

yearly family income were included as covariates in model 1 and the child's IQ was added as a covariate in model 2.

**Results:** Children who were breastfed had higher listening ( $p = 0.048$ ), speaking ( $p < 0.001$ ), reading ( $p = 0.002$ ), writing ( $p = 0.002$ ), spelling ( $p = 0.001$ ), mathematical calculation ( $p = 0.002$ ), and learning quotient ( $p < 0.001$ ) scores in the LDES in model 1. When adding the child's IQ as a covariate, the speaking ( $p = 0.013$ ), spelling ( $p = 0.041$ ), and learning quotient ( $p = 0.042$ ) still remained significant

**Conclusion:** The results suggest that breastfeeding has a protective effect on learning disabilities in school-aged children.

**Keywords:** Breastfeeding, Continuous Performance Test, Learning disability

## SCHIZOPHRENIA:PM358 – PM543

### PM358

#### Antidepressant Prescription pattern and Clinical Correlates for Schizophrenia

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#### Abstract

**Objectives:** Few studies have investigated antidepressant(AD) prescriptions for patients with schizophrenia. The aim of this study was to identify the sociodemographic and clinical correlates and prescription patterns of ADs among schizophrenia patients.

**Methods:** Schizophrenia patients were recruited and interviewed using standardized assessment instruments. Differences in demographic and clinical characteristics including current psychiatric symptoms, and concomitant psychotropic medications between patients with and without ADs were analyzed. Brief Psychiatric Rating Scale (BPRS) was used to evaluate current psychiatric symptoms.

**Result:** Among 297 patients, 78 (27%) patients received an AD prescription. The most commonly used ADs were Escitalopram(30.8%), Sertraline (25.6%), and Fluoxetine(10.3%). As for the combined prescription rate of psychotropic medications, there was only significantly greater rates of benzodiazepine prescription for AD user compared to AD nonuser( $p=0.005$ ).

With regard to sociodemographic characteristics, there was no significant difference between two groups. As for clinical aspects, we found that anxiety ( $p=0.007$ ) and depressive mood ( $p=0.014$ ) scores of patients taking AD were significantly higher than patients not taking AD in respect of BPRS. On the contrary, Excitement ( $p<0.001$ ) and Grandiosity ( $p=0.003$ ) scores were significantly lower among AD user compared to AD nonuser.

**Conclusion:** This study showed that the most commonly used AD is SSRI with the prevalence of 27% among schizophrenia patients. In addition, current AD use for schizophrenia compared to nonuse is likely to be related with anxiety and depressive symptoms regardless of positive and negative symptoms currently. Further evaluation of anxiety and depressive symptoms and management of those symptoms may improve quality of life and drug compliance for patients with schizophrenia.

**Keywords:**Schizophrenia, Antidepressants, Anxiety, Depressive mood

### PM359

#### A prospective cohort study for metabolic measures during antipsychotic treatments in patients with schizophrenia and schizoaffective disorder: A cross-sectional analysis of baseline data

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#### Abstract

We conducted a prospective cohort study for metabolic measures during antipsychotic treatments in patients with schizophrenia and bipolar disorder (matSaB study) using the Japanese blood glucose monitoring guidance (Kusumi et al. 2011) in order to find undiagnosed hyperglycemia systematically as a routine clinical practice. In this study, we aimed to report a cross-sectional analysis of baseline data to quantify the frequency of glucose abnormalities in patients with schizophrenia and schizoaffective disorder.

A total of 930 patients with schizophrenia and schizoaffective disorder, who had not been diagnosed as diabetes prior to baseline screening and started one-year monitoring between April 2013 and March 2015, were enrolled at 45 sites in Japan. Participants included both in- and outpatients who started some new antipsychotics at baseline monitoring. The study protocol was approved by the institutional review board of each site. All participants provided written informed consent after receiving a full explanation of the study protocol. This study was supported by grants from the Early-phase/Exploratory or International-standard Clinical Research by Japan Agency for Medical Research and Development.

Out of 930 patients, 46 (4.9%) met criteria for probable diabetic type, 155 (16.7%) for pre-diabetic type, and 729 (78.4%) for normal type. Individuals with pre-diabetic type, but not those with probable diabetic type, had a significantly higher body mass index than those with normal type. Both probable diabetic and pre-diabetic groups had a higher frequency of family history of hyperlipidemia and hypertension, but not that of diabetes than normal group. Patients with olanzapine use during one-year period before baseline screening showed a significantly higher serum triglyceride and lower HDL-cholesterol than those without olanzapine use.

One-year follow-up study is underway to assess the detective power and usefulness of the blood glucose monitoring guidance for patients with schizophrenia and schizoaffective disorder.

### PM360

#### Overactivation of the VPAC2 receptor during the early postnatal period causes prefrontal synaptic abnormalities and cognitive dysfunction in mice

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### Abstract

**Objective:** Clinical studies have shown that microduplications at 7q36.3, containing *VIPR2*, confer significant risk for schizophrenia. *VIPR2* gene encodes the VPAC2 receptor for vasoactive intestinal peptide (VIP) and pituitary adenylate cyclase-activating polypeptide (PACAP). Lymphocytes from patients with these mutations exhibited higher *VIPR2* gene expression and VIP responsiveness, but mechanisms by which overactive VPAC2 signaling may lead to these psychiatric disorders are unknown. Here we aimed to determine if the *VIPR2*-linkage to mental health disorders might be due to overactive VPAC2 receptor signaling during postnatal brain development by daily administration of the highly-selective VPAC2 receptor agonist Ro 25-1553 from postnatal day 1 (P1) to P14 in mice.

**Results:** Western blot analyses on P21 revealed significant reductions of synaptophysin and PSD-95 in the prefrontal cortex, but not in the hippocampus, in Ro 25-1553-treated mice. Furthermore, Golgi staining in adult brain revealed alterations in dendritic morphology of prefrontal cortical neurons in Ro 25-1553-treated mice. The same postnatally-restricted treatment resulted in a disruption in prepulse inhibition of the acoustic startle and cognitive impairment in the novel object recognition task in adult mice. No effects were observed in locomotor activity, sociability in the three-chamber social interaction test, or fear conditioning or extinction. In addition, Ro 25-1553 and VIP, but not PACAP, caused reductions in total numbers and length of neuronal dendrites and length of axon in mouse primary cultured cortical neurons.

**Conclusions:** These results suggest that overactivation of the VPAC2 receptor in the postnatal mouse leads to a reduction in synaptic proteins and alterations in dendritic morphology in the prefrontal cortex and cognitive impairments. These findings imply that the *VIPR2*-linkage to mental health disorders may be due in part to overactive VPAC2 receptor signaling during a critical time of neuronal maturation.

### PM361

The hallucinogen D-lysergic diethylamide (LSD) decreases dopamine firing activity through 5-HT<sub>1A</sub>, D<sub>2</sub> and TAAR1 receptors

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### Abstract

D-lysergic diethylamide (LSD) is a hallucinogenic drug that interacts with the serotonin (5-HT) system binding to 5-HT<sub>1</sub> and 5-HT<sub>2</sub> receptors. Little is known about its potential interactions with the dopamine (DA) neurons of the ventral tegmental area (VTA). Using *in-vivo* electrophysiology in male adult rats, we evaluated the effects of cumulative doses of LSD on VTA DA neuronal activity, we compared these effects to those produced on 5-HT neurons in the dorsal raphe nucleus (DRN), and we attempted to identify the mechanism of action mediating the effects of LSD on VTA DA neurons. We confirmed that low doses of LSD (5–20 µg/kg, *i.v.*) induce a significant decrease of DRN 5-HT firing activity, but at these doses, it did not alter VTA DA neuronal activity. On the contrary, higher doses of LSD (30–120 µg/kg, *i.v.*)

dose-dependently decreased VTA DA firing activity. The depletion of 5-HT synthesis with *p*-chlorophenylalanine did not modulate the effects of LSD on DA firing activity. The inhibitory effects of LSD on VTA DA firing activity were prevented by the D<sub>2</sub> receptor antagonist haloperidol (50 µg/kg, *i.v.*) and by the 5-HT<sub>1A</sub> receptor antagonist WAY-100,635 (500 µg/kg, *i.v.*). Notably, pretreatment with the novel synthesized trace amine-associate receptor 1 (TAAR<sub>1</sub>) antagonist EPPTB (5 mg/kg, *i.v.*) blocked the inhibitory effect of LSD on VTA DA neurons. These results suggest that LSD at high doses strongly affects DA mesolimbic neuronal activity in a 5-HT independent manner and with a pleiotropic mechanism of action involving 5-HT<sub>1A</sub>, D<sub>2</sub> and TAAR<sub>1</sub> receptors.

### PM362

Social Function of Dopamine D1 Receptor in Non-human Primates

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### Abstract

**Objective:** Humans and many animals including non-human primates organize and live in social groups. Although dopamine (DA) has been suggested to play important roles in mediating social behavior, it has remained less clear whether and how DA in each subject consisting of a social group is involved in organization of such a group as social hierarchy and affiliative relationships. In this study, we examined the impacts DA D1 receptor signaling on social relationships of socially housing non-human primates. **Methods:** The effects of D1 antagonist administration was examined using a group of Japanese macaques consisting of 4 males and 2 females, 3 years old. Chronic administration of D1 receptor antagonist, SCH23390 (~0.1 mg/kg/day) by subcutaneous implantation of an osmotic pump was given to the macaque at second rank in the group, which caused persist decrease of goal-directed actions and increased non-directional agonistic displays in the drug administered subject throughout the behavioral observation period for 1 month. **Results:** Although social dominance of the drug administered subject was not altered by drug administration, social dominance and affiliative relationships of other subjects in the groups, especially at higher social class, were altered, consequently resulting in stronger social order competitions among higher social class subjects including the drug administered one. However, chronic stress level of subjects, which were assessed by measuring the amount of hair glucocorticoids, were not altered in the drug administered subject as well as others, suggesting little negative consequence of re-organization of social relationships in the group. **Conclusions:** These results suggest that low D1 receptor signaling, which has been shown to cause detrimental effects on cognitive and affective function, may contradictorily not cause apparent disadvantages in animals such as non-human primates living in ecologically more natural socially groups.

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### PM363

The effect of Ketamine: Gunn rat as a Schizophrenia animal model

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