

Immunohistochemical Investigation of β-catenin Expression in Renal Cell Carcinoma

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Abstract

Renal cell carcinoma is the most common renal malignancy and accounts for approximately 5% of all cancer diagnoses in adults. One of the molecular mechanisms that have been implicated to play an important role in renal cell carcinogenesis is the dysregulation of Wnt signaling pathway, reflected by the abnormal expression of beta-catenin. For the purpose of our study, we selected twenty (20) cases of renal cell carcinomas of clear cell, papillary and chromophobe types, confirmed through pathological reevaluation, in order to assess the expression levels of β-catenin. Immunohistochemical staining with anti-β-catenin specific monoclonal antibody was performed. Our study provides hints of the involvement of β-catenin in renal cell oncogenesis.

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Introduction

Renal cell carcinoma is the most common renal malignancy and accounts for approximately 5% of all cancer diagnoses in adults. Renal cell cancer has proven to be a rising cause of morbidity and mortality during the last few decades, making more and more demanding the need for discovering its molecular background and the potential therapeutic interventions. Moreover, apart from the surgical approach based on radical or partial nephrectomy, very few drugs have been so far approved as treatment options, when dealing with a patient with renal cell carcinoma [1].

Until recently, the underlying molecular mechanisms of renal cell oncogenesis were quite unclear. However, remarkable research has been conducted in this field during the last few years, leading to the identification of various dysregulated molecular pathways in the pathogenesis of renal cell carcinoma, such as PI3K/Akt/mTOR, HGF/c-Met and MAPK. One of the molecular mechanisms that has been implicated to play an important role in renal cell carcinogenesis is the dysregulation of Wnt signaling pathway, reflected by the abnormal expression of beta-catenin [2].

Beta-catenin is a member of the catenin protein family involved in the regulation and coordination of cell-to-cell adhesion and gene transcription. Signal transduction pathways implicating β-catenin have proven to be involved, as common mechanisms, in the carcinogenesis of various organs [3].

For the purpose of our study, twenty (20) cases of renal cell carcinoma of clear cell, papillary and chromophobe types, confirmed through pathological reevaluation, were selected. In order to evaluate the expression levels of β-catenin an immunohistochemical evaluation using an anti-β-

catenin specific monoclonal antibody (mouse monoclonal, clone 14, 1:200 dilution, Bio SB, Santa Barbara, CA, USA) was performed. The peritumoral renal cell tissue was used as a normal control for the immunohistochemical assessment.

The immunohistochemical evaluation showed that in all cases of renal cell carcinoma, the expression level of β-catenin was increased compared with normal peritumoral tissues. More specifically, the entire group of renal cell carcinomas, regardless of histopathological subtype, showed strong membranous and/or cytoplasmic staining patterns (Fig. 1)

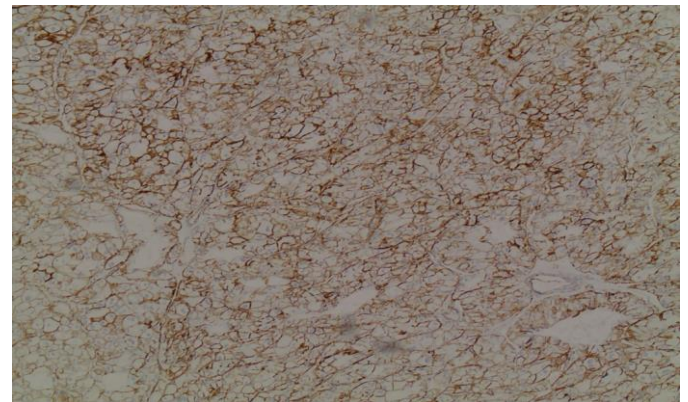


Figure 1. Membranous immunohistochemical staining for β-catenin on formalin-fixed, paraffin-embedded section from a case of clear cell renal cell carcinoma (original magnification x200)

During the last few decades several studies have been performed in order to elucidate the structure and functions of β-catenin. However, the exact role and mechanism of action of β-catenin in renal cell carcinoma remains unclear [4]. Our study provides hints of the involvement of β-catenin in renal cell oncogenesis.

In conclusion, further research is needed in order to evaluate the variable expression of β-catenin in renal cell cancer, the importance of the immunostaining expression pattern - membranous and cytoplasmic in contrast to nuclear -and the potential use in clinical therapeutics.

References

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