

STUDYING THE EFFECT OF STEMNESS FACTORS INVOLVED IN MOLECULAR CASCADES OF THE DEVELOPMENT OF COLON CANCER STEM CELLS



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INTRODUCTION

During the last decade, cancer stem cell - like cells are the subject of intensive study. It has been proven by the scientific community that a triplet of genes (nanog, oct3 / 4, sox2) is responsible for the development and behavior of this small population of cells that have the ability of self-renewal, ability to differentiate into several cell types (pluripotency) and finally are resistant to chemotherapy. The present study aims to discover a possible molecular model which may be correlated with the expression of these transcription factors as well as with disease progression in patients with colorectal cancer.

MATERIALS AND METHODS

Two scientific methods have been chosen in order to prove the above hypothesis. The first was based on the siRNA protocol in which the expression of nanog gene was repressed transiently by using liposomes. The second panel included a Real-time PCR based protocol in order to study the gene expression levels of the three transcription factors (nanog, oct3 / 4 & sox2) (qPCR). Colon cancer stem -cell like cells were isolated from patients who suffered from colorectal cancer. A commercial colon cancer cell line was used as control.

CONCLUSION

The present scientific attempt has indicated that, in this particular case, the three stemness markers are being correlated in a gene level. It has been shown that the oct3/4 and sox2 factor act synergistically in order to activate molecular cascades in which the nanog gene is involved. Although the present experiments were performed in triplicates in order to avoid incorrect results, further studies need to be conducted in order to prove the above model.

RESULTS

The results have showed that both the commercial colon CSCs and the population of colon CSCs isolated from colon cancer patient;s blood sample, stage Duke C, as the nanog gene expression was reduced, the oct3/4 and sox2 gene expression was increased.

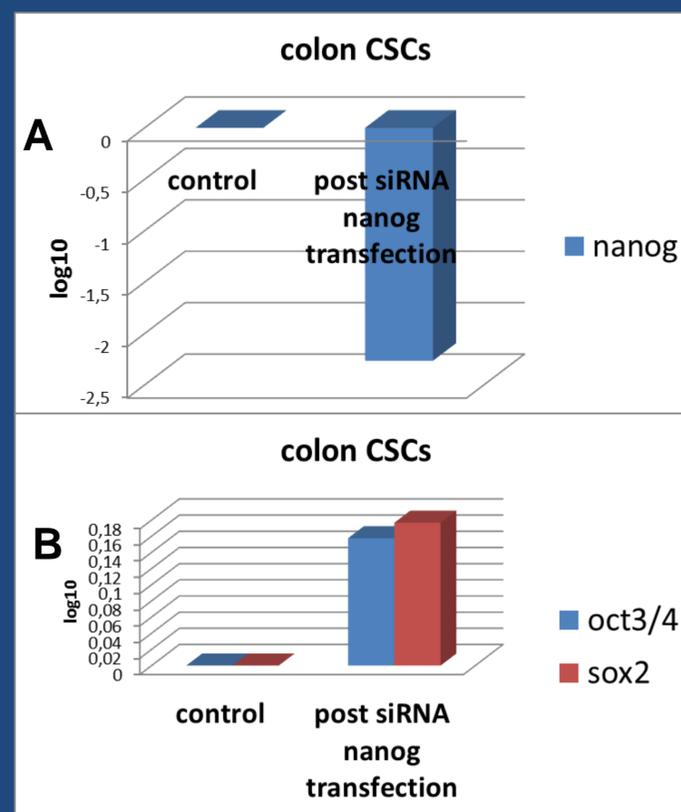


Figure 1. The diagrams show the reduction (%) of gene expression of the three stemness markers after nanog's knocking down. The diagram A shows the reduction of nanog gene expression post transfection while the diagram B shows the increase of oct3 / 4 and sox2 gene expression, in the same sample. When the nanog gene expression was reduced about 99%, the expression of both oct3 / 4 and sox2 genes in the same sample was increased approximately 1.5 - fold when was compared with the control level.

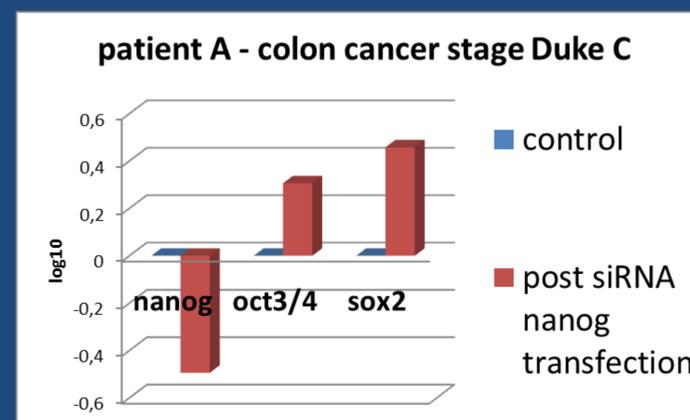


Figure 2. The diagrams show the reduction (%) of gene expression of the three stemness markers after nanog's knocking down.. When the nanog gene expression was reduced about 68%, the expression of both oct3 / 4 and sox2 genes in the same sample was increased approximately 2 - fold when was compared with the control level.

References

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