

## **St. John Wort sensitizes bronchial epithelial cells to radiotherapy by upregulation of P21 and BAX**

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**Background:** Lung cancer continues to be one of the most common and fatal cancers. St. John Wort (SJW) is a well-known, yellow-flowering plant found worldwide used medicinally for numerous illnesses. Recently, SJW has been shown to have anti-proliferative and pro-apoptotic effects on lung cancer. However, little is known about the effects of SJW on normal bronchial epithelial cells alone and when exposed to radiotherapy; this study was designed to address this unknown and further explore the potential mechanisms.

**Materials and Methods:** Clonogenic survival assay, PCNA staining, TUNEL staining, and caspase-3 activity were used to evaluate the proliferation and apoptosis in bronchial epithelial cell line B2B. RT-PCR and IHC were used to investigate the molecular mechanisms.

**Results:** We found that the percentage of colonies in B2B cells was comparable in the presence and absence of SJW. Interestingly, there was a decrease in the percentage of colonies, optical density, PCNA mRNA, and PCNA staining intensity in B2B cells within the RT/SJW group when compared with the RT group. The relative caspase-3 activity and TUNEL + cells in B2B cells increased significantly in the RT/SJW group when compared with the RT group. Additionally, the RT/SJW group showed a significant increase in the anti-proliferative molecule P21 and pro-apoptotic molecule BAX.

**Conclusion:** SJW alone has no effect on normal bronchial epithelial tissue. SJW does sensitize bronchial cells to radiotherapy by upregulation of P21 and BAX. This study may be helpful when designing a future protocol combining radiotherapy with SJW for the treatment of lung cancer.