analysis with structural equation modeling was performed for correlation between Japanese diet and health.

As the result of the trend test, intake of rice and miso (fermented soybean paste) was correlated with sleep quality (trend p=0.006 and 0.003, respectively) and rice consumption is also correlated with impulsiveness (trend p=0.007). Fish consumption was correlated with impulsiveness (trend p=0.027). The path analysis indicated that rice consumption improves impulsiveness, depressiveness and sleep quality via indirect effect of miso consumption (p values for sum of indirect were 0.046, 0.037 and 0.010, respectively). The statistical analysis didn't show direct effect of bread consumption on physical and mental health, as well as the path analysis showed no significant fit for the indirect effect between bread consumption via miso consumption. Thus, rice-based diet, especially with miso consumption, is suggested to maintain mental health.

PT739

Rice is nice: benefits of rice consumption for brain health

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Abstract

Previous our investigation has suggested that Japanese diet is associated with mental health and specified that rice, miso (soybean paste) and fish consumption affected to quality of life, sleep quality, impulsiveness and depressiveness. Furthermore, the study showed combination of rice and miso was supposed to be associated to mental and physical health. The Japanese diet consists of rice and other dishes with vegetable, fish and meat. Combinations of rice and other dishes have been developed over the centuries in order to have nutritionally balanced diet. We hypothesized rice-based diet impacts mental and physical health and investigate the consequences of dietary intervention of rice.

The study is a randomized, open trial, parallel-groups clinical trial where 60 participants were screened with inclusion criteria, which is (1) eating regularly 3 meals per day and (2) eating staple foods other than rice one or more times. Participants were randomly assigned to have rice-based meals or no rice-centered meals for 3 dairy meals for 2 months. Participants were surveyed sleep quality, quality of life, anxiety scale and dietary pattern before and after the experimental period. As well as questionnaire surveys, biochemical changes focusing on orexin A, cortisol and eotaxin-1 were measured in the blood.

The sleep quality index scores showed improvement after the intervention of rice-based meal. In addition to the subjective assessment, blood plasma eotaxin-1 levels substantially reduced by the intervention. Several molecular studies demonstrated that eotaxin-1 impaired neurogenesis, synaptic plasticity and cognition, thus the molecule is suggested negative modifier of central nervous system. Although the relationship between sleep quality and blood plasma eotaxin-1 level has not been cleared so far, findings of the present study support that rice-based diet benefits brain health.

PT740

Prediction of Circadian Clock with Combination of One point Expression Profiles of Ten Circadian Clock Genes of Circadian rhythm Prediction Model

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Abstract

Considering the importance of circadian rhythm on human pathophysiology and social behavior, it is of important to determine a man's real circadian clock on a certain time of a day. In the present study, we developed a realistic method to predict a man's circadian clock with combination of standard circadian clock genes' expression profiles and circadian clock prediction model (CPM) which is based on a machine learning program. At first, hair follicle cells were collected at 8, 11, 15, 19, and 23 o'clock for 2 days from 18 normal persons, and standard expression profiles of 10 circadian clock genes (*Per1, Per2, Per3, Clock, Arntl, Cry1, Cry2, Npas2, Nr1d1* and *Nr1d2*) were established. The expression of each clock genes were then conducted to cosine curve fitting with the frequency of 24 hours, because every circadian clock gene expressions have 24 hour periodicity. The circadian clock prediction model (CPM) was designed by the inversed form of the circadian rhythm function (i.e. Circadian Time = F(gene)), and the accuracy of CPM was evaluated with model validation technique such as leave one out cross validation (LOOCV). The mean absolute error (MAE) using 10 circadian clock genes is 3.43, which means the prediction error of collection time is 3. 43 hours. When using 6 clock genes such as *Per1, Per3, Clock, Cry2, Npas2,* and *Nr1d2*, the MAE is lowest and its value is 3.24 hours. In conclusion, by using CMP, we can predict a man's real circadian clock time with only a single point biological sample at any time of a day, and the accuracy of prediction time is within 3.24 hours.

Keywords: circadian rhythm, circadian clock gene, circadian clock prediction model, machine learning

PT741

Association between Morningness-Eveningness, Temperament, and Character Traits

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An abbreviated title: Morningness-Eveningness and TCI

Abstract
Objective: The aim of this study was to examine the association between circadian types, temperament, and character.
Methods: We analyze the data obtained from a total of 2910 students who undertook the Temperament and Character Inventory (TCI) and the Composite Scale of Morningness-Eveningness (CSM). According to the CSM score, the circadian types were classified as the morning type (MT), neither type (NT), and the evening type (ET); four of temperament and three of character types of TCI scores were compared accordingly. We also conducted a correlation analysis between CSM scores and the TCI dimension, as well as a multiple regression analysis.
Results: When comparing the TCI dimension according to the circadian types after correcting for age and gender, the ET presented high levels of novelty seeking (NS, F=25.5, p<0.001) and harm avoidance (HA, F=58.112, p<0.001), whilst the MT presented a high level of persistence (PS, F=656, p<0.001), self-directedness (SD, 98.559, p<0.001) and cooperativeness (CO, F=32.538, p<0.001). There were no significant inter-group differences regarding RD and self-transcendence (ST). From the results of the correlation analysis, if the subjects were more morningness, they presented higher values of NS and HA but lower values of PS, SD, CO and ST. From the multiple regression analysis with corrections for age and gender, it was presented that PS, NS, HA and ST had significant effects on CSM scores (adjusted R2=0.146, df=6, p<0.001).
Conclusion: It was determined that the MT was associated with a high level of PS, whereas the ET was associated with high levels of NS and HA.
Key Words: Morningness–eveningness, Circadian typology, Chronotype, Temperament, Character

PT742

Histamine *N*-methyltransferase is important for the normal sleep-wake cycles and aggression through the regulation of brain histamine concentration.

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Abstract
Brain histamine regulates the important physiological functions including sleep-wake cycles acting as a neurotransmitter. Although neurotransmitter concentration in the synaptic clefts is strictly regulated by the clearance systems, the mechanisms of histamine clearance remained almost unclear. Our previous studies have demonstrated that histamine *N*-methyltransferase (HNMT), a histamine-metabolizing enzyme, was important for histamine clearance *in vitro*. Thus, in order to clarify the importance of HNMT *in vivo*, we analyzed HNMT deficient mice in this study.

First, we revealed that the histamine content in the brain lysate of HNMT KO was 6 times as abundant as that of WT, confirming that HNMT was essential for histamine clearance in the brain. Next, most of Hnmt KO was wounded in home cages, suggesting the high aggression in Hnmt KO. We confirmed the high aggressive behaviors of Hnmt KO in the resident-intruder test and aggressive biting behaviors test. The aggressive behaviors of Hnmt KO in the resident-intruder test were significantly decreased by the pretreatment with a H2 antagonist zolantidine but not with a H1 antagonist pyrilamine, indicating that excessive H2 activation led to the high aggressive behaviors. In addition, the locomotor activities significantly decreased in Hnmt KO. Because histamine is known to the key molecule for the wakefulness, we suggested that abnormal histamine concentration disrupted the sleep-wake cycles leading to the decrease of locomotor activity. The sleep analysis has elucidated that a prolonged waking time of KO in light period with extended sleep time in dark period, implying that high brain histamine induced by Hnmt deficiency prolonged the wakefulness in light period. These results indicated that Hnmt might contribute to the regulation of aggression and sleep-wake cycles in mice through the maintaining for the histamine concentration and histaminergic neuronal activities.

PT743

Mental Health status of Correctional Officers in Correctional Institutions

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Abstract
Objectives: The purpose of this study is to measure the current levels of mental health statuses of correctional officers using various instruments. The result of the study could help establish appropriate solutions and policies for the officers.
Methods: Subjects were 2571 correctional officers from 50 correctional facilities in South Korea. They were asked to answer or rate their occupational experiences with using diverse inventories and scales such as Maslach Burnout Inventory (MBI), Korean Occupational Stress Scale (KOSS), The Job Satisfaction Scale by Davison and Cooper, The Korean version of Beck Depression Inventory (K-BDI), and Rosenberg's Self-Esteem Scale (RSE). We also gathered additional data with working conditions and treatment.
Results: The burnout score of the correctional officer was higher than that of the other occupations based on Maslach Burnout Inventory (MBI). Using the Korean Occupational Stress Scale (KOSS), the averaged occupational stress of the correctional officer was higher than that of the other occupations. The average score of job satisfaction was lower than that of the other occupations. The average depression level of the correctional officer was 9.36 using the Korean version of Beck Depression Inventory (K-BDI). The level of self-esteem was lower than that of the other occupations based on Rosenberg's Self-Esteem Scale (RSE). In addition to the five different evaluations, the mental health status of male officers was worse than female officers. Meanwhile, we noticed that they already understood the state of their working environment and the employment treatment was worse than the other occupations.
Conclusion: This research shows the mental health status of the correctional officer is worse than the other occupations. This finding emphasizes the need for a system to regularly assess mental health states of the officers and solutions for improvements.
Key Words: Correctional institution · Correctional officers · Mental health · South korea.

PT744

The study of facilitating factors of suicide and strategies for suicide prevention in Korean military executive members

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