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Large prospective investigation of meat intake, related mutagens, and risk of renal cell carcinoma^{1,2,3,4}

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[+](#) Author Affiliations[+](#) Author Notes**Abstract**

Background: The evidence for meat intake and renal cell carcinoma (RCC) risk is inconsistent. Mutagens related to meat cooking and processing, and variation by RCC subtype may be important to consider.

Objective: In a large US cohort, we prospectively investigated intake of meat and meat-related compounds in relation to risk of RCC, as well as clear cell and papillary RCC histologic subtypes.

Design: Study participants (492,186) completed a detailed dietary assessment linked to a database of heme iron, heterocyclic amines (HCA), polycyclic aromatic hydrocarbons (PAHs), nitrate, and nitrite concentrations in cooked and processed meats. Over 9 (mean) y of follow-up, we identified 1814 cases of RCC (498 clear cell and 115 papillary adenocarcinomas). HRs and 95% CIs were estimated within quintiles by using multivariable Cox proportional hazards regression.

Results: Red meat intake [62.7 g (quintile 5) compared with 9.8 g (quintile 1) per 1000 kcal (median)] was associated with a tendency toward an increased risk of RCC [HR: 1.19; 95% CI: 1.01, 1.40; *P*-trend = 0.06] and a 2-fold increased risk of papillary RCC [*P*-trend = 0.002]. Intakes of benzo(a)pyrene (BaP), a marker of PAHs, and 2-amino-1-methyl-6-phenyl-imidazo[4,5-b]pyridine (PhIP), an HCA, were associated with a significant 20–30% elevated risk of RCC and a 2-fold increased risk of papillary RCC. No associations were observed for the clear cell subtype.

Conclusions: Red meat intake may increase the risk of RCC through mechanisms related to the cooking compounds BaP and PhIP. Our findings for RCC appeared to be driven by strong associations with the rarer papillary histologic variant. This study is registered at clinicaltrials.gov as [NCT00340015](https://clinicaltrials.gov/ct2/show/study/NCT00340015).

Footnotes

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