**Title:** The Impacts of Environmental Chemicals on Telomere Length and Adverse Effects in A549 Cells

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## Abstract

Human exposure to environmental chemicals is associated with cardiovascular vascular disease, lung cancer, chronic respiratory disease and mortality. In this study, we investigated the exposure of one group of chemicals (oxidizing agents) can lead to adverse effects and change the telomere length as a mechanism of health effects in lung epithelial cells in cell cultures. We selected four oxidizing agents such as Potassium Bromate ($KBrO_3$), Hydrogen peroxide ($H_2O_2$), Sodium dichromate ($Na_2Cr_2O_7$) and 4-Nitroquinoline 1-oxide (4NQO) that can cause DNA damage. The compounds are suggested to be used as positive controls for the generation of DNA strand breaks and/or oxidatively damaged DNA. We measured cytotoxicity effects of cell metabolic activity, cell membrane damage and cell proliferation after 24 hours exposure to all chemicals and oxidative stress levels (ROS generation and antioxidant defense) were measured in short term and long-term exposures after 3 hours exposure to all chemicals and the effect of long-term exposure on the telomere length. The results can be summarized as (1) the short-term exposure for $KBrO_3$ leads to low cytotoxicity and oxidative stress effect; (2) the $H_2O_2$ causes no cytotoxicity effects and moderate oxidative stress effect; (3) the $Na_2Cr_2O_7$ leads to high cytotoxicity and moderate oxidative stress effect and (4) the 4-Nitroquinoline 1-oxide (4NQO) leads to high cytotoxicity and oxidative stress effects. The long-term exposure for all the chemicals induces moderate oxidative stress effect in the cells. Long term exposure to all chemicals are associated with no significant change on the telomere length was observed in A549 cells.



I have completed my MSc. degree from University of Copenhagen, Denmark. I defended my master's thesis about how the exposure of environmental chemicals (oxidizing agents) can lead to adverse effects and change in the telomere length as a mechanism of health effects in lung epithelial cells. Currently I am working as a research assistant to finalize the experiment for publications.

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