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Compensatory effects of *hOGG1* for *hMTH1* in oxidative DNA damage caused by hydrogen peroxide

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This study aimed to investigate the potential compensatory effects of *hOGG1* and *hMTH1* in the repair of oxidative DNA damage. The *hOGG1* and *hMTH1* gene knockdown human embryonic pulmonary fibroblast cell lines were established by Lentivirus-mediated RNA interference. The messenger RNA (mRNA) levels of *hOGG1* and *hMTH1* were analyzed by the real-time polymerase chain reaction and 8-hydroxy-20-deoxyguanosine (8-oxo-dG) formation was analyzed in a high-performance liquid chromatography-electrochemical detection system. The *hOGG1* and *hMTH1* knockdown cells were obtained through blasticidin selection. After transfection of *hOGG1* and *hMTH1* small interfering RNA, the expression levels of the mRNA of *hOGG1* and *hMTH1* genes were decreased by 97.2% and 96.2%, respectively. The cells then were exposed to 100 mmol/L of hydrogen peroxide (H_2O_2) for 12 hours to induce oxidative DNA damage. After H_2O_2 exposure, *hMTH1* mRNA levels were increased by 25% in *hOGG1* gene knockdown cells, whereas *hOGG1* mRNA levels were increased by 52% in *hMTH1* gene knockdown cells. Following the treatment with H_2O_2 , the 8-oxo-dG levels in the DNA of *hOGG1* gene knockdown cells were 3.1-fold higher than those in untreated HFL cells and 1.67-fold higher than those in H_2O_2 -treated wild-type cells. The 8-oxo-dG levels in *hMTH1* gene knockdown cells were 2.3-fold higher than those in untreated human embryonic pulmonary fibroblast cells but did not differ significantly from those in H_2O_2 -treated wild-type cells. Our data suggested that *hOGG1* could compensate for *hMTH1* during oxidative DNA damage caused by H_2O_2 , whereas *hMTH1* could not compensate sufficiently for *hOGG1* during the process.

Biography

Yuebin Ke is a Professor of the Shenzhen Center for Disease Control and Prevention and an Adjunct Professor of Life Sciences at Shenzhen University. He has completed his PhD from Huazhong University of Science and Technology and Postdoctoral studies from Virginia Polytechnic Institute and State University. He has published 18 papers in the areas of environmental health and molecular biology.

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