

· Biochemistry and Molecular Biology Bachelor's Degree Final Project ·

DOUBLE DEGREE OF BIOTECHNOLOGY AND BIOCHEMISTRY AND
MOLECULAR BIOLOGY

**EXO-MIRNAS ISOLATED FROM PROSTATE CANCER CELL
LINES, TARGET PREDICTION AND THEIR INTERACTION
WITH PROSTATE CANCER MICROENVIRONMENT**

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INDEX

1. ABREBBIATIONS

2. ABSTRACT

3. INTRODUCTION

3.1. Prostate Cancer

3.2. Diagnostic and Prognostic

3.3. Prostate Cancer Microenvironment, Exo-Vesicles and Exo-miRNAs

3.4. *In vitro* Models for Prostate Cancer Study

3.5. Databases

4. HYPOTHESIS AND OBJECTIVES

5. MATERIALS AND METHODS

5.1. Cells Culture

5.2. Exosome and Exo-miRNAs Isolation

5.2.1. Western Blot

5.2.2. Transmission Electron Microscopy Analysis

5.3. qRT-PCR

5.4. Data Analysis – Pathway and Functional Analysis

6. RESULTS

6.1. Exo-miRNAs and Targets for PCa Diagnosis

6.2. Exo-miRNAs and Targets for PCa Prognosis

6.2.1. miRNAs Down-Regulated in PC-3 vs LNCaP

6.2.2. miRNAs Up-Regulated in PC-3 vs LNCaP

7. DISCUSSION

8. CONCLUSIONS

9. ACKNOWLEDGEMENTS

10. BIBLIOGRAPHY

11. ANNEX

2. ABSTRACT

Introduction: Prostate cancer (PCa) is the second-most diagnosed cancer in men worldwide. A critical role of cell-to-cell communication by small extracellular vesicles released to the tumour microenvironment (exosomes) and their microRNA content (exo-miRNAs) have been shown to regulate gene expression and PCa development. Thus, the aim of this project is to investigate dysregulated exo-miRNAs in different prostate cancer cell lines and epithelial prostate cell cultures in order to identify their putative targets and their potential use in future as diagnostic and/or prognostic biomarkers.

Materials and Methods: PC-3, LNCaP and RWPE-1 cell lines were culture during 24h in their respective culture medium. Exosomes and exo-miRNAs were isolated and qRT-PCR was performed by using a panel that included 752 mature human cancer-related miRNAs. Pathway and functional enrichment analysis on putative targets of the selected exo-miRNAs was performed by using miRNet, Reactome and STRING softwares.

Results: For PCa diagnosis, *in silico* analysis revealed exo-miRNAs differentially expressed in PC-3 and LNCaP versus RWPE-1 cell line. miRNet, Reactome and STRING analysis demonstrated that 4 genes were common targets for the putative miRNA-regulated pathways with an important role on PCa tumorigenesis. And for PCa prognosis, *in silico* results showed that some exo-miRNAs were down-regulated and some others up-regulated comparing PC-3 and LNCaP cell lines. 4 genes were predicted to be under control of the down-regulated exo-miRNAs and 2 genes under control of the up-regulated exo-miRNAs. These genes have been found to be related to PCa progression.

Conclusion: PCa secreted exo-miRNAs within the PCa microenvironment can target genes involved in important PCa tumorigenesis and progression pathways. After validation studies in PCa tissue, they can be good future candidates to be incorporated in diagnostic and/or prognostic biomarker panels.

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