Exploration of Targeted Anti-tumor Therapy

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Emerging role of pioneer transcription factors in targeted ERα positive breast cancer

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Abstract

Transcription factors (TFs) are modular protein groups that preferably bind to DNA sequences and guide genomic expression through transcription. Among these key regulators, "pioneer factors" are an emerging class of TFs that specifically interact with nucleosomal DNA and facilitate accessible genomic binding sites for the additional TFs. There is growing evidence of these specialized modulators in particular malignancies, as highlighted by agents' clinical efficacy, specifically targeting nuclear hormone receptors. They have been implicated in multiple cancers more recently, with a high proportion inculpating on hormone influential cancers. Moreover, extended crosstalk and cooperation between ERα pioneering factors in estrogen-dependent breast cancer (BC) remain elucidated. This review discusses on the recent advances in our understanding of pioneer TFs in cancer, especially highlighting its potentiality to modulate chromatin condensation to permit ERα recruitment in BC cells. Through the study it was concluded that the highly prospected pioneer TFs in BC, including FOXA1, TLE1, PBX1, and GATA3, possess the potential therapeutic significance and further innovations in the field could yield targeted therapy in cancer treatment.

Keywords

Transcription factor, pioneer transcription factors, ERα signaling, breast cancer

Introduction

Transcription factors (TFs) include the most prominent regulatory proteins that bind to the specific region in the DNA and control gene expression by influencing RNA polymerase activity [1, 2]. DNA sequences of 6-20 bp within the transcriptional initiation sites referred to as TF binding sites are recognized by these specialized proteins and regulate the transcription of genes [3]. The biological diversity among these proteins is striking; they range from a smaller group of general TFs to many proteins called regulatory TFs [4]. Besides, an emerging subset of unique TFs termed pioneer transcription factors (PTFs) that specifically bind to allocated enhancers in the nucleosomal DNA and facilitates accessible genomic binding