



Winter Conference 2023, 5-6 December 2023, Diet and lifestyle strategies for prevention and management of multimorbidity

Relationship between carrot intake, dietary/circulating α -carotene and cancer risk: A systematic review and meta-analysis of prospective observational studies

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Carrot consumption reduces tumour development in several animal models. The constituent alpha-carotene has not by itself shown anti-cancer properties, however carrots typically provide >85% of alpha-carotene dietary intake⁽¹⁻³⁾, justifying its use as an indicator of carrot intake⁽³⁾. We conducted a meta-analysis to investigate inverse associations of carrot/dietary α -carotene intakes and cancer risk, and to quantify potential dose-response relationships.

PubMed, Cochrane Library, Web of Science, Scopus, EBSCO, and JSTOR were searched (from database inception to August 2021) for studies reporting risk estimates with 95% CIs for the relationship between carrot intake or α -carotene and cancer risk. Meta-analyses were conducted using a random-effects model comparing highest and lowest intakes to estimate summary risk estimates (RRs).

Of 80 prospective studies included, 15 (with 25738 cases) reported data on carrot intake, 35 (26262 cases) on dietary α -carotene intake and 30 (9331 cases) on plasma α -carotene levels. A significantly ($P < 0.01$) decreased risk of overall cancer was associated with carrot intake (RR = 0.90), dietary α -carotene intake (RR = 0.90) and plasma α -carotene (RR = 0.80). In addition, both carrot intake and plasma α -carotene level manifested linear dose-response relationships with cancer risk, with increasing carrot intake reaching 20% risk reduction at 5 servings (400g) per week ($p < 0.0001$), and successive 50 μ g/L increments in plasma α -carotene associated with 11% risk reduction ($p < 0.0058$).

Carrot consumption is robustly associated with decreased cancer risk. Carrot consumption should be encouraged, and the causal mechanisms further investigated.

References

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