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2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN INCREASES BOVINE HERPESVIRUS 1 INFECTION IN NEURO-2A CELLS

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Introduction:

Exposure to environmental contaminants, like 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), leads to an increased susceptibility to infectious agents (1). In particular, TCDD induces an activation of cytomegalovirus replication in human fibroblasts (2) and enhances Bovine Herpesvirus type-1 (BHV-1) replication in bovine cells (3). Recently, high levels of TCDD were detected in dairy products from some areas of Campania Region (Italy), where BHV-1 is widespread and its eradication represents still a goal (4). Infection of cattle with BHV-1 can provoke genital disorders, abortions and shipping fever. BHV-1 establishes latency in ganglionic neurons of the infected host. Reactivation from latency can be stimulated by immunosuppression and stresses conditions (5). Our previous studies showed that in MDBK cells TCDD enhances BHV-1 replication (3) and anticipates BHV-1-induced apoptosis (6), suggesting that TCDD may contribute to reactivate BHV-1 from latency. To test this hypothesis, herein we analyzed the effects of TCDD on BHV-1 replication using mouse neuroblastoma (neuro-2A) cells.

Methods:

Monolayers of neuro-2A cells were infected with BHV-1 (Cooper strain), in presence or not of TCDD (0.01 pg/ml, 1 pg/ml and 100 pg/ml). At different time post infection, we performed MTT test, evaluation of Cytopathic Effects (CPE) and virus titer.

Results and Discussion:

Cell viability of neuro-2A significantly decreases in presence of different concentrations of TCDD respect to untreated controls. These results were different in MDBK cells, where TCDD induced an increase of cell viability and cell proliferation (3). Infection of neuro-2A cells with BHV-1 resulted in cell death in a time-dependent, as previously described in bovine cells (7). Furthermore, in agreement to previous studies (3), TCDD induced an increase of BHV-1 replication, as detected by virus titer and CPE. Our results indicate that TCDD may contribute to reactivate BHV-1 from latency, acting as a risk factor for disease progression.

Keywords: BHV-1 – TCDD – Neuro-2A – cell viability – virus cytotoxicity - virus titer - CPE.

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Keywords: BHV-1, TCDD, Neuro-2A, Cell viability