

Public Symposium "Children's Toxicology: Current Status and Prospects of Clinical Applied and Basic Science for Understanding the Effects of Chemical Exposure on Higher Brain Functions in Children"

Various statistical data show that the number of cases of autism spectrum disorder (ASD) is increasing, while new cases of schizophrenia (SCZ) are decreasing. Autism spectrum disorder is a broad view of autism as a collection of cases that present with slightly different symptoms in a continuous rainbow of colors, but in fact, SCZ cases also present with a variety of symptoms that could be called a spectrum disorder. It has been reported that there are cases of ASD in young SCZ cases, and it has been pointed out that there is a relationship between ASD and SCZ. In recent years, research on the relationship between ASD and SCZ has been conducted at the genetic level as well, and a gene called *Auts2*, which is closely related to ASD, has received attention as an important gene not only for ASD but also for brain development, and this gene has been reported to be related to some cases of SCZ. It has been reported that mice with altered *Auts2* gene show abnormal behaviors associated with symptoms of ASD cases, and that expression of *Auts2* gene is affected when mice are given chemicals that target nerves such as acephate, resulting in behavioral abnormalities.

Taken together, the increase in ASD cases and the decrease in SCZ cases may be due to the fact that ASD cases are diagnosed by the age of 3 years, while SCZ cases are often first diagnosed at the age of 20 years, and some ASD cases might have been diagnosed as SCZ when the cases reached the age of 20. Therefore, there may be a possibility that some of the cases that should have been diagnosed as SCZ at the age of 20 are diagnosed as ASD at the age of 3 years, and a result of various measures taken from the age of 3, the number of new SCZ cases has decreased. At the same time, the question arises as to whether the "total number of ASD cases and SCZ cases" is still increasing or not. There is accumulating information suggesting that environmental exposure to chemicals may be contributing to the increase in ASD. Whether total number of cases are really increasing, or, the increase can be explained by the changes in diagnostic criteria and social factors such as changes in educational settings to bring more cases to normal school classrooms, or both?

These issues are very important from the standpoint of toxicology, which is an interdisciplinary field of study. Therefore, we planned to hold a symposium with experts in each research field to discuss the following topics: statistics from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), which was one of the triggers for this project; the relationship between the changes in diagnostic criteria for ASD and SCZ and the

number of cases; the current status and prospects of molecular biological analysis of ASD and SCZ, including the Aut2 gene; and the effects of environmental factors, including exposure to chemical substances (including epigenetic effects). We are looking forward to your participation.

Saturday, February 19, 2022, 13:00-17:20

On line

13:00 Opening Remarks

Jun Kanno (Affiliate Member of Science Council of Japan, National Institute of Health Sciences)

Chair: Seiichiro Himeno (Affiliate member of Science Council of Japan, Visiting Professor, Faculty of Pharmaceutical Sciences, Showa University)

13:10 "Relationship between birth weight and neurodevelopment in children"

Tsuyoshi Ichikawa (Lecturer, Faculty of Medicine, Dokkyo Medical University)

13:40 "Environmental Factors in Autism Spectrum Disorders"

Hideo Matsuzaki (Professor, Research Center for Child Mental Development, University of Fukui)

14:10 "Epidemiology of Autism and Schizophrenia"

Kenji Tsuchiya (Specially Appointed Professor, Research Center for Child Mental Development, Hamamatsu University School of Medicine)

Break 14:40 - 14:50

14:50 "Research on ASD/SCZ based on genome analysis"

Norio Ozaki (Member of Science Council of Japan, Secretary of the Second Section of SCJ, Professor, Graduate School of Medicine, Nagoya University)

15:20 "Emotional and cognitive behavioral effects of oral acephate administration in mice".

Kentaro Tanemura (Professor, Graduate School of Agricultural Science, Tohoku University)

15:50 "AUTS2 gene, brain neurodevelopment, and psychiatric disorders".

Mikio Hoshino (Director, Department of Pathophysiology and Biochemistry, National Institute of Neuroscience, National Center of Neurology and Psychiatry)

Break 16:20 - 16:30

16:30 - 17:10

Panel Discussion Chair: Jun Kanno

Panelists

Yuko Sekino (Adjunct Member, Science Council of Japan; Specially Appointed Professor, Endowed Chair in Human Cell Pharmacy, Graduate School of Pharmaceutical Sciences, The University of Tokyo)

Seiichiro Himeno

17:10 - 17:20 Closing remarks