contribute to amelioration of postprandial blood glucose elevation through a modulation of NK cell activity caused by up-regulation of relating genes.

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