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Gene Expression in Liver of Mouse by High-fat Diet

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Liver is very important tissue in lipid metabolism. It secretes extra energy to LDL form and secreted LDL was accepted in adipose tissue. It also causes fat accumulation in adipose tissue. This fat accumulation is related to obesity. Fat is disease as well as obesity. One of diseases in liver is fatty liver. Fatty liver is caused alcohol, over nutrient, diabete etc. In this study, we attempted to search which were differently expressed in liver of mouse feeding high-fat diet. In order to investigate gene expression difference in liver by dietary nutritious difference, we used C57/BL6 control group and db-/db-mouse group, and fed control diet and high-fat diet for 4 weeks, respectively. Each of control and high-fat diet contained 11.7% and 59.7% fat, respectively. Weight and adipose tissues were increased in high-fat diet feeding mouse but liver was increased a little. In blood, the amount of cholesterol was increased but TG and free fatty acid were not in C57/BL6. But TC, TG and free FA were all significantly increased in db-/db-mouse. As a result of microarray, 1.5% of total genes was affected by high-fat diet in C57/BL6, but about 5.57% genes were affected in db-/db-mouse. To identify microarray result, MEST3, Wnt7b and Ptk9l genes expression were performed by RT-PCR. MGST3 gene expression was increased whenever degree of obesity was increased, but wnt7b was decreased. This study was shown that many genes were affected by nutritious condition difference.

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Gene Expression in Hypothalamus of Mouse by High-fat Diet

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Obesity is caused by imbalance of energy intake and expenditure. If energy intake is more than its expenditure, body does fat accumulation and affect body weight. According to Williams(1972), it can be fetal disease although obesity is not disease in itself. Central regulatory system is affected by many neurotransmitter regulating food intake in brain. Hypothalamus was known as one of food intake regulation in CNS. It acts as feedback mechanism. When we eat food, stomach secretes serotonin. When it works at brain, the blood-sugar level increases. Insulin is secreted by the blood-sugar level increase and this insulin signaling activates leptin. Then it acts in hypothalamus. Therefore hypothalamus is one of affecting parts in obesity. In order to investigate gene expression difference in hypothalamus by diet nutritious difference, we used C57/BL6 control group and db-/db- mouse group. They divided each of two group with the mouse, and fed control diet and high-fat diet for 4 weeks. Each of control and high-fat diet contained 11.7% and 59.7% fat, respectively. Then we performed microarray assay with them. We compared among changed genes in hypothalamus region. In the results, we observed that increased genes were more than decreased genes. Although hypothalamus size of db-/db- mouse is smaller than that of C57/BL6 control, we were certain that db-/db-mouse had more affected genes. In this study, many genes are affected by nutrient in hypothalamus region.