Conclusions

Apoptosis is a highly regulated form of cell death and dysregulation of apoptosis is the hallmark of a number of diseases. For instance evasion of apoptosis results in cancer and progressive cell loss due to apoptosis is responsible for neurodegenerative diseases like Alzheimer’s, Huntington’s and Parkinson’s. Since the last decade, the research on miRNAs has gotten an overwhelming amount of attention because of their huge number and multiple functionally related targets. miRNAs have emerged as interesting modulators of apoptotic pathways. By regulating the apoptotic genes, they can be developed as potential therapeutics. Either miRNA replacements or miRNA-interfering techniques (such as AMO techniques, exogenous miRNA, miR-Mask techniques, and miRNA Mimic techniques) could be introduced into the cells to restore the physiological function of miRNAs and treat diseases. In this present study, hsa-miR-128 has been explored as an apoptotic modulator. The main findings of the present study are summarized below:

- Bax has been validated as a target of hsa-miR-128.
- Overexpression of hsa-miR-128 induces mitochondria-mediated apoptosis in HEK293T cells via upregulation of p53 and Bak.
- SIRT1 has been validated as another key target gene of hsa-miR-128.
- hsa-miR-128 exerts pro-apoptotic effects in a p53-dependent and – independent manner via PUMA-Bak axis.
- hsa-miR-128 affects a number of genes involved in cholesterol and fatty acid metabolism by targeting SIRT1.

Our findings show that apart from regulating apoptosis, hsa-miR-128 can also regulate cholesterol and fatty acid metabolism. However, further investigation needs to be performed to elucidate the role of hsa-miR-128 in regulating cholesterol and fatty acid metabolism. Introduction of hsa-miR-128 into in-vivo disease models would help us evaluate the prospect of its use as a therapeutic.
Fig. 8.1: Diagrammatic representation of hsa-miR-128 induced apoptosis. Hsa-miR-128 by targeting SIRT1 and Bax, induces mitochondrial-mediated apoptosis in HEK293T cells.