

The expression of CST Complex genes in prostate cancer cell lines and its relationship with telomere length

Poliana Romão da Silva¹; Gabriel Arantes Galvão Dias dos Santos¹; Ruan C A Pimenta¹; Nayara I Viana¹; Vanessa R Guimaraes¹; Juliana A Camargo¹; Iran A Silva¹; Kátia R M Leite¹; Miguel Srougi¹; Sabrina T. Reis^{1, 2}

¹ Medical Investigation Laboratory (LIM55), Urology Department, University of Sao Paulo Medical School (FMUSP), Sao Paulo, Brazil.

² Athens University Center (UniAtenas), Passos, Minas Gerais, Brazil.



Introduction and Objectives

The CST complex is a trimeric protein group consisting of CTC1, STN1 and TEN1, acting in telomere protection, regulation of telomeres activity, telomere DNA replication and for regulation of telomere length. Telomere dysfunction is associated to prostate cancer (PCa) progression, but we do not know yet the role of CST complex in prostate neoplasia. Because of that, this study evaluated the gene expression of CST in PCa cell lines and its relationship with telomere length.

Methodology

The gene expression of CTC1, STN1 and TEN1 and telomere length was evaluated in metastatic PCa cell lines, LNCaP, DU145 and PC3 by Q-PCR assay, PNT2 cell line (normal prostate cancer epithelium immortalized) was used as control group. ANOVA test was used for statistical analysis.

Results

In all cell lines we found an upregulation of TEN1 and STN1 compared with control group ($p= 0.0024$ and $p= 0.0007$, respectively) (Figure 1). The expression of CTC1 was upregulated in LNCaP and PC3 cell lines when compare with control group ($p= 0.0189$ and $p= 0.0029$) (Figure 2). However, when we compared DU145 with other cancer cell line we found a downregulation of CTC1 ($p= 0.0013$)(Figure 2). When we analyzed the telomere length, we found a shorter telomere in LNCaP, PC3 cell lines ($p<0.001$) and longer telomere in DU145 cell line ($p<0.001$) (Figure 3).

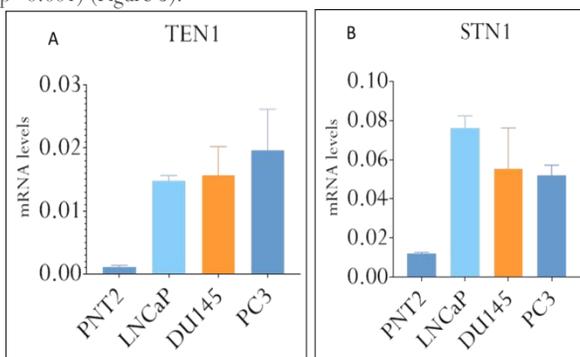


Figure 1. A. Upregulated expression of TEN 1 compared with control group ($p= 0.0024$). B. Upregulated expression of TEN 1 compared with control group ($p= 0.0007$).

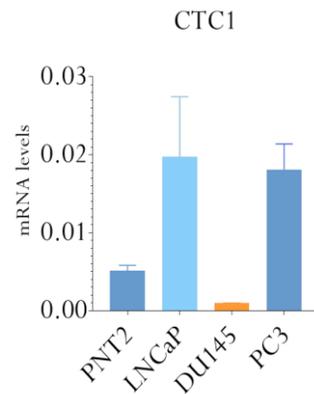


Figure 2. Upregulation expression of CTC 1 in LNCaP and PC3 cell line compared with control group ($p= 0.0189$; $p= 0.0029$). Downregulation expression of CTC1 in DU145 ($p= 0.0013$)

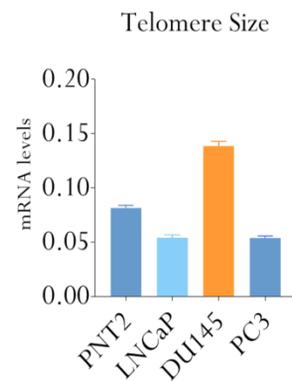


Figure 3. Compare telomere size with the control group, it is demonstrated a shorter telomere in LNCaP and PC3 cell lines ($p<0.001$) and longer telomere in DU145 cell line ($p<0.001$).

Conclusion

We can conclude that CST complex subunits are modified in PCa metastatic cell lines. Our main hypothesis is the abnormally long telomeres and CTC1 downregulation might be associated with disease progression to the brain microenvironment.