

The study of Tmx2 in self-renewal and pluripotency in breast cancer

Die Forschung der Tmx2 in Selbsterneuerung und Pluripotenz bei Brustkrebs

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Introduction: The thioredoxin-related transmembrane protein 2 (TMX2) is a member of TMX proteins, which are involved in redox signaling and immune response. These processes are correlated with cell proliferation and carcinogenesis. Cancer stem Cells (CSCs) are involved in self-renewal and differentiation, contributing to carcinogenesis. The present study aims to demonstrate the role of TMX2 in the above procedures in breast cancer, by studying the SOX2 transcription factor.

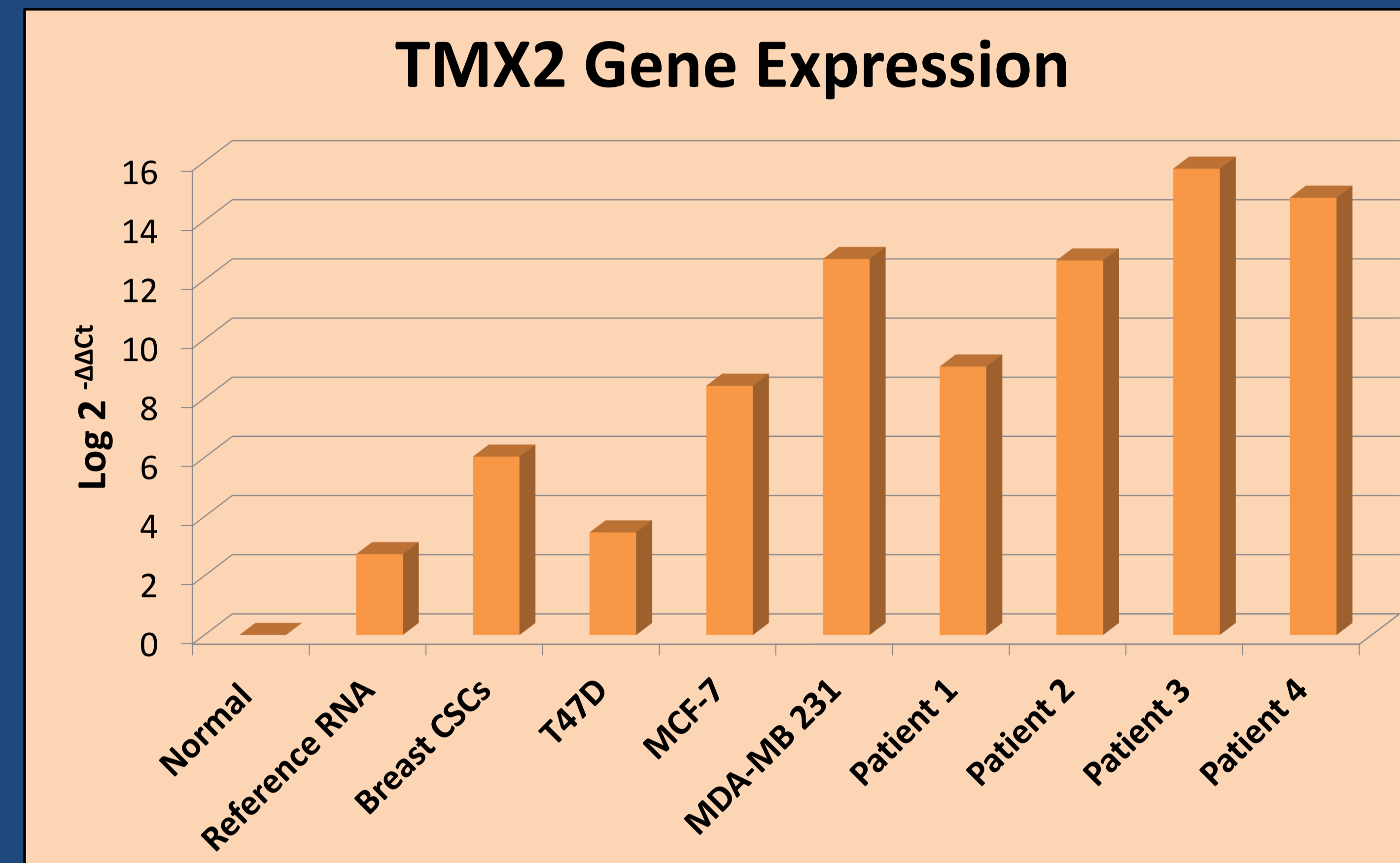


Figure 1: TMX2 Gene expression among breast cancer and breast CSCs

Results: The microarray data indicated that TMX2 was over-expressed in all breast cancer samples. The above results were confirmed with qPCR. The suppression of TMX2 led to decrease in gene expression of SOX2 transcription factor up to 40%.

Materials & Methods: The experiments were performed in human established breast cancer cell lines (MCF-7, T47D and MDA-MB 231), as well as in a commercial breast CSCs (Celprogen) and in CSCs derived from breast cancer patients. The stemness properties were evaluated both by molecular-based and cellular-based assays. mRNA was isolated from each cell line and whole genome DNA microarrays were performed. Reference RNA and non-cancer samples were used as reference samples. The data were validated with qPCR. Knocking-down experiments for TMX2 followed in breast CSCs, and finally the gene expression of SOX2 was measured.

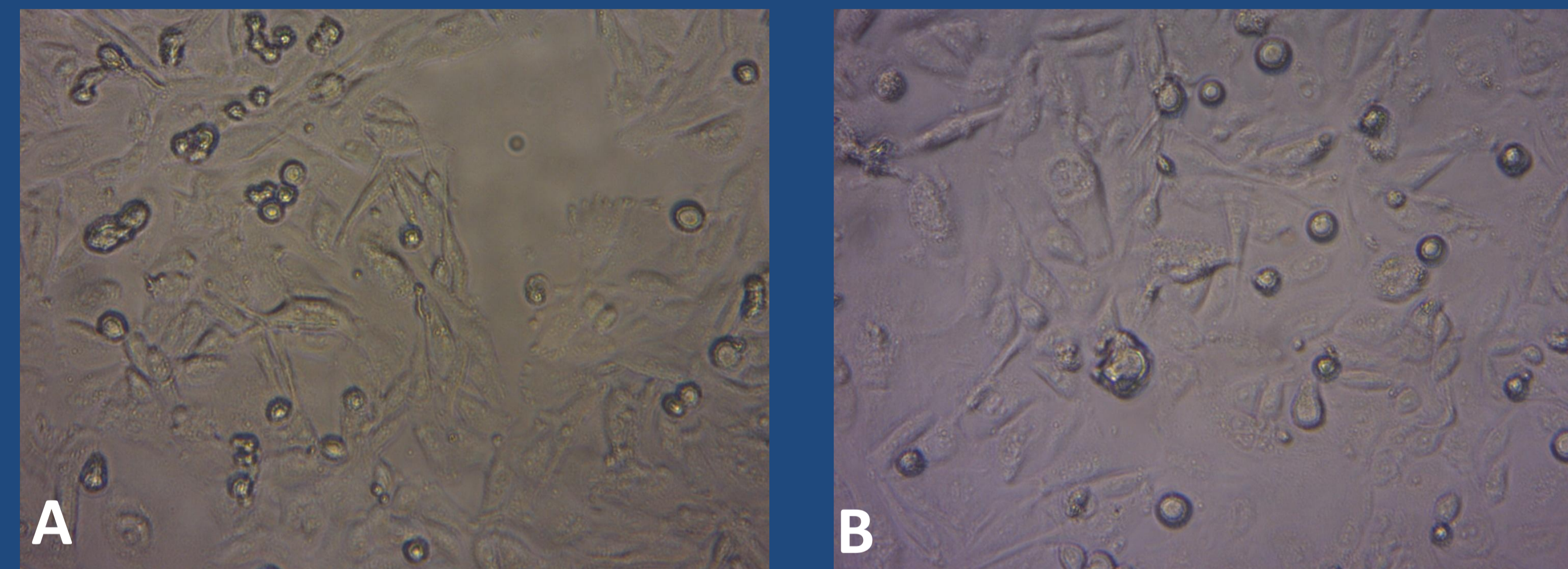


Figure 3: Breast CSCs before (A) and after (B) transfection.

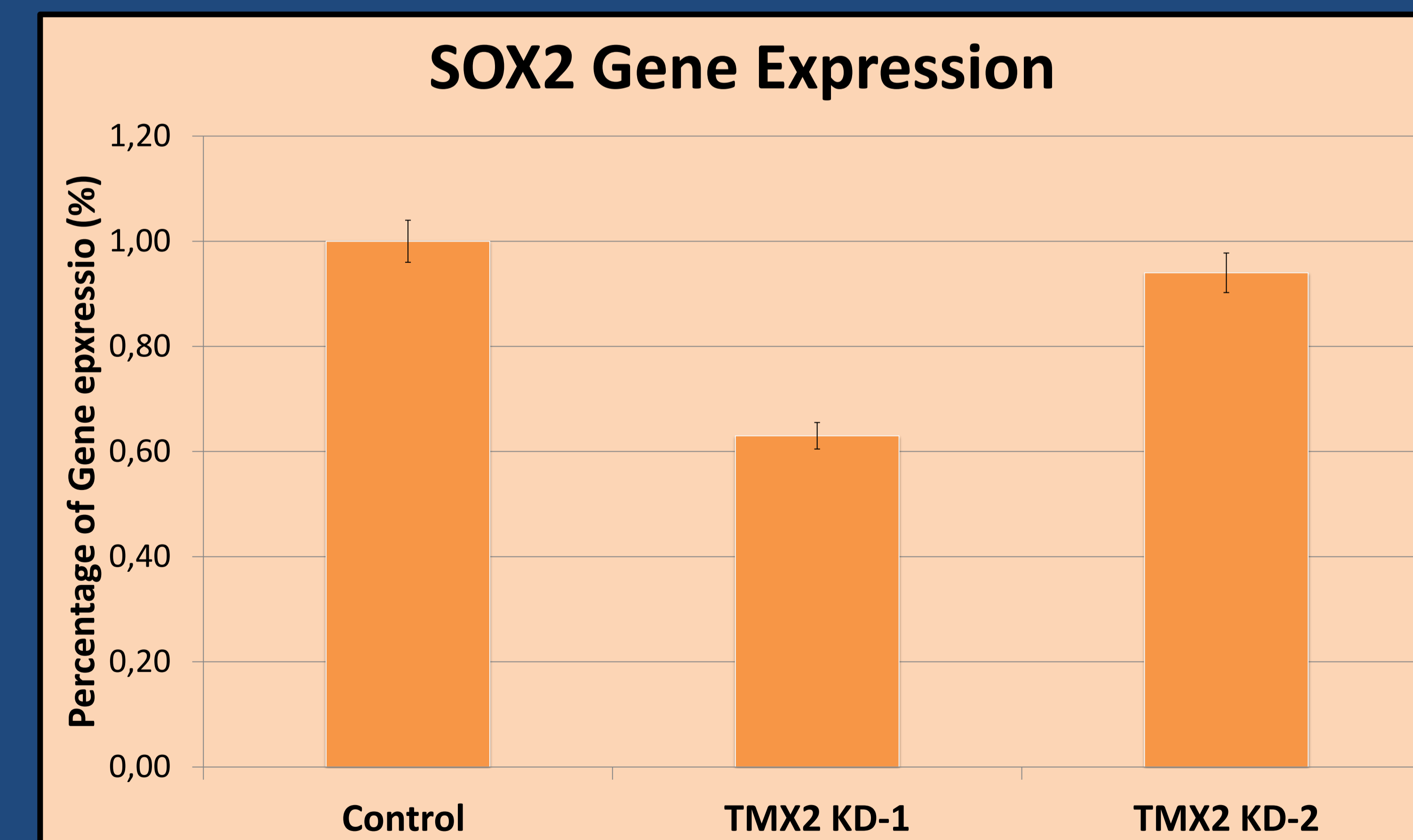


Figure 2: SOX2 Gene expression pre and post-siRNA transfection in breast CSCs

Conclusion: Although TMX2 and SOX2 are located in different chromosomes, there are many common transcription factors with binding sites upstream and downstream of them. Nevertheless, their relationship has not been clarified. This study demonstrated that TMX2 is overexpressed in breast cancer cell lines and in breast CSCs. It might also be involved in self-renewal and pluripotency processes, by affecting SOX2 gene expression. Further studies in more samples are needed so that it can be used at clinical level.

Selected References:

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Disclosure of Potential Conflicts of Interest

None of the authors of the above study has declared any conflict of interest

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