

Effect of theanine on brain function

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It is known that theanine is one of the major amino acids in a Japanese green tea such as gyokuro. Theanine is a ethylamide derived from glutamic acid. We have reported that theanine can pass through a blood-brain-barrier, modulated the release of neurotransmitters, and decreased blood pressure. We also reported the anti-stress (such as relaxation) effect induced by theanine in human. Other researchers also reported that theanine activated T-cell, and suppressed tumor cells.

In this study, we first determined memory performance as one of the brain functions, because it is reported that theanine modulates the release of neurotransmitters. Memory performance was evaluated by passive avoidance test and novel object recognition test. Passive avoidance test showed that rat administrated theanine (1 g/100 ml water) remained light room longer than control group. Novel object recognition test indicated that theanine administrated rat searched novel object longer than control group. These results suggest that the ability of memory might be enhanced by theanine administration.

Next study, as it is known that glutamic acid and NMDA receptor associated with memory performance, we determined whether theanine may protect neural cells against neurotoxicity of glutamic acid. Cell viability from SH-SY5Y cells was measured by MTT assay. Glutamic acid decreased viable cells in a dose-dependent manner. Treatment of theanine decreased neural death against neurotoxicity of glutamic acid, but not in a dose-dependent manner.

In conclusion, theanine enhanced memory performance, and it may protect neural death against neurotoxicity of glutamic acid.