

## Increased Levels of P, Pb and Zn in Renal Cell Carcinoma

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The incidence of RCC has nearly doubled over the past two decades, currently comprising about 2% of all human malignancies. Across the world, more than 100,000 people die annually from RCC. Cigarette smoking and obesity are the most consistently established causal risk factors, accounting for more than 20% and 30% of renal cell cancers, respectively. Other studies have identified additional risk factors, including hypertension, exposure to asbestos, petroleum products and heavy metals. The aim of this study was to examine the concentrations of trace elements in normal kidney and malignant renal tumor tissues. We examined 50 RCC and 20 normal kidney samples, all of them fixed in formaldehyde. Inductively coupled plasma optical emission spectroscopy (ICP-OES) was used to estimate the contents of Al, Ca, Cd, Cr, Cu, Fe, K, Mg, Mn, Na, P, Pb, and Zn in healthy kidney and renal cell carcinoma. Progressive accumulation was detected for P, Pb and Zn in stage T4. For P, the concentration in stage T4 was 11.1 times higher than in stage T1; for Pb, the concentration in stage T4 was 232.7 times higher than in T1, and for Zn the concentration in T4 was 8452 times higher than in T1. This study highlights the marked differences in the concentrations of selected trace metals in different malignant tumor stages. These findings indicate that some trace metals may play important roles in the pathogenesis of RCC.

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