Modulation of NAD(P)H:quinone oxidoreductase 1 by Methylmercury in Mouse Hepatoma Hepa1c1c7 cells

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INTRODUCTION

- The NAD(P)H:quinone oxidoreductase 1 (NQO1) is a cytosolic flavoenzyme that catalyzes the two-electron reduction of a broad range of substrates. NQO1 plays a pivotal role in detoxifying quinones to their corresponding hydroquinone.
- The exposure to methylmercury (MeHg), and environmental contaminants, typified by 2,3,7,8-Tetrachlorodibenzodioxin (TCDD), was found to modulate the NQO1 expression in human and animals.

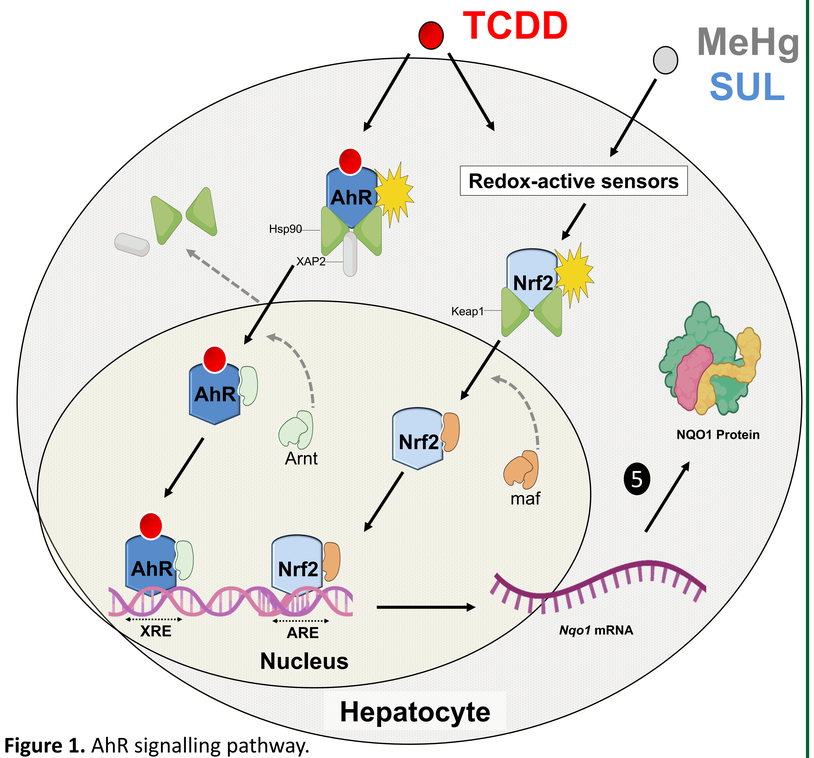
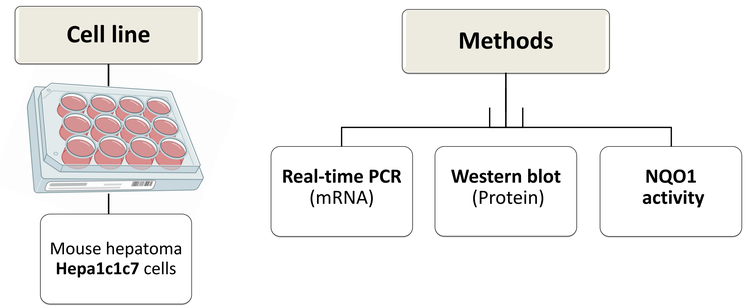


Figure 1. AhR signalling pathway.

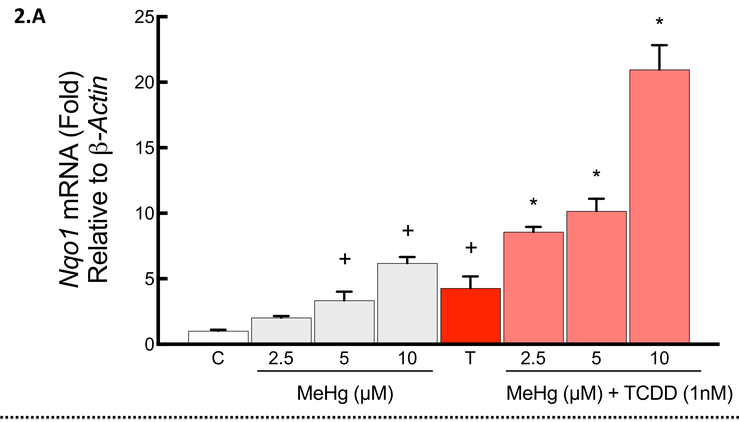
HYPOTHESIS AND OBJECTIVE

- **Hypothesis**: The exposure to MeHg and TCDD can modulate the expression antioxidant enzyme NQO1.
- **Objective**: To address the possible effect of MeHg on the *Nqo1* gene expression in the absence and presence of its inducer, TCDD, in Hepa1c1c7 cells.

METHODS



RESULTS



RESULTS (cont.)

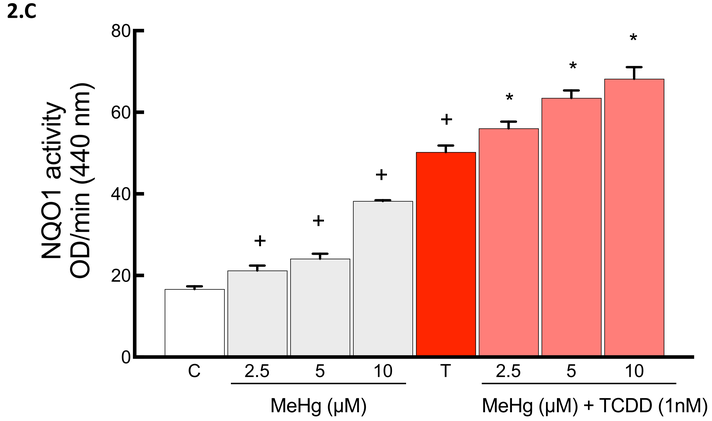


Figure 2. Concentration-dependent effect of MeHg on NQO1 mRNA, protein and activity levels. Hepa1c1c7 cells were treated with increasing concentrations of MeHg (2.5, 5 and 10 μM) in the absence and presence of TCDD (1nM). (**2.A**) mRNA expression of *Nqo1* at 6 h. (**2.B** and **2.C**) NQO1 protein expression and activity were measured at 24h. Results are presented as mean of two independent experiments ± SEM (n=6), + $p<0.001$ compared to control and * $p<0.001$, compared to respective TCDD treatment.

SUMMARY AND CONCLUSION

- MeHg or TCDD alone significantly increased NQO1 expression levels in a concentration-dependent manner.
- MeHg potentiated the TCDD-induced NQO1 expression at mRNA, protein and activity levels.
- MeHg up-regulates the antioxidant enzyme NQO1 at a transcriptional and post-translational levels in Hep1c1c7 cells.

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