



Cadmium induces cell death in SN56 cholinergic neurons from basal forebrain mediated by acetylcholinesterase variants altered expression.



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INTRODUCTION

Cadmium is a neurotoxic compound which induces cognitive alterations similar to those produced by Alzheimer's disease (AD). However, the mechanism through which cadmium induces this effect remains unknown. In this regard, we described in a previously that cadmium induces a more pronounced cell death on cholinergic neurons from basal forebrain (BF). Degeneration of BF cholinergic neurons, as happens in AD, results in memory deficits attributable to the loss of cholinergic modulation of hippocampal synaptic circuits. Moreover, cadmium induces acetylcholinesterase (AChE) overexpression, which has been related with cell death induction. Moreover, AChE variants alteration has been reported to mediate apoptotic and necrotic cell loss induction of BF cholinergic neurons and development of AD. According to all above, we hypothesized that cadmium induces the more pronounced cell death on BF cholinergic neurons through alteration of AChE variants expression.

METHODS

The present study is aimed at researching the mechanisms of cell death induced by cadmium on basal forebrain cholinergic neurons. For this purpose, we evaluated, in SN56 cholinergic murine septal cell line from basal forebrain region, the cadmium toxic effects on neuronal viability through AChE splice variants.

RESULTS

This study proves that cadmium induces cell death on cholinergic neurons, which was reversed partially by AChE silencing. The cell death induced after cadmium was mediated by overexpression of AChE-S and down-regulation of AChE-R.

CONCLUSIONS

Our present results provide new understanding of the mechanisms contributing to the harmful effects of cadmium on cholinergic neurons and suggest that cadmium could mediate this effect through AChE splices altered expression.

