# 3 - 49 X-ray Radiation Induced Caspase-8 and Caspase-9 Activation in Human Colon Cancer Cells

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Caspases as critical components in cell signaling pathways have been proved to be involved in events such as apoptosis, cell growth and differentiation. Two distinct apoptotic pathways related to the Caspase cascade have been identified; death receptor-induced apoptosis and mitochondrial stress-induced apoptosis. Death receptors trigger Caspase-8 and the mitochondria subsequently release apoptogenic factors (cytochrome c, Apaf-1, AIF), leading to the activation of Caspase-9. The mitochondrial and death receptor apoptotic pathways are intimately connected[1].

In this study, we investigated the activation of Caspase-8 and Caspase-9 in response to X-ray radiation (30 kVp) in isogenic colon cancer cell lines HCT116 ($p53^{+/+}$) and HCT116 ($p53^{-/-}$) using western blotting analysis. As shown in Fig. 1, doses of 0, 2 and 5 Gy were given and the detection time points post-irradiation were 24 , 48 and 72 h, respectively. Untreated cells were taken as the control to indicate the differences. The results show that Caspase-8 was not activated in HCT116 ($p53^{+/+}$) cells while Caspase-9 was activated in a time- and dose-dependence manner. In HCT116 ($p53^{-/-}$) cells, Caspase-8 and Caspase-9 were both activated, especially upregulated at the time point of 24 h after irradiation. It has been reported that under most conditions, any cross communication or crosstalk of mitochondrial and death receptor apoptotic pathways is minimal, and the two pathways operate largely independently of each other[2]. Therefore, the phenomenon of both activation of Caspase-8 and Caspase-9 in HCT116 ($p53^{-/-}$) cells above needs further explorations.

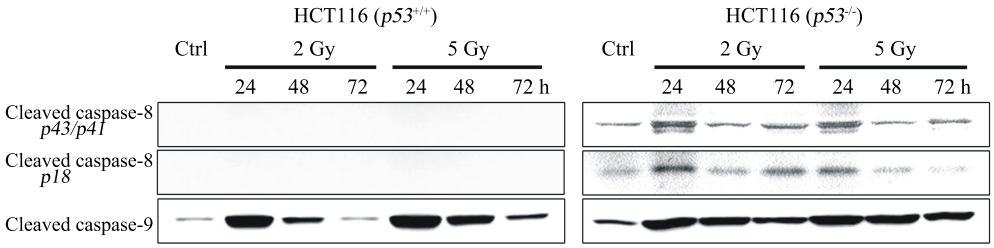


Fig. 1 Activation of Caspase-8 and Caspase-9 in colon cancer cells exposed to X-rays.

## References

[1] E. Mori, A. Takahashi, N. Yamakawa, et al., J Radiat Res, 50(2009)37.

[2] MO. Hengartner. Nature, 407(2000)770.