The Mediterranean Diet

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What is the Mediterranean Diet?
What are its health effects?
In what way is the diet changing?

The Rockefeller Study

- 1948 (The Rockefeller Foundation, LG. Allbaugh)
- Island of Crete
- Members of 128 households (collection of demographic, social, economic, health and dietary data)

The Rockefeller Report I

"olives, cereal grains, pulses, fruit, wild greens and herbs, together with limited quantities of goat meat and milk, game, and fish consist the basic Cretan foods... no meal was complete without bread ... Olives and olive oil contributed heavily to the energy intake ... food seemed literally to be 'swimming' in oil".


The Rockefeller Report II

"the food consumption levels were surprisingly good. On the whole, their food pattern and food habits were extremely well adapted to their natural and economic resources as well as their needs".

"only one out of six of the interviewed families judged the typical diet to be satisfactory"

"meat (72%), rice, fish, pasta, butter, and cheese: foods most desired to improve their diets"

The Mediterranean Diet

- Based on plant foods
- Olive oil as the main added lipid
- Low in SFA (7-8% of energy)
- Total lipid intake = 25-40% of energy
- Regular physical activity
**Dietary Characteristics in U.S., Greece and Japan, in 1960's**

<table>
<thead>
<tr>
<th>Dietary Characteristics</th>
<th>U.S.</th>
<th>Greece</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat (% Energy)</td>
<td>39</td>
<td>37</td>
<td>11</td>
</tr>
<tr>
<td>Saturated Fat (% Energy)</td>
<td>18</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Vegetables (g/day)</td>
<td>171</td>
<td>191</td>
<td>198</td>
</tr>
<tr>
<td>Fruits (g/day)</td>
<td>235</td>
<td>463</td>
<td>34</td>
</tr>
<tr>
<td>Legumes (g/day)</td>
<td>1</td>
<td>30</td>
<td>91</td>
</tr>
<tr>
<td>Bread/Cereals (g/day)</td>
<td>123</td>
<td>453</td>
<td>481</td>
</tr>
<tr>
<td>Potatoes (g/day)</td>
<td>124</td>
<td>170</td>
<td>65</td>
</tr>
<tr>
<td>Meat (g/day)</td>
<td>273</td>
<td>35</td>
<td>8</td>
</tr>
<tr>
<td>Fish (g/day)</td>
<td>3</td>
<td>39</td>
<td>130</td>
</tr>
<tr>
<td>Eggs (g/day)</td>
<td>40</td>
<td>15</td>
<td>29</td>
</tr>
<tr>
<td>Alcohol (g/day)</td>
<td>6</td>
<td>23</td>
<td>22</td>
</tr>
</tbody>
</table>

**Life expectancy / Disease Rates in U.S., Greece and Japan, in 1960's**

<table>
<thead>
<tr>
<th></th>
<th>U.S.</th>
<th>Greece</th>
<th>Japan</th>
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</thead>
<tbody>
<tr>
<td>Life expectancy at age 45 in years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>27</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>(F)</td>
<td>33</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>189</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>(F)</td>
<td>54</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>30</td>
<td>26</td>
<td>102</td>
</tr>
<tr>
<td>(F)</td>
<td>24</td>
<td>25</td>
<td>57</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(F)</td>
<td>22</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Stomach Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>6</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>(F)</td>
<td>3</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Colon, Rectal Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>11</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>(F)</td>
<td>10</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Total Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>102</td>
<td>85</td>
<td>98</td>
</tr>
<tr>
<td>(F)</td>
<td>87</td>
<td>61</td>
<td>77</td>
</tr>
</tbody>
</table>

**Mediterranean Diet**

- high olive oil consumption
- high consumption of legumes
- high consumption of cereals
- high consumption of fruits
- high consumption of vegetables
- moderate wine consumption
- moderate consumption of dairy products
- moderate to high consumption of fish
- low consumption of meat and meat products

**Trends in polyunsaturated oil availability in 3 Mediterranean countries, from 1970 to 1990**

![Graph showing trends in polyunsaturated oil availability in Greece, Italy, and Spain from 1970 to 1990.](image)

Based on data from WHO, 1993

**Dietary patterns have the ability to integrate complex or subtle interactive effects or many dietary exposures and bypass problems generated by multiple testing and the high correlations that may exist among these exposures.**
Many studies have evaluated the association between single foods, food groups, or nutrients and chronic disease.

Last 10 years: focus on the identification of a dietary pattern that maximizes longevity.

**Adherence to the Mediterranean Diet**

**Study characteristics**
- 1988 – 1989
- 182 males and females
- >70 yrs of age (median age 75 yrs)
- Residents of 3 rural Greek villages
- Dietary data collection through a validated semi-quantitative food frequency questionnaire

Trichopoulou et al BMJ 1995;311:1457-60

**Dietary Patterns May Be Developed**

A priori: on the basis of previous knowledge

A posteriori: on the basis of existing data

Principal component and factor analysis popular statistical techniques for the a posteriori identification of dietary patterns

**Diet and Overall Survival of Elderly People**

182 elderly residents of three Greek villages

An one unit increase in an eight-unit diet score, devised a priori on the basis of eight component characteristics of the traditional common diet in the Mediterranean region, was associated with a significant 17% reduction in overall mortality.

Trichopoulos et al. BMJ 1995

**Aim**

To evaluate the association between either:
- degree of adherence to the traditional, Greek-Mediterranean diet,
- or
- individual food groups
- and
- total mortality during follow-up

**Diet and Mortality in a Cohort of Elderly People in a North European Community**

Diet and nutritional status was studied among 202 men and women born 1914 - 1918 and living in a Danish Municipality (Roskilde). They were followed for 6 years.

A score, with seven dietary characteristics of the Mediterranean diet, was associated with a significant reduction in overall mortality.

Osler M and Schroll M. International Journal of Epidemiology, 1997
A cohort study in Melbourne Australia

141 Anglo-Celts and 189 Greek-Australians of both sexes aged 70 years or more

A one unit increase in the eight-unit Mediterranean diet score, was associated with a significant 17% reduction in overall mortality.


The Mediterranean Diet at present

National surveys
- Meat and milk products
- Olive oil and fruit

International data
- Food Balance Sheets
- DAFNE databank
- International food consumption surveys

Mediterranean diet and age with respect to overall survival in institutionalized, nonsmoking elderly people

161 nonsmoking Spaniards of both sexes aged 65 years or more

They were followed for 9 years.

A one unit increase in the eight-unit Mediterranean diet score was associated with a significant 31% reduction in mortality among subjects aged <80 y.

Lasheras et al. AJCN 2000

MEAT and MEAT PRODUCTS

Epidemiological studies
- Blood lipids levels
- Heme iron
- Homocysteine levels

Shift to the traditional Mediterranean nutrition of the Western countries could mean

Prevention of several forms of cancer
- 25% colorectal
- 15% breast
- 10% prostate

Trichopoulou et al. Cancer Epidemiol Biomarkers Prev 2000

Trends in meat availability in 3 Mediterranean countries, from 1970 to 1990

Source: Based on data from WHO, 1993
Meat availability in Greece in the 1990s

Source: The DAFNE databank (www.et.uoauoa.gr)

FISH
Epidemiology
Metabolic studies

Fruits and Vegetables
The presence of
- dietary fiber
- Vitamins C, E, B₆, B₁₂, Folic acid, β-carotene etc

Mean availability of vegetables in 10 European countries, circa 1990 (g/person/day)

Greece
Poland
Hungary
Spain
Luxembourg
Belgium
U.K.
Germany
Ireland
Norway

Average availability of total added lipids by type, in the DAFNE countries

Source: DAFNE databank
The role of diet on the longevity of elderly Europeans
A study in the context of the European Prospective Investigation into Cancer and Nutrition

Supported by the EC, DG Research

OBJECTIVES AND EXPECTED ACHIEVEMENTS

• To study the possible role of diet on the health and longevity of the elderly

• To identify an overall dietary pattern that maximises longevity of elderly Europeans.

106,196 subjects aged 60 years and over from 10 European countries

Supported by the EC, DG Research

Participating Countries

22 centres in 10 European Countries

Approximately 500,000 Europeans participate in the EPIC project

Coordinating Center

International Agency for Research on Cancer (IARC)
Word Health Organization
?PIC : PROSPECTIVE STUDY

<table>
<thead>
<tr>
<th>exposure</th>
<th>end-point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>Cancer</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Chronic diseases</td>
</tr>
</tbody>
</table>

Biological samples (*serum, plasma buffy coat*)

METHODOLOGY

BASELINE
- Dietary questionnaire (semiquantitative FFQ)
- Life style questionnaire
- Somatometry
- Blood sampling

CALLIBRATION
- 24 h recall (EPIC Soft)

FOLLOW-UP

Wishing to retrieve information?

Visit our web site at:

[www.nut.uoa.gr](http://www.nut.uoa.gr)