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Title: microRNA-155 negatively regulates Apaf-1 and enhance sensitivity of A549 to cisplatin

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Body: MicroRNA-155(miR-155) overexpression is often found in malignancies including lung cancer. The objective of this study is to verify the hypothesis that miR-155 is involved in development and progress of lung cancer by modulating cell apoptosis and DNA damage through regulation on Apaf-1, which is postulated according to the bioinformatics analysis. Firstly, the expression of miR-155 and Apaf-1 protein in the lung cancer tissues were measured. The results showed that expression of miR-155 is significantly higher in lung cancer tissues compared with the paracancerous tissues and normal tissues, while Apaf-1 protein expression level decreased in lung cancer tissues. Then the miR-155 silenced and Apaf-1 overexpressed A549 cell models were established through transfection with pMAGic2.0-BIC-siRNA and pcDNA3.1-Apaf-1, respectively. The cell apoptosis and DNA damage of different cell models under treatment with cisplatin were assessed, and the untranfected A549 cells were used as negative control. The results showed that silence of miR-155 resulted in elevated expression of Apaf-1 protein, but the Apaf-1 mRNA level had no significant difference compared with the control group. Both miR-155 silencing and Apaf-1 overexpression in A549 cells seemed greatly increase the cellular sensitivity to cisplatin treatment as evidenced by elevated apoptosis rate and DNA damage. Further, dual-transfection with both miR-155 siRNA and Apaf-1 siRNA in A549 cells resulted in attenuation and alleviation of cell apoptosis and DNA damage. In conclusion, inhibition of miR-155 can enhance the sensitivity of A549 cells to cisplatin treatment by regulation on cell apoptosis and DNA damage through Apaf-1 mediated pathway.