

## Abstract of Presentation

### Presentation Title(Should be no more than 20 words):

Stress regulation by inhalation of (*R*)-(-)-linalool as seen from blood gene expression analysis.

### Abstract :

Aromas may sometimes have an effect to relax our stress. In recent years, there has been more interest in the psycho-physiological effects elicited by pleasant aromas, because they are expected to contribute to health maintenance and promotion. Despite that, no molecular logic of this event has remained to be clarified. In our research, to quantitatively analyze psycho-physiological effects elicited by aromas, we profiled blood cells and gene expressions of the rats which inhaled (*R*)-(-)-linalool under a restraint stressed condition.

In neutrophils and lymphocytes, significant changes in quantity caused by the restraint were repressed by exposure to the odorant. Moreover, inhalation of (*R*)-(-)-linalool induced significant changes in the stress-induced variations with respect to 115 gene expression levels of the whole blood. Of those, 109 genes were down-regulated. Another study was carried out by gene expression profiling for a sample of hypothalamus as a stress response center. It resulted that inhalation of (*R*)-(-)-linalool under a restraint stress-added condition up-regulated a number of neuron differentiation-related genes toward activating the processes of neuronal maturation, and the inhalation also up-regulated restraint stress-inducible, heat shock protein-related genes that can be associated with the suppression of stress-caused apoptosis.

In conclusion, (*R*)-(-)-linalool inhalation returns stress-elevated levels of neutrophils and lymphocytes to near-normal levels. The inhalation also reduces the activity of more than 100 genes overdriven in stressful situations for the whole blood of the odorant-inhaling rats subjected to acute restraint stress. Our study is the first to reveal the possibility that olfactory input can modify the gene expressions in the hypothalamus neural network involved in feeding behaviors of animals, as well as their blood chemistry. Our finding has thus elucidated a physiological effect of an inhaled pleasant aroma, (*R*)-(-)-linalool in this case, by an in-depth analysis of gene expressions, and also could largely contribute as a new method for assessing effects caused by of aromas on stress regulation.