

## Carotenoid and vitamin intake, *von Hippel-Lindau* gene mutations and sporadic renal cell carcinoma

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Received: 10 January 2007 / Accepted: 4 October 2007 / Published online: 9 November 2007  
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### Abstract

**Objective** We investigated whether dietary carotenoid and vitamin intake and supplemental vitamin use were inversely associated with RCC risk and with *Von Hippel-Lindau* (*VHL*)-gene mutations in clear-cell renal cell carcinoma (RCC).

**Methods** The Netherlands Cohort Study on diet and cancer (NLCS) includes 120,852 persons, who completed a self-administered food-frequency questionnaire in 1986. After 11.3 years of follow-up, 284 cases and a random sample of 4,095 persons (subcohort) with complete data

were included in multivariable analyses using a case-cohort approach. *VHL* gene mutational analysis was complete for 225 cases. Rate ratios and corresponding 95% confidence intervals were estimated using Cox proportional hazard models, while adjusting for age, sex, smoking, body mass index, and a history of hypertension.

**Results** We observed no association for dietary carotenoid and vitamin intake and RCC risk, and a somewhat increased risk with supplemental vitamin E, AD, and multivitamin use. Results were suggestive of higher RRs for alpha-carotene, beta-cryptoxanthin, folate, and supplemental vitamin C and multivitamin intake for wildtype *VHL* tumors compared to *VHL*-mutated tumors.

**Conclusions** There was no association of carotenoid, vitamin or supplemental vitamin intake and RCC risk. These associations should be investigated by others to confirm the current observations.

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**Keywords** Renal cell carcinoma · Vitamins ·  
Carotenoids · Supplements ·  
*von Hippel-Lindau* gene mutations · Netherlands ·  
Cohort study

### Introduction

Mutations in the *von Hippel-Lindau* (*VHL*) gene are believed to be an early event in renal carcinogenesis. *VHL* mutations are mainly observed in tumors of the most common histological subtype, clear-cell renal cell carcinoma (RCC) [1]. Mutations are observed in the entire gene and usually lead to a truncated inactive protein [1]. The *VHL* gene is a tumor suppressor gene involved in cell cycle regulation, regulation of hypoxia inducible genes and proper fibronectin assembly in