Identifying Hipk1 as a target of Mir-22-3p enhancing recombinant protein production from Hek 293 by using microarray and Htp sirna screen

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Identifying HIPK1 as Target of miR-22-3p, Enhancing Recombinant Protein Production From HEK 293 Cells

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Introduction

Mammalian cells are being used for producing proteins and antibodies for therapeutic, biochemical and structural studies. [1] Chinese Hamster Ovary (CHO) cells are commonly used for recombinant protein production but Human Embryonic Kidney (HEK-293) cells have the advantage of human post-translational modification.[2] microRNA (miRNA or miR) are small non-coding RNA that regulate gene expression. [3]

Our previous high throughput screen identified several miRNA, which improve protein production in HEK cells with multiple protein types, from these we decided to concentrate on hsa-mir-22-3p. [4]

Objectives

A. To improve protein expression in HEK 293 cells
B. To identify genes involved with improving protein expression as a result of treatment with the identified hsa-mir-22-3p
C. To create cell lines with improved protein expression

Conclusions

miR-22-3p improves recombinant protein expression
Using microarray analysis along with an siRNA screen, [7] common seed analysis and nCounter analysis can identify genes involved in recombinant protein production
HIPK1 is connected with improving luciferase and GPC3 expression
Validated with siRNA and RT-PCR

Future work

Investigate the mechanism(s) leading to improved protein biogenesis
Create high producing cell line by stable knock-out of top candidate genes
Compare to a high producing cell line with stable over-expressing mir-22

References


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