

Review

Transforming growth factor- β and breast cancer

Introduction

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The balance between growth stimulatory and growth inhibitory signals is essential for normal tissue homeostasis. An imbalance of these signals may favour the development of uncontrolled proliferation, leading to neoplasia. Transforming growth factor (TGF)- β plays an important role in the regulation of mammary duct development and cellular proliferation in the mammary gland during adult life. The different *in vitro* and *in vivo* models that have shed light on mammary development and the limitations of these models are presented in the first review of this series. The second article reviews murine models that have provided insights, not only into the role of TGF- β in mammary development, but also into its role in tumour suppression. TGF- β receptors and the Smad signalling molecules transduce TGF- β signals. The study of these has yielded important insights into the regulation of this pathway. A review of the many levels at which TGF- β signalling can be disrupted during oncogenesis is presented in this series. TGF- β is a potent mediator of G₁ arrest in mammary epithelial and other cell types.

Mechanisms of G₁ arrest by TGF- β and their dysregulation in cancers are addressed. In a final review, the tumor promoting effects of TGF- β are discussed. In advanced stages of breast cancer, not only is the cell cycle arrest response to TGF- β lost, but, in addition, this pathway can be subverted in such a way that TGF- β signalling indirectly supports tumour viability, invasiveness and malignant progression.

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