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Serum TRAF-1 as a biomarker for developing clear cell renal cell carcinoma

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Background and Aims: Renal cell carcinoma (RCC) serum biomarkers, that effectively identify the developing cancer non-invasively, are urgently needed. Tumour necrosis factor receptor-associated factor-1 (TRAF-1) is strongly expressed in the proximal tubular epithelium of normal kidney. The proximal tubular epithelium is thought to be the tissue of origin of clear cell RCC (ccRCC), the most common of the RCC subtypes. The TRAF-1 signalling pathway is necessary for immune response and apoptosis regulation. We have found TRAF-1 is significantly decreased in ccRCC, but no serum analyses had been carried out. The aim of this study was to compare tissue TRAF-1 levels with serum levels in control and ccRCC patients from the University of Malaya Medical Centre (UMMC).

Methods: Immunohistochemistry with automated batch staining, and Aperio Image Scope morphometry were used to compare TRAF-1 in 69 ccRCC patients from UMMC with paired normal kidney tissue from those patients. Serum from 15 ccRCC and 15 healthy people were tested for TRAF-1 (ELISA). ANOVA with Tukey's post-hoc (tissue) and Mann-Whitney U-test (serum) was used (mean ± SEM).

Results: Compared with normal kidney (168512 ± 6166 positive pixel counts/PPC), ccRCC was lower (82591 ± 5646 PPC) ($p<0.05$). However, TRAF-1 in serum from ccRCC patients was significantly increased over normal serum levels (202.28 ± 74.58 vs 50.63 ± 13.56 ng/ml; $p=0.012$).

Conclusion: To the best of our knowledge, this is the first study to evaluate serum TRAF-1 levels in patients with ccRCC. Serum TRAF-1 levels were significantly elevated in patients with ccRCC compared with healthy individuals. The increased serum TRAF-1, compared with decreased tissue TRAF-1 in ccRCC, may indicate the protein is actively secreted from developing ccRCC. As such, serum TRAF-1 may be a useful addition to biomarker panels as a non-invasive indicator of ccRCC development.

Biography

Retnagowri Rajandram completed her B.Sc (Hon I) then her Ph.D. with University of Queensland Australia in 2009 at age 25. She is currently a Senior Lecturer with University of Malaya in Malaysia where she is from. She is an upcoming researcher and is keen in cancer research specifically kidney cancer from her honours year. Her broad interest in this field encompasses the investigation of a possible panel of biomarkers for the disease. Her skills comprise of cell culture work including transfections, western immunblotting, RNA and tissue microarray, immunohistochemistry as well as using Aperio image software. Her current research consist of investigating tumour necrosis factor associated factor 1's (TRAF1) role in renal cell carcinoma (RCC) using human paraffin embedded tissue and blood from RCC subjects. Her other projects in this area include further defining the molecular pathway of TRAF1 in renal cell carcinoma. She has presented her work at local and international conferences, ever since 2005

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