

lncRNA profiling analysis for a better understanding of prostate cancer

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Prostate cancer is one of the most common cancers in men and, although it has been studied extensively for many years, there is still much to be learned with respect to its clinical diagnosis, prognosis, and mechanism. To better understand prostate cancer development, we used the human RT² lncRNA Cancer PathwayFinder PCR Array to evaluate cancer-related long noncoding RNA (lncRNA) expression in prostate cancer RNA samples.

Introduction

lncRNAs have been linked to the development of cancer and their potential as tumor biomarkers has been recently demonstrated. The lncRNA, PCA3, is used as a biomarker for clinical diagnosis of prostate cancer. Researchers are now becoming more aware of the important role played by lncRNAs in tumorigenesis and a variety of lncRNAs have been identified as oncogene or tumor suppressors. As studies of lncRNA have been limited so far, our knowledge of the many cancer-related lncRNAs is still in its infancy and only very few tumor types have been screened for changes in lncRNA expression. Better lncRNA profiling and more detailed studies of their mechanism of action will improve the understanding of cancer and its treatment.

Materials and methods

Total RNA from normal tissue control and prostate cancer tissue samples was analyzed (OriGene, MD, USA). The control group was total RNA from normal prostate tissue. Group 1 was total RNA from stage II prostate cancer tissue samples and group 2 was total RNA from stage III–IV prostate cancer tissue samples. The RT² First Strand Kit was used for cDNA synthesis (200 ng RNA/20 µl RT reaction) and the human RT² lncRNA Cancer PathwayFinder PCR Array was used for lncRNA detection with the RT² SYBR® Green qPCR Mastermix. Real-time PCR was carried out on an Applied Biosystems® 7900HT Sequence Detection System. The QIAGEN® PCR array analysis tool was used for gene expression analysis.

Results

With standard total RNA input (2 ng/25 µl qPCR reaction), 30–40% of cancer-related lncRNA can be detected at a C_q <30 with the human RT² lncRNA Cancer PathwayFinder PCR Array — thus, the RT² lncRNA Cancer PathwayFinder PCR Array simplifies lncRNA profiling. In contrast to normal control samples, stage II prostate cancer samples demonstrated significant changes in lncRNA expression (Figure 1). The biomarker, PCA3, was easily identified. The novel tumor suppressor ►



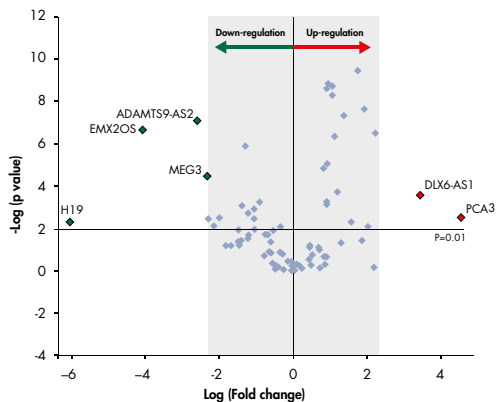


Figure 1. Accurate profiling of lncRNA gene expression.
A volcano plot of lncRNA gene expression change in stage II prostate cancer tissue compared with normal tissue was generated using the RT² data analysis module in GeneGlobe (www.qiagen.com/GeneGlobe).

lncRNA, ADAMTS9-AS2, was also associated with prostate cancer progression. Rapid screening of samples showed that ADAMTS9-AS2 was down-regulated even further in stage III–IV prostate cancer samples.

Conclusions

- RT² lncRNA PCR Arrays profile lncRNA expression accurately and sensitively using total RNA from cancer tissue.
- While confirming lncRNA expression changes that are already known, RT² lncRNA PCR Arrays can help to link lncRNAs to cancer types that are less well studied and, thus, provide information on their role in different tumor types.
- Being able to correlate tumor stage with lncRNA expression enables lncRNAs to be used as potential biomarkers for clinical diagnosis and prognosis.

Ordering Information

Product	Contents	Cat. no.
RT ² lncRNA PCR Arrays	For profiling lncRNA by pathway or disease. Available in 96-well, 384-well, and Rotor-Disc® 100 formats for almost all qPCR instruments	330721
RT ² lncRNA PCR Array Modification	Add up to 4 genes to a RT ² lncRNA PCR Array	330711
Custom RT ² lncRNA PCR Array	Build your own RT ² lncRNA PCR Array for RNA-seq verification or qPCR profiling of your most important genes	330731
RT ² RNA QC PCR Arrays	Arrays for quality-control analysis prior to experiments using RT ² lncRNA PCR Arrays; available in 96-well, 384-well, and Rotor-Disc 100 formats	330291
RT ² lncRNA qPCR Assay (200)	For 200 x 25 µl reactions: Laboratory-verified SYBR Green qPCR assay	330701

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RT² lncRNA PCR Arrays are protected by U.S. Patent [8,597,938] for the "System for providing control reactions for real time RT-PCR".
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