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E7-Expressing HaCaT Keratinocytes Are Resistant to Oxidative Stress-Induced Cell Death via Induction of Catalase

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Cervical carcinoma is one of the predominant cancers developed in women in the world, and human papillomavirus (HPV) type 16 is the most common agent linked to human cervical carcinoma. In order to identify various important factors affected by E7 oncogene, a stable cell line constitutively expressing E7 was established using a human keratinocyte cell line HaCaT. The increased expression and activity of catalase in E7-expressing HaCaT cell (HaCaT/E7) was confirmed by matrix-assisted laser desorption /ionization time of flight, Western blot, and RT-PCR analyses. Regulation of catalase by E7 was investigated by detecting catalase promoter activity. E7 enhanced the activities of catalase promoter and nuclear factor-κB, one of the major transcription factors regulating catalase gene expression. HaCaT/E7 cells produced lower amount of intracellular reactive oxygen species (ROS) and were more resistant to H_2O_2-induced cell death. Moreover, in order to test the specific effect of E7 on the induction of catalase, HaCaT/E7 cells were transiently transfected with E7 antisense vector, resulting in reduced both expression and activity of catalase, and showed restored intracellular level of ROS, thus resulting in increased sensitivity to H_2O_2-induced cell death. These results suggest that HPV 16 E7 oncogene exerts higher resistancy to ROS-induced cell injury, probably by modulation of several antioxidant enzymes including catalase.