Diagnostic microRNA biomarkers for prostate cancer in cell-free urine

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Prostate cancer (PC) is a leading cause of death among men in the western world. Due to the frequent occurrence of non-lethal, non-progressing cases of PC, screening using Prostate Specific Antigen (PSA) has led to a high degree of overdiagnosis and overtreatment. Because of the high risk of side effects from radical prostatectomy (RP), such as urinary incontinence and impotence, the inaccuracy of PSA testing is a profound problem. Accordingly, better methods or tools are required to give a more accurate diagnosis.

In order to discover novel biomarker candidates for PC, the expression levels of 183 microRNAs (miRNA) were assayed in cell-free urine. The inclusion of urine samples from 188 patients treated by RP and 44 non-cancer patients with benign prostatic hyperplasia (BPH) allowed an effective investigation of diagnostic biomarker candidates.

The expression level in cell-free urine of several individual miRNAs was able to significantly distinguish between PC and BPH, suggesting that these miRNAs have potential as non-invasive biomarkers for PC. However, as a single miRNA may be subject to fluctuations from patient to patient, both ratio-based and multi-miRNA classifiers were constructed, which were able to outperform any of the single miRNA biomarker candidates.

**ABSTRACT**

Prostate cancer (PC) is a leading cause of death among men in the western world. Due to the frequent occurrence of non-lethal, non-progressing cases of PC, screening using Prostate Specific Antigen (PSA) has led to a high degree of overdiagnosis and overtreatment. Because of the high risk of side effects from radical prostatectomy (RP), such as urinary incontinence and impotence, the inaccuracy of PSA testing is a profound problem. Accordingly, better methods or tools are required to give a more accurate diagnosis.

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**1. INTRODUCTION**

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
Score distribution for 20-mir classifier

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Score distribution for 20-mir classifier

**2. DIAGNOSTIC ANALYSIS**

**Diagnostic performance of single miRNA biomarkers.** AUC: 89.6%

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**3. CLASSIFIER CONSTRUCTION**

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
Score distribution for 20-mir classifier

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Score distribution for 20-mir classifier

**4. CLASSIFIER RESULTS**

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
Score distribution for 20-mir classifier

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
Score distribution for 20-mir classifier

**5. CONCLUSION**

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
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**6. ACKNOWLEDGMENTS**

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**7. REFERENCES**

-20 -16 -12 -9 -6 -3 0 2 4 6 8 11 14 17 20
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