

MEETING ABSTRACTS

INDIRECT EFFECTS OF DIOXIN ON NEURONAL AChE EXPRESSION VIA ASTROCYTES

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Acetylcholinesterase (EC3.1.1.7; AChE) is one of the most important enzymes in the cholinergic system. Our previous works showed that 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), a notorious persistent organic pollutants, suppressed neuronal AChE activity by both transcriptional and post-transcriptional regulations via aryl hydrocarbon receptor pathway in SK-N-SH human neuroblastoma cells [1, 2]. In the nervous system, the most abundant cell type, astrocyte is regarded to play vital roles in protecting neurons from various kinds of insults, including environmental pollutants. Astrocytes have been considered as one of the target cells of dioxin in the nervous system. However, whether astrocytes are able to mediate indirect effect of dioxin on neuronal AChE is still unknown. In the present study, we aimed to reveal the potential indirect effect by using conditional medium derived from dioxin-treated astrocytes. Rat primary astrocytes were employed which were exposed to TCDD at 0.01 to 1 nM directly for 4 days. After the treatment, the astrocyte conditioned medium (ACM) was collected and administrated to the primary neurons on DIV (day *in vitro*) 2 for 4 days. Meanwhile, the primary neurons (DIV 2) from the same bench were exposed to TCDD directly at same concentrations for 4 days. The results showed that the enzymatic activity and mRNA expression of AChE was suppressed in TCDD-ACM-treated neurons compared to those of solvent-ACM-treated neurons. The effective concentrations of TCDD were 0.01 and 0.03 nM, which are close to the average serum TCDD concentration in exposed population from different areas of the world. However, AChE was less sensitive in the primary neurons directly exposed to TCDD. These results suggested that astrocytes play roles in mediating the indirect effect of TCDD on neuronal AChE expression.

Keywords: Dioxin; Astrocyte; Neuron; astrocyte conditioned medium; Acetylcholinesterase

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