Title of Research:

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Evaluation methods for toxicity using indices of developing neurons

Principal Investigator:

Yaichiro Kotake, Ph.D (Professor, Hiroshima University, Graduate School of Biomedical and Health Sciences)
1-2-3 Kasumi, Minami-ku, Hiroshima 734-8553, Japan
(tel)+81-82-257-5325 (e-mail)yaichiro@hiroshima-u.ac.jp

Collaborators:

Yasunari Kanda, Ph.D (Division Head, National Institute of Health Sciences, Division of Pharmacology)
3-25-26 Tonomachi, Kawasaki-ku, Kawasaki 210-9501, Japan
(tel)+81-44-270-6640 (e-mail)kanda@nihs.go.jp

Summary of Research:

In recent years, basic research in the field of neuroscience has revealed many molecules involved in neurite outgrowth and neuronal reorganization, but there have been few attempts to evaluate the toxicity of chemical substances using these molecules as indicators. The purpose of this study was to identify better indicators of developmental neurotoxicity of chemicals from key molecules in neurodevelopment and to clarify their usefulness in assessing developmental neurotoxicity of chemicals.

In the second year of the project, a validation check of the experiment was conducted due to a change in the experimenter in order to eliminate the variation in gene expression data. By strictly standardizing the position of fetal cerebral cortex sections and the method of cell counting before seeding, we were able to obtain data with less variation than before. Next, changes in mRNA expression encoding 12 molecules that play important roles in neurodevelopment were examined up to day 21 of culture when exposed to acrylamide, a candidate positive control substance. The results suggest that the expression of three genes, *Dlg4*, *Syp*, and *Bdnf*, is altered at similar time points as during methylmercury exposure. Since the experimental conditions for human iPS neurons are now in place, we plan to increase the number of compounds evaluated in rat cortical neurons in the next year and compare them with human iPS neurons to clarify a better evaluation index.

Timeline:

March 1, 2021-Februery 28, 2022

Topics:

Publications: