

## Tomato/Tomato-based foods and Disease Risk

### Lung Cancer Critical Findings

Disease type	First Author	Study Title and Complete Citation	Date	Abstract	Study Type	G.Tom +, N, -	P.Tom +, N, -	F.Tom +, N, -	Lyco +, N, -	Other +, N, -	
Cancer: lung	Le Marchand L	Vegetable consumption and lung cancer risk: a population-based case-control study in Hawaii.  Le Marchand L, Yoshizawa CN, Kolonel LN, Hankin JH, Goodman MT.  J Natl Cancer Inst. 1989 Aug 2;81(15):1158-64.	1989	We conducted a population-based study of diet and lung cancer among the multiethnic population of Hawaii in 1983-1985. We completed interviews for 230 men and 102 women with lung cancer and 597 men and 268 women controls, frequency-matched to the patients by age and sex. A quantitative dietary history assessed the usual intake of foods rich in vitamins A and C and carotenoids. A clear dose-dependent negative association was demonstrated between dietary beta-carotene and lung cancer risk in both sexes. After adjusting for smoking and other covariates, the men in the lowest quartile of beta-carotene intake had an odds ratio of 1.9 (95% confidence interval, 1.1-3.2) compared to those in the highest quartile of intake. The corresponding odds ratio for women was 2.7 (95% confidence interval, 1.2-6.1). No clear association was found for retinol, vitamin C, folic acid, iron, dietary fiber, or fruits. All vegetables, dark green vegetables, cruciferous vegetables, and tomatoes showed stronger inverse associations with risk than beta-carotene. This observation suggests that other constituents of vegetables, such as lutein, lycopene, and indoles, and others, may also protect against lung cancer in humans	CC	(-)					
Cancer: lung	Forman MR	The effect of dietary intake of fruits and vegetables on the odds ratio of lung cancer among Yunnan tin miners.  Forman MR, Yao SX, Graubard BI, Qiao YL,	1992	All newly diagnosed cases of lung cancer (N = 183) among male tin miners of Yunnan Province, China and age-sex matched occupational controls (N = 183 aged 45-79 years) were interviewed within 3 months following cancer diagnosis. The questionnaire included information about usual adult diet as well as employment and smoking histories. Over 95% of cases and controls were current smokers. The 27-item food frequency questionnaire included 11 fruits and vegetables rich in vitamin A and/or carotenoids. The effect of dietary intake of fruits and vegetables on risk of lung cancer was examined with adjustment for	CC	(-)					

		<p>McAdams M, Mao BL, Taylor PR.</p> <p>Int J Epidemiol. 1992 Jun;21(3):437-41.</p>		<p>exposures to radon, arsenic, and smoking as previously documented risk factors for lung cancer. Tin miners with reduced intake of yellow and light green vegetables had statistically significant increased odds ratios (OR) of lung cancer (OR = 2.26 and OR = 2.39 for the lowest two quartiles of intake; P value for trend = 0.02) among cases compared with controls after multiple logistic regression adjustment for covariates; and this relationship was monotonic. Tin miners with reduced intake of tomatoes had statistically significant increased adjusted OR of lung cancer (OR = 2.64, OR = 3.09, OR = 2.36 for the three lowest quartiles of intake; P value for trend = 0.04). This is the first study to demonstrate a protective effect of vegetable intake versus the strong effects of smoking and occupational exposures on lung cancer risk.</p>							
Cancer: lung	Goodman MT	<p>Dietary factors in lung cancer prognosis.</p> <p>Goodman MT, Kolonel LN, Wilkens LR, Yoshizawa CN, Le Marchand L, Hankin JH.</p> <p>Eur J Cancer. 1992;28(2-3):495-501.</p>	1992	<p>A hypothesis-generating analysis of the role of diet on survival was conducted among a sample of 463 men and 212 women with histologically-confirmed lung cancer. Interview information was obtained from two population-based case-control studies of lung cancer conducted on the Island of Oahu, Hawaii, between 1979 and 1985. The interview consisted of a quantitative dietary history to assess the usual intake of foods 1 year prior to diagnosis, a complete tobacco history, and other demographic and lifestyle information. Records from the Hawaii Tumor Registry were reviewed for data on stage, histology, and follow-up status of these patients. A food group analysis showed a significant reduction in the risk of death with increasing consumption of all vegetables combined among women (P for trend = 0.03), but not among men. The covariate-adjusted median survival times for women from the highest to the lowest quartiles of vegetable intake were 33, 21, 15, and 18 months, respectively. The results also suggested an association of fruit intake and survival among women (P for trend = 0.02), although a similar effect was not found among men. Increased consumption of certain foods, such as tomatoes and oranges among men, and broccoli and, perhaps, tomatoes among women, appeared to improve survival. This exploratory analysis provides mixed indications that certain components of vegetables and fruits may prolong survival in lung cancer patients.</p>	CC	(-)				V/F (-) JW Survival	

Cancer: lung	Agudo A	<p>Vegetable and fruit intake and the risk of lung cancer in women in Barcelona, Spain.</p> <p>Agudo A, Esteve MG, Pallares C, Martinez-Ballarín I, Fabregat X, Malats N, Machengs I, Badia A, Gonzalez CA.</p> <p>Eur J Cancer. 1997 Jul;33(8):1256-61.</p>	1997	<p>A case-control study on women was carried out in Barcelona, Spain, to investigate the relationship of lung cancer with the intake of vegetables, fruits and some foods of animal origin. The study included 103 cases and 206 controls matched by age and residence. Diet intake was assessed by means of a food frequency questionnaire. A reduction in risk, adjusted for smoking habit, was found for the intake of yellow/orange vegetables (mainly carrots) and tomatoes. The odds ratio (OR) and 95% confidence interval (CI) for the highest versus lowest tertile of intake were 0.37 (0.19-0.74) for yellow/orange vegetables and 0.45 (0.22-0.91) for tomatoes; both had a significant inverse trend. A tendency to a reduction in risk of lung cancer with increased intake was observed for all vegetables, leafy green vegetables, dark green vegetables and cruciferous, but these associations did not reach statistical significance. No association with lung cancer was found for the intake of fruits or foods of animal origin rich in retinol. Similar patterns were observed for women who never smoked and when the analysis was restricted to adenocarcinoma.</p>	CC	(-)					
Cancer: lung	Brennan P	<p>A multicenter case-control study of diet and lung cancer among non-smokers.</p> <p>Brennan P, Fortes C, Butler J, Agudo A, Benhamou S, Darby S, Gerken M, Jokel KH, Kreuzer M, Mallone S, Nyberg F, Pohlman H, Ferro G, Boffetta P.</p> <p>Cancer Causes Control.</p>	2000	<p>OBJECTIVE: We have examined the role of dietary patterns and specific dietary nutrients in the etiology of lung cancer among non-smokers using a multicenter case-control study. METHODS: 506 non-smoking incident lung cancer cases were identified in the eight centers along with 1045 non-smoking controls. Dietary habits were assessed using a quantitative food-frequency questionnaire administered by personal interview. Based on this information, measures of total carotenoids, beta-carotene and retinol nutrient intake were estimated. RESULTS: Protective effects against lung cancer were observed for high consumption of tomatoes, (odds ratio (OR) = 0.5; 95% confidence interval (CI) 0.4-0.6), lettuce (OR = 0.6; 95% CI 0.3-1.2), carrots (OR = 0.8; 95% CI 0.5-1.1), margarine (OR = 0.7; 95% CI 0.5-0.8) and cheese (OR = 0.7; 95% CI 0.5-1.0). Only weak protective effects were observed for high consumption of all carotenoids (OR = 0.8; 95% CI 0.6-1.0),</p>	CC	(-)					

		2000 Jan;11(1):49-58.		<p>beta-carotene (OR = 0.8; 95% CI 0.6-1.1) and retinol (OR = 0.9; 95% CI 0.7-1.1). Protective effects for high levels of fruit consumption were restricted to squamous cell carcinoma (OR = 0.7; 95% CI 0.4-1.2) and small cell carcinoma (OR = 0.7; 95% CI 0.4-1.2), and were not apparent for adenocarcinoma (OR = 0.9; 95% CI 0.6-1.3). Similarly, any excess risk associated with meat, butter and egg consumption was restricted to squamous and small cell carcinomas, but was not detected for adenocarcinomas.</p> <p>CONCLUSIONS: This evidence suggests that the public health significance of increasing vegetable consumption among the bottom third of the population would include a reduction in the incidence of lung cancer among lifetime non-smokers by at least 25%, and possibly more. A similar protective effect for increased fruit consumption may be present for squamous cell and small cell lung carcinomas.</p>							
Cancer: lung	Darby S	<p>Diet, smoking and lung cancer: a case-control study of 1000 cases and 1500 controls in South-West England.</p> <p>Darby S, Whitley E, Doll R, Key T, Silcocks P.</p> <p>Br J Cancer. 2001 Mar 2;84(5):728-35.</p>	2001	<p>We have examined the relationship between diet and lung cancer in a case-control study of 982 cases of lung cancer and 1486 population controls in south-west England in which subjects were interviewed personally about their smoking habits and their consumption of foods and supplements rich in retinol or carotene. Analyses were performed for 15 dietary variables, including intake of pre-formed retinol and carotene. There were significant associations (P&lt; 0.01) with lung cancer risk for 13 of the variables, eight of which remained after adjustment for smoking. When the 15 variables were considered simultaneously, independent significant associations remained for 5: pre-formed retinol (increased risk), and fish liver oil, vitamin pills, carrots and tomato sauce (decreased risk). It is unlikely that all five associations represent biological effects, or that they can all be</p>	CC		(-)				

			<p>explained by residual confounding by smoking, or by biases. We conclude that there is at least one as yet unidentified factor that is causally related to lung cancer risk and of considerable importance in terms of attributable risk in this population.</p>								
--	--	--	--	--	--	--	--	--	--	--	--