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Dietary carrot intake compared favourably with three other vegetable groups in protection against incidence of cancers: A systematic review and meta-analysis

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High consumption of fruits and vegetables has been associated with reduced risk of cancers and other degenerative diseases, although the overall association is weak for breast, colorectal, lung, and prostate cancer^(1–2), suggesting that protective effects may be peculiar to specific fruits or vegetables. The present meta-analysis explored the assertion that carrots may contribute a unique protective effect compared with other common vegetables, possibly owing to their content of highly bioactive polyacetylenes⁽³⁾. We hypothesized that⁽¹⁾ carrot consumption is associated with reduced risks of cancers, and⁽²⁾ carrots offer greater or equal protective effects compared with tomatoes, cruciferous, and green leafy vegetables. A comprehensive protocol was published on PROSPERO with ID CRD42019124009 and the results of the present meta-analysis were included (with other analyses) in the first version of a pre-print⁽⁴⁾; however, the comparison with other vegetables was removed from subsequent versions of that manuscript, so this will not be published elsewhere before July 2023.

PubMed, Cochrane Library, Web of Science, Scopus, EBSCO, and JSTOR were searched, from database inception to June 2022, for studies reporting risk estimates with 95% CIs for the relationship between carrot intake and the risk of cancers, and studies were included in the present analysis if they also reported the associations with the intake of any of the above-mentioned vegetables. Using a random-effects model, a meta-analysis was conducted comparing the highest and lowest intakes to estimate summary risk estimates (RRs) and 95% confidence intervals (CIs) in retrospective studies.

Out of 58 studies with 64,131 cases that reported data on carrots and at least one of the other vegetables being investigated, 11 were prospective studies and 47 retrospective⁽⁴⁾. Due to substantial interaction with study design (prospective/retrospective), only retrospective studies were included in the present analysis, since while the RR values from prospective studies are more reliable than from retrospective studies, the number of prospective studies was too low for this comparison. The 47 retrospective studies included 30 studies with 20286 cases that reported data on tomatoes; 34 studies, 16692 cases on green leafy vegetables; and 14 studies, 11616 cases on cruciferous vegetables, each assessing intakes compared with cancer risks. Significantly decreased ($P < 0.017$) risks of cancers were associated with the intake of each vegetable: carrots RR 0.66, 95%CI 0.60–0.72; tomatoes 0.76, 0.68–0.85; green leafy vegetables 0.74, 0.65–0.84; and cruciferous vegetables 0.84 0.76–0.97. Carrot intake significantly decreased the risk of cancers ($P < 0.01$) more than cruciferous vegetables⁽⁴⁾.

In conclusion, carrot consumption decreased the risk of cancers as much as green leafy vegetables or tomatoes, and more than cruciferous vegetables.

References

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