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CURRICULUM VITAE

Current position (from 2002 till now) :

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Medical Doctor (1990 – 1996) :

University of Athens

Clinical Specialisation (1999-2004):

Internal Medicine. Therapeutics Clinic, “Alexandra” Hospital.
Medical University of Athens

PhD (1999-2004):

University of Athens

Masters:

1. Master in Epidemiology, Harvard School of Public Health (2003-2004)
2. Master in Health Management, University of Athens (2002-2003)

Publication (relevant to nutrition):

1. [van Gils CH, Peeters PH, Bueno-de-Mesquita HB, Boshuizen HC, Lahmann PH, Clavel-Chapelon F, Thiebaut A, Kesse E, Sieri S, Palli D, Tumino R, Panico S, Vineis P, Gonzalez CA, Ardanaz E, Sanchez MJ, Amiano P, Navarro C, Quiros JR, Key TJ, Allen N, Khaw KT, Bingham SA, Psaltopoulou T, Koliva M, Trichopoulou A, Nagel G, Linseisen J, Boeing H, Berglund G, Wirfalt E, Hallmans G, Lenner P, Overvad K, Tjonneland A, Olsen A, Lund E, Engeset D, Alsaker E, Norat T, Kaaks R, Slimani N, Riboli E.](#)

Consumption of vegetables and fruits and risk of breast cancer.

JAMA. 2005 Jan 12;293(2):183-93

2. [Benetou V, Bamia C, Trichopoulos D, Mountokalakis T, Psaltopoulou T, Trichopoulou A.](#)

The association of body mass index and waist circumference with blood pressure depends on age and gender: a study of 10,928 non-smoking adults in the Greek EPIC cohort.

Eur J Epidemiol. 2004; 19(8): 803 - 9.

3. [Psaltopoulou T, Naska A, Orfanos P, Trichopoulos D, Mountokalakis T, Trichopoulou A.](#) Olive oil, the Mediterranean diet, and arterial blood pressure: the Greek European Prospective Investigation into Cancer and Nutrition (EPIC) study.

Am J Clin Nutr. 2004 Oct;80(4):1012-8.

4. [Psaltopoulou T, Orfanos P, Naska A, Lenas D, Trichopoulos D, Trichopoulou A.](#) Prevalence, awareness, treatment and control of hypertension in a general population sample of 26,913 adults in the Greek EPIC study.

Int J Epidemiol. 2004 Dec;33(6):1345-52

5. [Key TJ, Allen N, Appleby P, Overvad K, Tjonneland A, Miller A, Boeing H, Karalis D, Psaltopoulou T, Berrino F, Palli D, Panico S, Tumino R, Vineis P, Bueno-De-Mesquita HB, Kiemeny L, Peeters PH, Martinez C, Dorronsoro M, Gonzalez CA, Chirlaque MD, Quiros JR, Ardanaz E, Berglund G, Egevad L, Hallmans G, Stattin P, Bingham S, Day N, Gann P, Kaaks R, Ferrari P, Riboli E; European Prospective Investigation into Cancer and Nutrition \(EPIC\).](#)

Fruits and vegetables and prostate cancer: no association among 1104 cases in a prospective study of 130544 men in the European Prospective Investigation into Cancer and Nutrition (EPIC).

Int J Cancer. 2004 Mar;109(1):119-24.

SINTESI INTERVENTO

Dr. ssa Psaltopoulou Theodora

OLIO DI OLIVA: POVERO DI GRASSI SATURI. PREVIENE E RIDUCE RISCHIO TUMORI

La dieta mediterranea fu inizialmente descritta da Keys come una dieta povera di grassi saturi, con azione protettiva nei confronti delle coronaropatie. Lo studio è stato successivamente ampliato a contemplare possibili effetti benefici sull'insorgenza dei tumori, la mortalità totale e la longevità. L'incidenza e la mortalità correlate alle principali forme di tumore risultano più basse nei paesi mediterranei dove l'olio d'oliva copre una quota sostanziale dell'apporto lipidico.

In un lavoro pubblicato di recente dal Dipartimento di Epidemiologia dell'Università di Atene, una maggiore aderenza alla dieta mediterranea risultava associata a una significativa riduzione della mortalità per tumore.

Si ritiene che l'olio d'oliva eserciti effetti antimutageni. I dati in nostro possesso depongono per un'assunzione di olio d'oliva inversamente proporzionale al rischio di carcinoma mammario e cancro coloretale.

Studi caso - controllo, condotti principalmente in Grecia, Italia e Spagna, hanno rilevato un'associazione inversa tra olio d'oliva e altre forme tumorali, in modo particolare: carcinoma ovarico,

endometriale, prostatico, pancreatico, esofageo, laringeo, faringeo e della cavità orale.

Olive Oil and Cancer

Theodora Psaltopoulou, MD

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Department of Epidemiology**

Medical School, University of Athens, Greece

**Italian Cancer Day
16 March 2005, Rome**



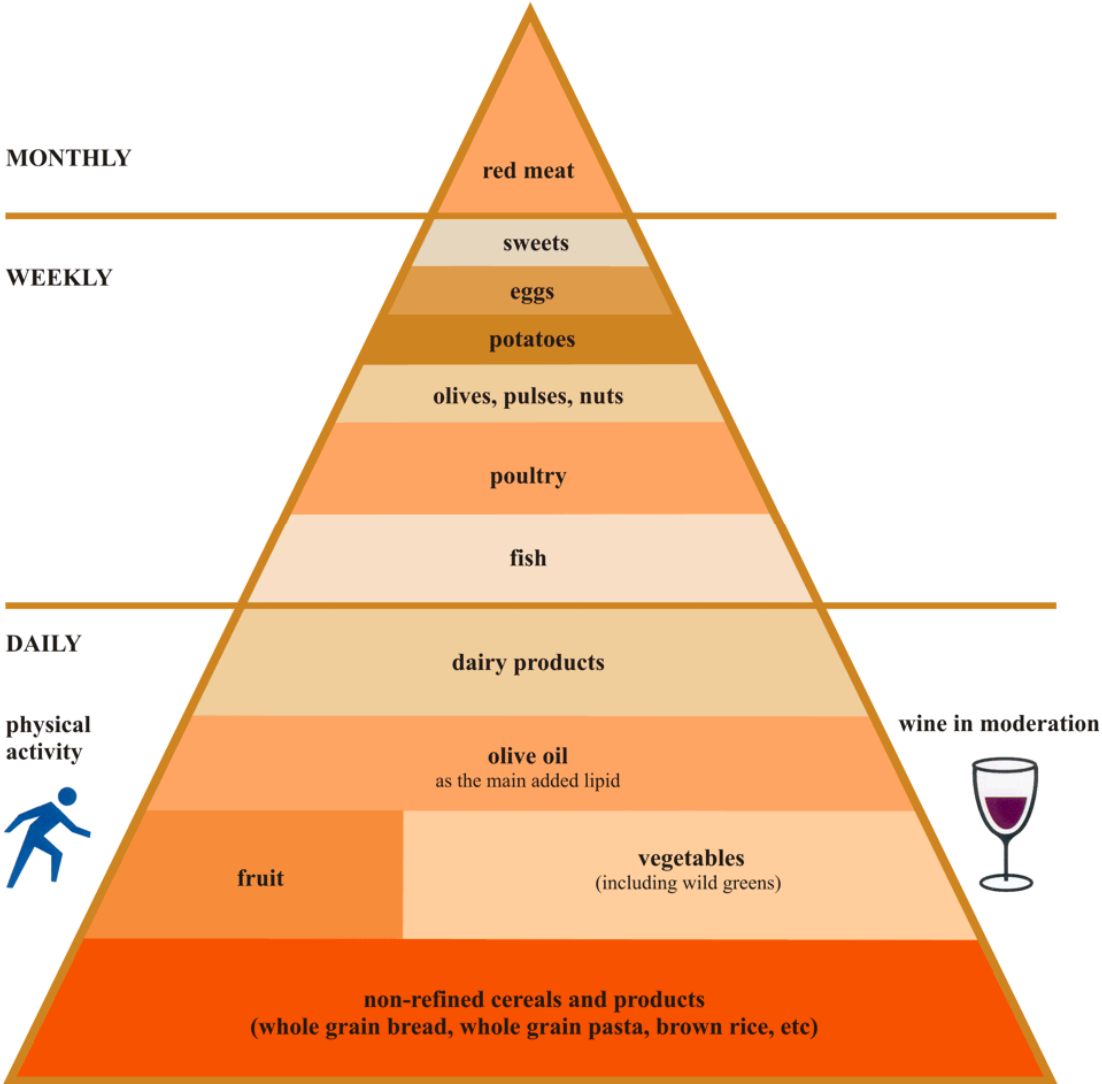
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MEDITERRANEE

The Mediterranean Diet can be thought of as having 9 characteristics:

- **high olive oil consumption**
- **high consumption of legumes**
- **high consumption of unrefined cereals**
- **high consumption of fruits**
- **high consumption of vegetables**
- **moderate wine consumption**
- **moderate consumption of dairy products, mostly as cheese and yogurt**
- **moderate to high consumption of fish**
- **low consumption of meat and meat products**

MEDITERRANEAN DIET



Also remember to:

- drink plenty of water
- avoid salt and replace it by herbs (e.g oreganon, basil, thyme, etc)

Mediterranean diet and longevity

Mediterranean diet was firstly described by Keys, as a low saturated lipid diet conveying protection against coronary heart disease.

Keys A et al. Am J Epidemiol 1986

The study of the Mediterranean diet was expanded to include possible effects on cancer occurrence, total mortality and longevity.

Avani and La Vecchia. Am J Clin Nutr 1995

Trichopoulos A et al. Cancer Epidemiol Biomarkers Prev 2000

Trichopoulos A et al. N Engl J Med 2003

Results

per 2-unit increase in Mediterranean diet score (in a 10-unit scale)

A higher degree of adherence to the Mediterranean diet was associated with a reduction in :

total mortality

adjusted mortality ratio 0.75

coronary heart disease

adjusted mortality ratio 0.67

cancer

adjusted mortality ratio 0.76

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 1. Breast cancer



Olive oil and genetics of breast cancer: *in vitro experiments*

- Oleic acid has been found to suppress the erbB-2 overexpression and synergistically enhances the growth inhibitory effects of trastuzumab (monoclonal antibody).
- Specifically, it promotes apoptotic cell death of breast cancer cells with erbB-2 oncogene amplification.
- This is a novel molecular mechanism by which oleic acid may regulate the malignant behavior of breast cancer cells.

Menendez JA et al. Ann Oncol 2005

Olive oil and breast cancer: *animal experiments*

- High-fat corn oil diet promotes the development of high histologic grade rat-induced mammary adenocarcinomas, while high olive oil does not

Costa I et al. Breast Cancer Res Treat 2004

- In experimental mammary adenocarcinomas, high corn oil diet increases EGFR activity, whereas high olive oil diet decreases the EGFR and Neu signal transduction pathway

Moral R et al. Oncol Rep 2003

Olive oil and breast cancer :

case-control studies

At least 3 case-control studies, conducted in Greece, Spain and Italy suggest that olive oil may be associated with decreased risk of breast cancer

In the Greek hospital-based case-control study (820 women with breast cancer- 1,548 controls), more frequent consumption of olive oil was associated with an odds ratio of 0.75 (95%CI 0.57-0.98)

Trichopoulos A et al. J Natl Cancer Inst 1995

In a multicentric case-control study in Italy (2,564 cases- 2,588 controls), the odds ratio per unit (30g) increase of olive oil consumption was 0.89 (95%CI 0.81-0.99)

de Vecchia et al. Cancer Causes Control 1995

In a population-based case-control study conducted in five regions of Spain (762 cases- 988 controls), higher consumption of monounsaturated fat was related to reduced risk for breast cancer. For olive intake, the odds ratios for increasing quartiles were 1.0, 0.79, 0.72, and 0.66

Martin-Moreno JM et al. Int J Cancer 1994

Olive oil and breast cancer: *other epidemiological evidence*

Ecologic comparisons do not suggest a positive correlation between breast cancer incidence or mortality and olive oil consumption as they seem to do for consumption of saturated fat or total animal fat. Indeed, incidence of breast cancer in Mediterranean countries is relatively low compared with that in most of other Western countries.

Shipworth L et al. Prev Med 1997

Cohen LA and Wynder EI. Med Hypotheses 1990

In the case of breast cancer, dietary fat intake in adulthood is unrelated to the risk. There is some suggestive, but preliminary evidence that olive oil or other sources of monounsaturated fatty acids may modestly decrease risk.

Villett WC et al. JAMA 1992

Miyoshi L and Giovannucci E. Am J Med 2002

Olive oil and breast cancer

other epidemiological evidence

- 8984 women, follow-up 9.5 years, 207 incident cases of breast cancer: completed a semiquantitative FFQ in Northern Italy, during 1987 to 1992 (ORDET cohort).
- A diet rich in raw vegetables and olive oil protects against breast cancer

Sieri S et al. Cancer Epidemiol Biomarkers Prev 2004

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 2. Large bowel cancer



Olive oil and genetics of colon cancer: *in vitro* experiments

Hydroxytyrosol, an important component of virgin olive oil, inhibits proliferation of both human promyelocytic leukemia cell HL60 and colon adenocarcinoma cells HT29 and HT29 clone 19A.

abiani R et al. Eur J Cancer Prev 2002

Olive oil extracts showed high antioxidant capacity *in vitro*. As epsilon-DNA adducts are biomarkers for oxidative stress and lipid peroxidation induced DNA damage, they can verify the efficacy of antioxidants, such as from olive oil, as chemoprotective agents against colon carcinogenesis.

artsch H. Biol Chem 2002

Olive oil and colon cancer: *animal experiments*

- In chemically induced rat cancer model, olive oil/sulindac combinations were effective in downregulating colonic mucosa Bcl-2 expression and COX-2 expression.
- These effects were not observed in rats fed the soy oil/sulindac combinations.
- Diets containing high levels of olive oil exert a significant protective effect from tumor development that is additive with the inhibitory effect of sulindac.

Schwartz B et al. Eur J Nutr 2004

Olive oil and colon cancer:

case-control studies

- Examining the association of mono-unsaturated fat intake and colorectal cancer in a study in Majorca, Spain (295 cases-203 hospital controls), the odds ratio for cancer of colon and rectum was found 0.72, with a non-significant trend ($p=0.16$). No data for olive oil was given.

Benito E et al. Int J Cancer 1990

- Other studies that did not control for energy intake have been undertaken. An inverse association with olive oil has been reported by Macquart-Moulin *et al*, whereas in the studies by Manousos *et al*, La Vecchia *et al*, and Bidoli *et al*, positive association with olive oil or monounsaturated fat was found.

Macquart-Moulin G et al. Int J Cancer 1986

Manousos O et al. Int J Cancer 1983

La Vecchia C et al. Int J Cancer 1988

Bidoli E et al. Int J Cancer 1992

Olive oil and colon cancer: *ecologic evidence*

The ecologic evidence shows that olive oil may not increase the risk for cancer of the large bowel, but, Mediterranean populations also consume large quantities of vegetables, fruits and fiber-containing foods, all of them contributing possibly to the lower incidence and mortality from colorectal cancer.

Thus, the overall evidence at this stage is weak to allow firm conclusion.

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 3. Ovarian cancer



Olive oil and ovarian cancer: *epidemiological evidence*

In a study assessing diet and cancer mortality in Mediterranean countries, Greece and Spain has the lowest rates of ovarian cancer, together with the lowest intake of animal fat and the highest consumption of olive oil

erra-Majem L et al. Eur J Clin Nutr 1993

In a hospital-based case-control study conducted in Greece (189 cases with epithelial ovarian cancer-200 controls), an inverse relation of monounsaturated fat intake, mostly olive oil, and risk for ovarian cancer was found (odds ratio 0.80, 95%CI 0.65-0.99)

izonou A et al. Int J Cancer 1993

Olive oil and ovarian cancer: *epidemiological evidence*

- In another case-control study in Italy, in which total energy intake was not controlled, it was found that while elevated butter consumption was associated with a 2-fold increase in ovarian cancer risk, no association was observed with consumption of olive oil.

La Vecchia et al. J Natl Cancer Inst 1987

- In the most recent case-control study conducted in Italy between 1992 and 1999, 1031 cases and 2411 controls were included. After allowance for study centre, year at interview, age, education, parity, oral contraceptive use and total energy intake, a reduce risk of ovarian cancer was observed for high intake of olive oil (OR 0.68, 95%CI 0.50-0.93, for the highest quintile, compared with the lowest one), as well as for a group of specific seed oils.

Bosetti C et al. Cancer Causes Control 2002

In ancient Greece:

- The prize for the winners of the Olympic Games was a wreath of wild olive, “kotinos”.
- Olive oil was also used as a sacred symbol for religious purposes in different ceremonies.
- The Hippocratic code of medicine mentions approximately 60 therapeutic uses of the olive tree for treating diseases and ailments.



OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 4. Endometrial cancer



Olive oil and endometrial cancer: *epidemiological evidence*

- Data are sparse
- In a cooperative case-control study conducted in Switzerland and northern Italy, 274 patients with endometrial cancer and 572 controls had their diet assessed, using a dietary questionnaire with 50 indicator foods.

More frequent consumption of olive oil was associated with a decreased risk for endometrial cancer; the odds ratio for the highest vs the lowest tertile was 0.82.

Levi F et al. Cancer 1993

Olive oil and endometrial cancer: *epidemiological studies in Greece*

In the first study, a hospital-based case-control study (145 cases and 298 controls), diet was ascertained using a semi-quantitative FFQ. The only statistically suggestive association was the inverse one with monounsaturated fats (1SD was associated with 1 26% risk reduction, 95%CI 0.54-1.03).

In the second study, another hospital-based case-control study (84 cases and 84 controls) was conducted. Concerning the lipids, a protective effect of added lipids, which in the Greek diet are primarily represented by olive oil, is highly suggestive.

Michalopoulos A et al. Br J Cancer 1996

Petridou E et al. Nutr Cancer 2002

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 5. Prostate cancer



Olive oil and prostate cancer: *epidemiological evidence*

- Data are sparse
- In a hospital-based case-control study in Greece (320 patients with prostate cancer -246 controls), among added lipids, seed oils were significantly and butter and margarine non-significantly positively associated with prostate cancer risk, whereas olive oil was unrelated to the risk

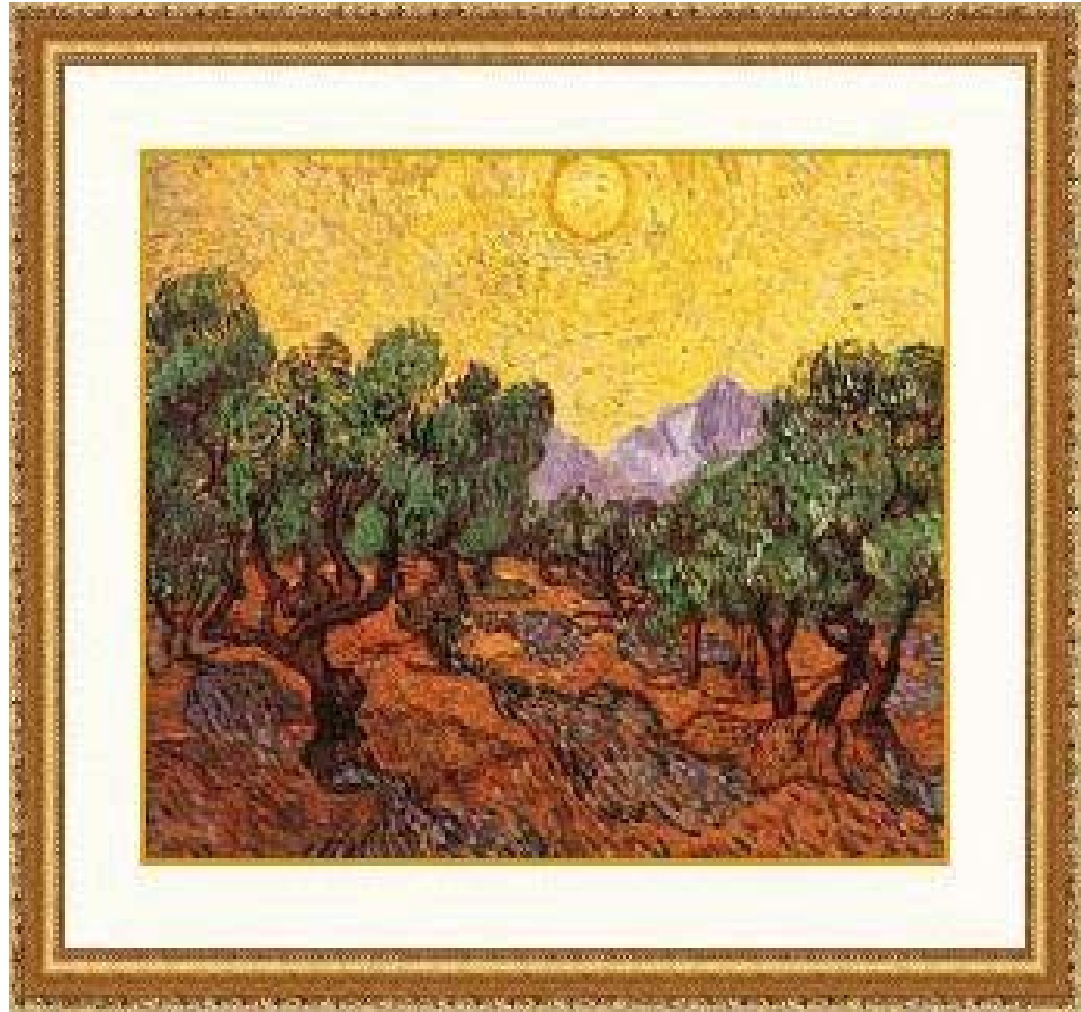
Tzonou A et al. Int J Cancer 1999

- In a population-based case-control study of 858 men with prostate cancer in Australia, margarine intake was positively associated ($p=0.04$); inverse association for palmitoleic acid ($p=0.04$) and a non-significant trend for oleic acid ($p=0.09$) were observed.

Hodge AM et al. Cancer Causes Control 2004

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 6. Cancer of the pancreas



Olive oil and pancreatic cancer: *epidemiological evidence*

- Data are sparse
- In a hospital case-control study conducted in Greece (181 cases), monounsaturated fat intake, largely deriving from olive oil, was evaluated in relation to pancreatic cancer. No association emerged.

Kalapothiski V et al. Cancer Causes Control 1993

- In northern Italy, in a case-control study conducted between 1983-1992 (362 cases-1552 controls), pancreatic cancer risk was inversely associated with consumption of olive oil (OR=0.58)

Soler M et al. Eur J Cancer Prev 1998

La Vecchia C and Negri E. Eur J Cancer Prev 1997

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 7. Cancer of the esophagus



Olive oil and cancer of the esophagus: *epidemiological evidence*

- Data are sparse
- In a case-control study in Greece, a low risk population, (99 cases-200 controls), an association between monounsaturated fat intake and esophageal cancer was not established.

Tzonou A et al. Int J Cancer 1996

- In a recently conducted study in northern Italy (304 cases-743 controls), among added lipids, olive oil intake showed a significant reduction of esophageal cancer risk, even after allowance for total vegetable consumption (odds ratio=0.4).

Bosetti C et al. Int J Cancer 2000

OLIVE OIL AND DIFFERENT TYPES OF CANCER

- 8. Other types of cancer



Olive oil and other types of cancer: *epidemiological evidence*

- **Laryngeal cancer** :An analysis in the combined dataset from 2 case-control studies (1986-2000) conducted in northern Italy and Switzerland (68 cases-340 controls) showed an inverse association of laryngeal cancer with olive oil (odds ratio=0.3, 95%CI 0.1-0.9).

Gallus S et al. Cancer Epidemiol Biomarkers 2003

- **Cancer of the pharynx** :A case-control analysis in Italy with 512 men and 86 women with cancer of the oral cavity and pharynx showed that the risk was approximately halved in the highest compared to the lowest quintile of olive oil. The inverse association with oils, especially olive oil, was only slightly attenuated by allowance for vegetable intake.

Franceschi S et al. Br J Cancer 1999

Conclusions (continued):

- The incidence of and mortality from several major cancers are lower in Mediterranean countries where olive oil represents a substantial fraction of dietary fat.
- A higher degree of adherence to the Mediterranean diet is associated with a reduced mortality for cancer.



Conclusions (concluded):

- The data available seem to suggest that olive oil is inversely associated with breast cancer risk and colorectal cancer risk.
- Evidence to support that olive oil conveys some protection against occurrence of different types of cancer necessitates more epidemiological studies, specifically designed to address this issue.



For more information about the work done for Mediterranean diet and olive oil in our department, you could visit:

www.nut.uoa.gr

Thank you very much for your attention.

