Endometriosis and Nutrition / Diet
子宮內膜異位症 與 營養/飲食

臺中榮民總醫院 婦產部

陳明哲 醫師

緣起：施秘書邀請為EATw演講
2010年 人類生殖雜誌 美國 哈佛大學醫學院

human reproduction

ORIGINAL ARTICLE *Reproductive epidemiology*

A prospective study of dietary fat consumption and endometriosis risk

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飲食中之油脂攝取與子宮內膜異位症之風險研究

歐洲人類生殖暨胚胎學會
子宮內膜異位症診斷治療指引

ESHRE Guideline for the Diagnosis and Treatment of Endometriosis

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ESHRE guideline for the diagnosis and treatment of endometriosis

The aim of this guideline is to provide clinicians with up-to-date information about the diagnosis and treatment of endometriosis, based upon the best available evidence. This guideline, which is reviewed annually, was last updated on 30 June 2007.

Objective
The objective was to develop recommendations for the diagnosis and treatment of endometriosis and its associated symptoms.

Design
A working group was convened comprised of practising gynaecologists and experts in evidence-based medicine from Europe, as well as an endometriosis self-help group representative.

After reviewing exisiting evidence-based guidelines and systematic reviews, the expert panel met on three occasions for a day during which the guideline was developed and refined. Recommendations based soley on the clinical experience of the panel were avoided as much as possible. The entire ESHRE Special Interest Group for endometriosis and endometrium was given the opportunity to comment on the draft guideline, after which it was available for comment on the ESHRE website for 3 months. The working group then ratified the guideline by unanimous or near-unanimous voting; finally, it was approved by the ESHRE Executive Committee.

Following this process, the guideline is now updated annually, following a strict protocol, which includes an annual search of new research followed by two months of peer review of the updated guideline.

The guideline is available on this website with hyperlinks to the supporting evidence, and the relevant references and abstracts.

Main conclusions
For women presenting with symptoms suggestive of endometriosis, a definitive diagnosis of most forms of endometriosis requires visual inspection of the pelvis at laparoscopy as the 'gold standard' investigation. However, pain symptoms suggestive of the disease can be treated without a definitive diagnosis using a therapeutic trial of a hormonal drug to reduce menstrual flow.

In women with laparoscopically confirmed disease, suppression of ovarian function for 6-months reduces endometriosis-associated pain; all hormonal drugs studied are equally effective although their side-effects and cost profiles differ. Ablation of endometriotic lesions reduces endometriosis-associated pain and the smallest effect is seen in patients with minimal disease; there is no evidence that also performing laparoscopic uterine nerve ablation (LUNA) is necessary.

In minimal/mild endometriosis, suppression of ovarian function to improve fertility is not effective, but ablation of endometriotic lesions plus adhesiolysis is effective as compared to diagnostic laparoscopy alone. There is insufficient evidence available to determine whether surgical excision of moderate-severe endometriosis enhances pregnancy rates. IVF is appropriate treatment especially if there are coexisting causes of infertility and/or other treatments have failed, but IVF pregnancy rates are lower in women with endometriosis than in those with tubal infertility.

The management of severe/deeply infiltrating endometriosis is complex and referral to a centre with the necessary expertise is strongly recommended. Patient self-help groups can provide invaluable counselling, support and advice.

The guideline has been produced by the ESHRE Special Interest Group for Endometriosis and Endometriosis Guideline Development Group, and the original, concise, version was published in **Human Reproduction 2005;20(10):2698-2704**

This website provides access to the concise version of this guideline and to further supporting documentation. To access the concise version of this guideline please click on the 'Concise' link under each chapter heading. To access the supporting documentation for this guideline please click on the 'Supporting Documentation' link under each chapter heading.

日文版翻譯
中文在哪裡?

歐洲人類生殖暨胚胎學會
子宮內膜異位症診斷治療指引

ESHRE Guideline for the Diagnosis and Treatment of Endometriosis

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認識它 面對它 處理它

Coping with endometriosis

Complementary therapies

輔助治療的角色

C	There is evidence from two systematic reviews suggesting that high frequency TENS, acupuncture, vitamin B1 and magnesium may help to relieve dysmenorrhoea (Proctor et al., 2002; Proctor and Murphy, 2001). One RCT has shown that vitamin E may relieve primary dysmenorrhoea and reduce blood loss (Ziaei et al., 2005). Whether such treatments are effective for endometriosis associated dysmenorrhoea and heavy bleeding is unknown.	Evidence Level 4
GPP	Many women with endometriosis report that nutritional and complementary therapies such as homeopathy, reflexology, Traditional Chinese Medicine, herbal treatments, etc., do improve pain symptoms. Whilst there is no evidence from RCTs in endometriosis to support these treatments, they should not be ruled out if the woman feels that they could be beneficial to her overall pain management and/or quality of life, or work in conjunction with more traditional therapies.	

Patient support groups

病友自助支持團體提供無價之諮詢支持及建議

GPP	Patient self-help groups can provide invaluable counselling, support and advice. The website www.endometriosis.org/support.html provides a comprehensive list of all the self-help groups in the world. Self-management programmes may prove beneficial in providing the woman with tools to enable her to live with a chronic disease.

Level	Evidence
1a	Systematic review and meta-analysis of randomised controlled trials (RCTs)
1b	At least one RCT
2a	At least one well-designed controlled study without randomisation
2b	At least one other type of well-designed quasi-experimental study
3	Well-designed, non-experimental, descriptive studies, such as comparative studies, correlation studies or case studies
4	Expert committee reports or opinions and/or clinical experience of respected authorities
A	Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation. (Evidence levels 1a, 1b).
B	Requires the availability of well controlled clinical studies but no randomised clinical trials on the topic of recommendations. (Evidence levels 2a, 2b, 3).
C	Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates and absence of directly applicable clinical studies of good quality. (Evidence level 4).
GPP	Recommended best practice based on the clinical experience of the guideline development group.

證據等級4:專家意見

建議等級C:有待證據

建議之優良治療

ESHRE guideline: Coping with disease

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經皮神經電刺激;針灸;維他命(B1, E)及礦物質(鎂)協助減緩經痛(經血多)症狀

Coping: nutritional therapies (i)

營養治療/飲食調節 有療效之科學證據

Nutritional therapy/dietary modification has shown promising effects on dysmenorrhoea in three small RCTs:

對經痛有療效

- supplementation with omega-3 fish oil combined with vitamin B12
- a diet high in vegetables and low in animal fats

Harel et al, 1996; Deutch et al, 2000; Barnard et al, 2000; Fjerbaek and Knudsen, 2007

補充0-3魚油及維他命B12

高蔬菜低動物脂肪

Coping: nutritional therapies (ii)

營養治療/飲食調節 影響疾病發生機率

- Intake of fruit and green vegetables decreased the risk of endometriosis
- Ham, beef and other red meat increased the risk

Parazzini et al, 2004

之科學證據及可能之機轉

- Fibre intake is linked to an increased oestrogen excretion

Rose et al, 1997; Kaneda et al, 1997

Coping: nutritional therapies (iii)

營養治療/飲食調節

A randomised comparative study evaluated:

- conservative surgery plus placebo
- conservative surgery plus hormonal suppression treatment
- conservative surgery plus dietary therapy (vitamins, minerals, lactic ferments, fish oil).

對手術後骨盆疼痛症狀之控制 有療效

- hormonal suppression therapy and dietary supplementation were equally effective in reducing non-menstrual pelvic pain and improving quality of life compared with placebo in women with endometriosis stage III-IV.

Dietary therapy was a protocol consisting of nutritional intake in addition to vitamins (B6, A, C, E), minerals salts (Ca, Mg, Se, Zn, Fe), VSL3 lactic ferments (*Bifidobacterium breve*, *Bifidobacterium longum*, *Bifidobacterium infantis*, *Lactobacillus acidophilus*, *Lactobacillus casei*, *Lactobacillus bulgaricus*, *Streptococcus thermophilus*), and omega-3 and omega-6 fatty acids (fish oil), which secured nutritional rate between 1,600 and 2,000 calories. A different dietary protocol was assigned according to the body mass index, the physical activity, and the job of each woman.

(Fertil Steril® 2007;88:1541–7.

Coping: nutritional therapies (iv)

營養治療/飲食調節

proved). Half of these women (n = 40) were supplemented with 1200 IU vitamin E and 1g vitamin C for a period of two months. The other half was

A randomised controlled trial of 80 women with endometriosis demonstrated that two months of high-dose vitamin E and C therapy was associated with significant improvement in endometriosis pain and a reduction in inflammatory markers.

Santanam et al, 2003

不只減輕症狀
高劑量抗氧化維他命治療
也減少腹膜液內之發炎指標

For vitamins and minerals, the RDIs are given in the foll

Nutrient	RDI	highest RDA of DRI
Vitamin A	3000 IU	10,000 IU
Vitamin C	60 mg	90 mg
Calcium	1000 mg	1300 mg
Iron	18 mg	18 mg
Vitamin D	400 IU	600 IU
Vitamin E	30 IU	15 mg (33 IU of synthetic)
Vitamin K	80 µg	120 µg
Thiamin	1.5 mg	1.2 mg
Riboflavin	1.7 mg	1.3 mg
Niacin	20 mg	16 mg
Vitamin B6	2 mg	1.7 mg
Folate	400 µg	400 µg
Vitamin B12	6 µg	2.4 µg
Biotin	300 µg	30 µg
Pantothenic acid	10 mg	5 mg
Phosphorus	1000 mg	1250 mg
Iodine	150 µg	150 µg

[Intervention Review]

Herbal and dietary therapies for primary and secondary dysmenorrhoea

2001 柯考蘭回顧資料庫

原次發經痛之草藥及飲食治療

Michelle Proctor[1], Patricia A Murphy[2]

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Editorial group: Cochrane Menstrual Disorders and Subfertility Group.
Publication status and date: Edited (no change to conclusions), published in Issue 1, 2009.
Review content assessed as up-to-date: 12 February 2001.

Citation: Proctor M, Murphy PA. Herbal and dietary therapies for primary and secondary dysmenorrhoea. *Cochrane Database of Systematic Reviews* 2001, Issue 2. Art. No.: CD002124. DOI: 10.1002/14651858.CD002124.

維他命B1及鎂可減輕經痛

維他命B1每日100毫克

連續兩個月

PLAIN LANGUAGE SUMMARY

Vitamin B1 and magnesium may both help reduce the pain of dysmenorrhoea

Vitamin B1 is shown to be an effective treatment for dysmenorrhoea taken at 100 mg daily, although this conclusion is tempered slightly by its basis on only one large RCT. Results suggest that magnesium is a promising treatment for dysmenorrhoea. It is unclear what dose or regime of treatment should be used for magnesium therapy, due to variations in the included trials, therefore no strong recommendation can be made until further evaluation is carried out. Overall there is insufficient evidence to recommend the use of any of the other herbal and dietary therapies considered in this review for the treatment of primary or secondary dysmenorrhoea.

Zentralbl Gynakol. 1989;111(11):755-60.

[Magnesium--a new therapeutic alternative in primary dysmenorrhea]

[Article in German]

Seifert B, Wagler P, Dartsch S, Schmidt U, Nieder J.

Klinik für Gynäkologie und Geburtshilfe, Medizinischen Akademie Magdeburg.

1989 德國

Abstract

50 patients suffering from primary dysmenorrhoea were treated with Magnesium (Mg 5-longoral, Artesan GmbH) in a double-blind study. After a six-month period 21 out of 25 women showed a decline of symptoms, only 4 ones reported no therapeutical effect. For monitoring treatment results prostaglandin F2 alpha (PGF2 alpha) was measured every second month. On Mg-therapy conditions we achieved a reduction of PGF2 alpha in menstrual blood to 45% of value before treatment started. As against that 90% of basic concentration were estimated from women who received a placebo. Probably, the specific therapeutical effect of Mg based on inhibition of biosynthesis of PGF2 alpha but also on its direct muscle relaxant and vasodilatory effect. Beside the PG-synthesis and ovulation inhibitors the use of Magnesium is a potential, natural opportunity to treat primary dysmenorrhoea, which is widely free of side effects.

In three double-blinded, but small, RCTs it was shown that magnesium was more effective than placebo for pain relief and the need for additional medication was less (Davis, 1988; Fontana-Klaiber and Hogg, 1990; Seifert et al., 1989). The largest of these trials (n=50) also reported that women taking the magnesium therapy had substantially lower levels of PGF2-al in their menstrual blood than those on placebo ($p<0.05$), which mirrored the therapeutic decrease in pain experienced by the participants (Seifert et al., 1989). Overproduction of PGF2 has been shown to be a substantial contributing factor to the painful cramps associated with dysmenorrhoea. This emphasises the potential biological rationale behind magnesium therapy for dysmenorrhoea, as magnesium inhibits the biosynthesis of PGF2-a as well as having a role in muscle relaxation and vasodilation (Altura and Altura, 1985; Reavely, 1998).

參考資料：口服鎂 減輕 原發性經痛

Mg 5-Longoral

Found in: Germany, Switzerland

Mg 5-Longoral is NOT known to be marketed in the USA. Mg 5-Longoral may be available in the countries listed above.

Generic/rINN (Recommended International Non-Proprietary Name)

Magnesium Hydrogen Aspartate

每日口服連續服用六個月

84%病人症狀減輕

Indian J Med Res. 1998 Apr;103:227-31.

Curative treatment of primary (spasmodic) dysmenorrhoea.

Gokhale LB.

1998 印度醫學研究雜誌

Abstract

To prove the efficacy of oral vitamin B1 administration for the treatment of primary dysmenorrhoea, a randomised, double-blind, placebo-controlled study was carried out on 556 girls aged 12-21 yr, having moderate to very severe spasmodic dysmenorrhoea. Thiamine hydrochloride (vitamin B1) was given in a dose of 100 mg orally, daily for 90 days. The combined final results of both the 'active treatment first' group and the 'placebo first' group, after 90 days of vitamin B1 administration, were 87 per cent completely cured, 8 per cent relieved (pain almost nil to reduced) and 5 per cent showed no effect whatsoever. The results remained the same two months later as well when no drug was administered. Unlike all the current treatments which are suppression-oriented, this curative treatment directly treats the cause, is free from side effects, is inexpensive and easy to administer.

Vitamin B1 plays an important role in metabolism and deficiency can result in fatigue, muscle cramps, various pains, and a reduced tolerance to pain, which are all factors that can be associated with dysmenorrhoea (Reavely, 1998). This may be why one large trial (n=556) showed a daily intake of 100mg of vitamin B1 for two months to be an effective treatment for dysmenorrhoea, with none of the women taking placebo experiencing complete pain relief (Gokhale, 1996).

參考資料:維他命B1 減輕 原發性經痛 每日100毫克 連續兩個月

British Journal of Obstetrics and Gynaecology
November 2001, Vol. 108, pp. 1181–1183

2001 英國婦產科雜誌

A randomised placebo-controlled trial to determine the effect of vitamin E in treatment of primary dysmenorrhoea

S. Ziaei*, S. Faghihzadeh, F. Sohrabvand, M. Lamyian, T. Emamgholy

Objective To determine whether vitamin E is effective in the treatment of primary dysmenorrhoea.

Design A randomised placebo-controlled trial.

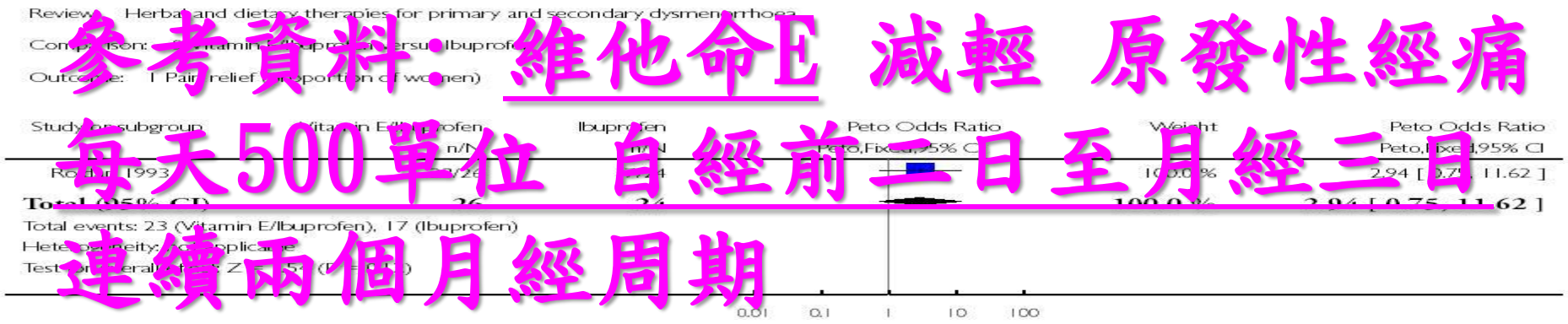
Participants One hundred girls, aged 16–18 years old who suffered from primary dysmenorrhoea, among 1000 students attending a public high school in Region 5 in the Greater Tehran Municipality.

Methods Fifty girls were given 500 units of vitamin E (five tablets) per day, and 50 were given five placebo tablets per day. The treatment began two days before the beginning of menstruation and continued through the first three days of bleeding. The severity of pain before and after the treatment was studied. Treatment in both groups was carried out in two consecutive menstrual periods.

Results The severity of pain in the two groups was reduced after treatment, but the reduction was greater in the group treated with vitamin E. These differences were maintained in the second month of therapy.

Conclusion Both placebo and vitamin E are effective in relieving symptoms due to primary dysmenorrhoea, but the effects of vitamin E are more marked.

Analysis 8.1. Comparison 8 Vitamin E/Ibuprofen versus Ibuprofen, Outcome 1 Pain relief (proportion of women).



參考資料：維他命E 減輕 原發性經痛
每天500單位 自經前二日至月經三日
連續兩個月經周期

Coping: homeopathy

順勢療法

In a very small, non-randomised, study in eight patients diagnosed with endometriosis, five out of seven, who had dysmenorrhoea, reported relief from symptoms (and two had intermittent relief) following individualised homeopathic

順勢療法的第一個原則是相似法則。其他的醫藥歷史，如古希臘、中國、西藏等也都有提到相關的相似法則，但都沒有詳細的解釋和說明。赫尼曼是第一位為相似法則建立科學基礎的醫師。他以健康的人體進行藥物實驗，來測試藥物所引起的相關症狀，而當一個病患的症狀和藥物在健康人體實驗所產生的症狀相似時，這個藥物就適合用來治療病患的疾病。舉例來說，當一個人有腹瀉的問題時，此時用來治療的也是會讓人產生腹瀉症狀的藥物。如果服用的藥物劑量太強的話，就會讓病患的症狀嚴重加劇。所以赫尼曼醫師建立了一套標準化的藥物稀釋震盪程序，他將其命名為藥力強度（Potency）。民間流傳的故事裡提到，他每次駕車出去看診時，總是最後看診的一個病人最快痊癒，而意外發現馬車長時間的搖晃和震盪可以加強藥力的強度，因此產生這個標準化的稀釋震盪程序。但事實上，赫尼曼醫師從未駕車出門為病患看病，而是病患來他家裡進行看診，或是用通信的方式為病患看病。赫尼曼醫師發現根據相似法則給予病患高劑量藥物的話，會讓病患的症狀嚴重加劇，所以他才會有將藥物濃度降低的想法。[來源請求]

順勢療法可以增加人體的自我調節與防禦能力，因此不管是急性或是慢性疾病都有很好的治療效果。有人說順勢療法的效用不比安慰劑高[2]，但因為它也能對動物和失去知覺的人產生療效[來源請求]，由此可知順勢藥物並不是安慰劑。在歐洲地區，尤其是奧地利，有許多的獸醫使用順勢療法為動物進行醫療。甚至在奧地利的特別護理病房裡也會使用順勢藥物，如Kalium bichromicum（重鉻酸鉀）來減少黏液物質的產生，維持人工呼吸器的運作（維也納醫學大學已發表相關的研究報告）。而在2005年，瑞士的一項醫學研究報告指出順勢療法對於過動兒（ADHD）有很好的治療效果。在歐洲，順勢療法是最常被用來替代西醫的另一種療法，而且主要是用來治療一些慢性疾病，如過敏症、濕疹、風濕病……等。在癌症的治療方面，順勢療法可以幫助減輕一般癌症治療（化療、輻射）所帶來的副作用，另外在許多急性的症狀治療上和現代主流西醫(化學藥品)，例如感冒、過敏、青春痘、喉嚨痛..一樣有良好的療效，但順勢療法的好處是沒有副作用。

目前世界上的順勢療法藥品僅佔所有藥品的0.3%，但每年以20%的速度在成長，遠高於平均藥品工業的成長速度，其中以法國BOIRON市佔率(27%)、德國DHU(7%)、德國HEEL(5%)為世界前三大順勢療法藥廠。

[Intervention Review]

Chinese herbal medicine for endometriosis

2008 柯考蘭回顧資料庫

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中草藥治療
與黛美痊療效相當
副作用較小

Editorial group: Cochrane Menstrual Disorders and Subfertility Group.
Publication status and date: New, published in Issue 3, 2009.
Review content assessed as up-to-date: 7 August 2008.

Authors' conclusions

Post-surgical administration of CHM may have comparable benefits to gestrinone but with fewer side effects. Oral CHM may have a better overall treatment effect than danazol; it may be more effective in relieving dysmenorrhea and shrinking adnexal masses when used in conjunction with a CHM enema. However, more rigorous research is required to accurately assess the potential role of CHM in treating endometriosis.

比療得高效果佳
需再多些高品質研究

PLAIN LANGUAGE SUMMARY

Chinese herbs for endometriosis

Endometriosis is a common gynaecological condition causing menstrual and pelvic pain. Treatment involves surgery and hormonal drugs, with potentially unpleasant side effects and high rates of reoccurrence of endometriosis. This review suggests that Chinese herbal medicine (CHM) may be useful in relieving endometriosis-related pain with fewer side effects than experienced with conventional treatment. However, the two trials included in this review are of poor methodological quality so these findings must be interpreted cautiously. Better quality randomised controlled trials are needed to investigate a possible role for CHM in the treatment of endometriosis.

Coping: herbal medicine/TCM (ii)

中草藥：異位寧

An randomised controlled trial compared Yiweining (YWN) with Gestrinone post-operatively:

异位宁：桃仁、红花、丹参、蒲黄、莪术、赤芍、鳖甲、当归、元胡9种中药

- YWN: recurrence rate of 5.0%
- Gestrinone: recurrence rate of 5.3%
- Placebo: recurrence rate of 30.7%
- Adverse reaction rate in the YWN was lower (10.0%) than that in the Gestrinone group (31.6%)

Yang

异位宁组术后7 d开始服药，2次/d,200 ml/次，连服6个月，经期不停药。异位宁药物组成：桃仁、红花、丹参、蒲黄、莪术、赤芍、鳖甲、当归、元胡等9种中药组成，购自黑龙江中医药大学附属一院药局，两煎共得药液400 ml。丹那唑组术后1周开始用药，2～3次/d，200 mg/次，疗程6个月。丹那唑为扬州制药厂产品，每粒胶囊含药物200 mg。用药组用药期间每月复诊，均行妇科检查、盆腔B超检查。了解药物副反应，复查肝功能，停药后随访6～30个月。未用药组每半年复查1次，了解其症状、体征，行妇科检查、盆腔B超检查。

Coping: exercise

腦內啡

Exercise releases endorphins, and can assist the body getting back into shape after surgery:

- walking
- swimming
- pilates
- yoga
- physiotherapy

Pilates (pronounced /pɨˈlɑːtiːz/) is a physical fitness system developed in the early 20th century by Joseph Pilates in Germany,[1] the UK and the USA. As of 2005, there were 11 million people who practice the discipline regularly and 14,000 instructors in the United States.[2]

Pilates called his method *Contrology* (from *control* and Greek -λογία, *-logia*), because he believed his method uses the mind to control the muscles.[1] The Pilates method seeks to increase the strength, flexibility and control of the body.

ESHRE guideline: Coping with disease

建議之優良治療：可與傳統治療合併治療

GPP	Many women with endometriosis report that nutritional and complementary therapies such as homeopathy, reflexology, Traditional Chinese Medicine, herbal treatments, etc, do improve pain symptoms. Whilst there is no evidence from RCTs in endometriosis to support these treatments, they should not be ruled out if the woman feels that they could be beneficial to her overall pain management and/or quality of life, or work in conjunction with more traditional therapies.

指壓治療

eflexology (**zone therapy**) is an alternative medicine, complementary, or integrated medicine method of treatment involving the physical act of applying pressure to the et and hand with specific thumb, finger and hand techniques without the use of oil or lotion. It is based on what reflexologists claim to be a system of zones and reflex reas that they say reflect an image of the body on the feet and hands, with the premise that such work effects a physical change to the body.[1] A 2009 systematic review

- Books for women with endometriosis
- Books for clinicians and researchers

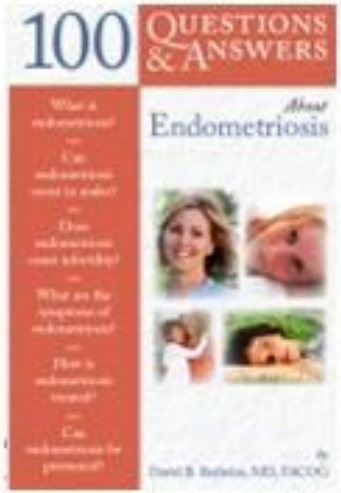
Books on endometriosis and infertility

Search: Books

Keywords: GO!

This list aims to highlight some of the books published on endometriosis and/or infertility both for those with the disease, as well

100 Questions and Answers about Endometriosis



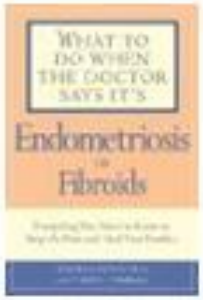
by David Redwine

"100 Questions and Answers on Endometriosis" encourages the reader to question and challenge non-validated assumptions about the treatment of the disease, and it provides straight forward answers to 100 questions about endometriosis.

The author, surgeon David Redwine MD FACOG, provides provocative answer and statements, which challenges the reader to to question current assumtions about endometriosis.

» MORE INFORMATION

What to do when the doctor says it's endometriosis



What to Do When the Doctor Says It's...

Thomas L Lyons, Ch...

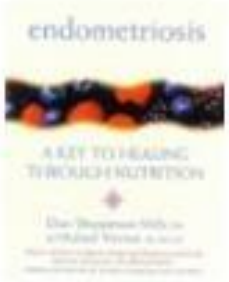
Best Price $10.40

by Thomas Lyons MD and Cheryl Kimball

Easy to understand advice on easing the pain of endometriosis.
This book will teach you about:

- Alternative treatments that can alleviate pain and calm symptoms.
- How to assemble a health care team that is on your side and will help you achieve the medical results you want.
- The latest research on surgery and infertility treatments in order to make informed, educated decisions about the advice and care you receive.
- The truth about endometriosis and its impact on fertility

Endometriosis: a key to healing through nutrition



Endometriosis

Dian Shepperson Mi...

Best Price $9.93

or Buy New

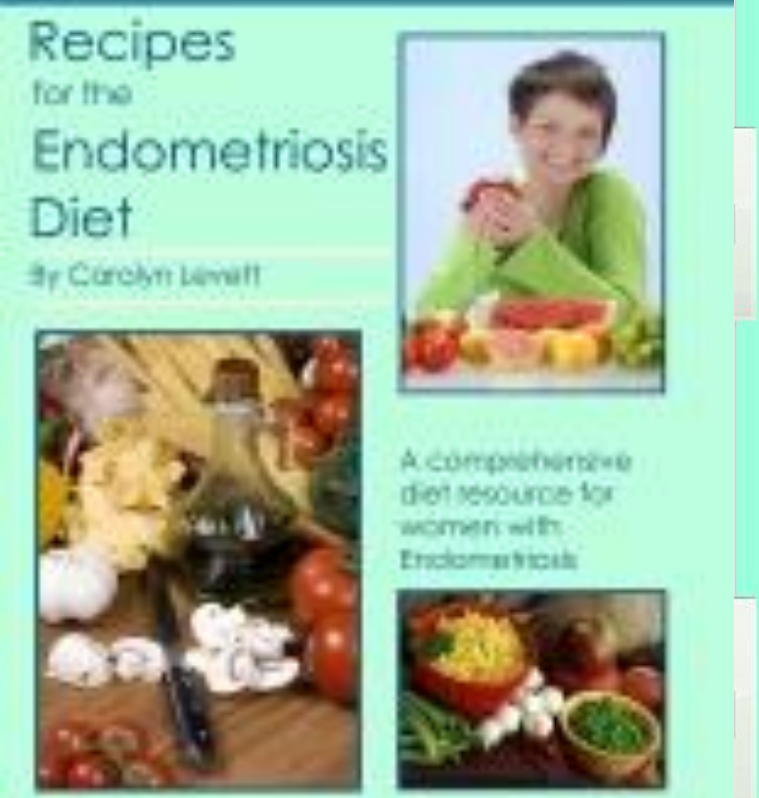
by Michael Vernon and Dian Shepperson Mills

Research has shown that certain nutritional changes can alleviate symptoms in some women with endo. This book is an excellent resource to help you begin making changes in your diet. The authors show how the right diet can provide the key to optimum health in overcoming endometriosis. Includes delicious recipes, and details the orthodox and complementary treatments available.

» **MORE INFORMATION**

內膜異位飲食

專家意見之一



Recipes
for the
Endometriosis
Diet

By Carolyn Levett

A comprehensive
diet resource for
women with
Endometriosis

Endometriosis - Diet and Nutrition - Windows Internet Explorer

http://www.endo-resolved.com/diet.html

Endo Resolved

- Home
- What is Endo
- Symptoms of Endo
- Diagnosis of Endo
- Treatment of Endo
- AlternativeTreatment
- 內膜異位飲食
- Overview of Curing
- Pain and Endo
- Healing Testimonies
- How you heal
- Endo articles
- Laparoscopy Advice
- Endo + Laparoscopy
- Progesterone Cream

Endometriosis - Diet and Nutrition

Diet changes can help reduce the symptoms of endometriosis

改變飲食 協助改善症狀 回復健康

Changing your diet to deal with Endometriosis is an excellent foundation to assist you in reducing the symptoms, and will help regenerate your health.

Adjusting what you eat can bring about many positive physical and metabolic changes, as well as improving our health. Many of you may be aware that various illnesses and diseases have responded very positively to changes in diet, and Endometriosis is no exception.

TO SUM UP

- increase omega-3 fatty acids
- avoid meat, dairy products, wheat and sugar
- increase fiber
- modulate estrogen
- avoid caffeine and alcohol
- avoid refined foods, e-numbers, additives
- minimize or avoid soy products as they contain high levels of phytoestrogens, and soy contains a particular toxin which seems to be particularly detrimental for women with Endometriosis
- peel fruit and vegetables to remove toxic chemicals
- eat organic produce wherever possible
- drink lots of filtered or mineral water

天下文化
健康生活

吃太油會生病，體內缺油更會生病

其實，你一直吃錯油

病気がイヤなら「油」を変えなさい！

現代人視「油」為疾病的根源，
「不吃油比較健康」變成一種「常識」。
於是訴求低脂肪、低卡路里的加工食品大行其道。
現在，請馬上重新調整這些錯誤觀念。
因為過敏體質、心肌梗塞、高血壓、糖尿病，甚至癌症，
可能是因為吃錯油，以及油質攝取不均衡所引起的，
正確認識油，以及每天喝15cc亞麻仁油，
是想要健康過活的你必須學習的第一課。

每天喝15cc好油，養生關鍵第1步

杏林預防醫學研究所所長
山田豐文◎著
陳光榮◎譯
署立金門醫院婦產科主治醫師
林文斌◎審訂

歐陽英 歐陽英樂活生機網 網主
傅娟 資深媒體人
黃苡菱 芝名生物能量中心營養師
共同推薦

其實，你一直吃錯油
陳光榮 譯

專家意見之二

說來汗顏，畢業後行醫15年，雖然知道均衡飲食的重要性，但在忙碌的接生、開刀生涯裡，卻常常忘記必須「吃得巧」，才能維持身體健康，加上吃素後營養不夠完整，最後竟然導致失眠、憂鬱、異位性皮膚炎等嚴重症狀。最初我誤認為是醫療忙碌造成生活紊亂及壓力過高所導致，服用了許多安眠藥以及抗過敏藥，甚至還一度計畫要停職休養。現在我每日服用15cc亞麻油，調配飲食，結果這些疾病竟然都改善了，恢復了健康，而且也充滿了喜悅。

——署立金門醫院婦產科主治醫師　林文斌

我研究食療已27年，經常舉辦斷食營和臨床照顧病人，並將所有食療研究成果登在網站上，今讀完《其實，你一直吃錯油》這本書，不禁感嘆：這真是一本經典之作！有幸讀到這本書的人，若能確實改吃亞麻仁油，那就真的可以與病絕緣、遠離醫院了！我打算多買幾本，送給我的爸媽、兄弟姐妹及至親好友！

——歐陽英樂活生機網網主　歐陽英

1992年美國農業部頒布「食物指南金字塔」，建議油脂的攝取愈少愈好，不僅美國人奉為飲食圭臬，在台灣也是如此教育民眾。但10年來許多慢性病並非如預期般的減少。2002年哈佛大學公共健康學院的威萊特博士提出「健康飲食金字塔」概念，將植物油放到了底層，作為飲食結構中的油脂攝取基礎。其實，選擇好的植物油比多吃植物油來得更重要，吃到好的油脂可以幫助身體的新陳代謝；吃到不好的油脂，卻會增加身體的負擔，大家在選擇食用時不得不慎。

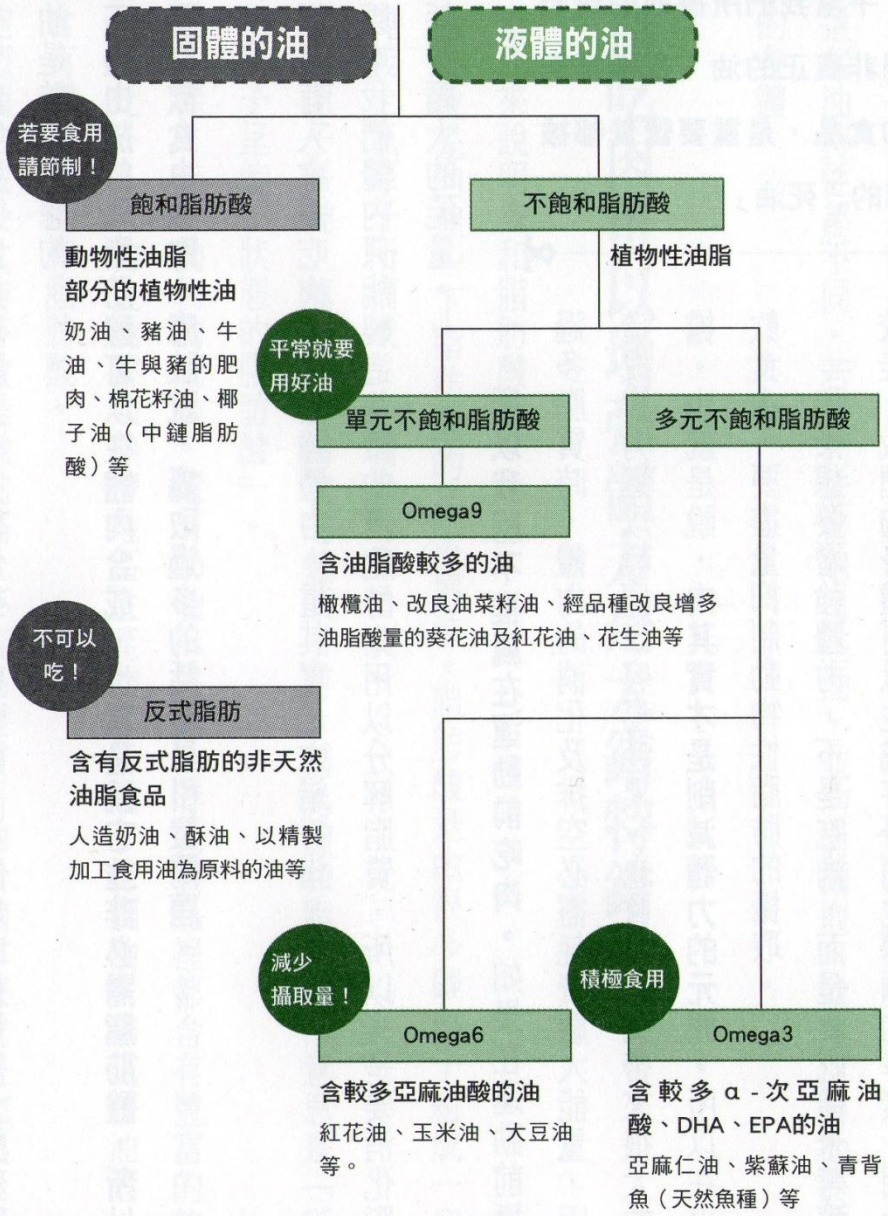
——芝名生物能量中心營養師　黃苡菱

天下文化
ISBN：978-986-216-163-0
GH106　定價：250元

Types of fats in food

- Unsaturated fat
  - Monounsaturated fat
  - Polyunsaturated fat
  - Trans fat
  - Cis fat
  - Omega fatty acids:
    - ω-3
    - ω-6
    - ω-9
- Saturated fat
  - Interesterified fat

牢記！含於油脂當中的主要脂肪酸



參考：氏家京子 著《食用油危機四伏！》（中央美術出版）

Omega3與Omega6的理想比例與現實比例

	Omega3	Omega6
理想攝取量	1	1~4
現代人的飲食	1	10~50

食用油中所含的Omega3與Omega6

單位：%

	Omega3	Omega6
優質的亞麻仁油	58	14
紅花油	未達1	75
玉米油	未達1	59
橄欖油	未達1	8
菜籽油	7	30
牛油	未達1	2
豬油	未達1	10

現代人的體內油脂比例有極端偏向Omega6的傾向。一般常用的油當中幾乎都不含Omega3。為了調整脂質的均衡，記住應節制富含Omega6油脂的攝取，並積極攝取含有豐富Omega3的亞麻仁油做為替代。

出處：Udo Erasmus 「Fats That Heal Fats That Kill」Alive Books,1993

Omega3令人期待的功效

- 有助腦部健康（預防阿茲海默症等，幫助提高智能）
- 預防神經疾病（預防憂鬱症、精神分裂等）
- 維持骨骼健康
- 抑制所有的炎症（預防異位性皮膚炎、風濕、鼻竇炎等）
- 預防癌症
- 提高運動選手的持久力與預防受傷
- 強化生殖機能，預防不孕症
- 預防心臟病
- 預防肥胖

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- 預防肥胖

Let's start with pain and hormones in relation to diet .....

Endometriosis is an estrogen-sensitive condition, but the painful menstrual cramping that occurs is predominantly due to prostaglandin synthesis in the body. Prostaglandins are naturally occurring fatty acids, which are derived from dietary sources. The body can produce different types of prostaglandins through a complex series of pathways.

There are the 'good guys' and the 'bad guys' of the prostaglandin group. The goal of a controlled diet is to block the 'bad guys' for their negative actions on the body, and increase the 'good guys' for their opposite and beneficial actions. The action of the

Excellent sources of the omega-3 fatty acid producing oils are:

1. evening primrose 報春花; 歐洲櫻草
2. Walnut oil 胡桃
3. flax seeds/oil 亞麻

1. It is also important to decrease intake of those fatty acids that will stimulate the bad guys which are found in **saturated fats, butter, animal and organ meat, lard**. 豬油

In addition to decreasing bad fat intake, the diet should also consist of **high fiber.** Not only does this help with good digestion, but it is also thought that a diet high in fiber can decrease total circulating estrogens. It is recommended to incorporate 25 grams per day of fibre. Good sources are:

- **whole grains excluding** wheat 小麥 and rye 裸麥, 黑麥
- **beans, peas and pulses** 豆類植物
- **brown rice**
- **vegetable and fruits**
- **oatmeal** 燕麥粉, 燕麥片 燕麥粥

??

高纖食物
（每日30克纖維）

The following foods are recommended to modulate estrogen levels by incorporating one or two servings a day:

調節雌激素

- **mustard greens** 芥末; 芥子
- **broccoli** 球花甘藍
- **cabbage** 甘藍菜, 捲心菜
- **turnips** 蕪菁; 蕪菁甘藍

Variety of pulses

Turnip

turnip roots

Broccoli

Broccoli, Calabrese cultivar

Cabbage

Cabbage and its cross section

Whole Grains 全穀食物

What are whole grains anyway.....

果核或果殼內的仁

Whole grains are foods that contain the entire kernel or grain, or the entire kernel that is edible. Some examples are oatmeal, whole cornmeal, popcorn, brown rice, whole rye, barley, quinoa, spelt.

When grains are refined, much of the nutritional value is lost by removing the kernel. Whole grains are more wholesome and you have a better chance of getting the vitamins, minerals, folic acid, magnesium, vitamin E, antioxidants, and other unknown factors that you lose when grains are refined.

Another important factor - you get much more fiber in your diet when you eat whole grains; and the more fiber you eat the easier it is to off-load excess estrogens from your system. The fiber content varies from grain to grain, ranging from 3.5% in rice to over 15% in barley and bulgur.

FOODS TO AVOID

- **wheat** * - this includes breads, cakes and pasta products, all based on wheat 小麥
- **red meats** - promotes negative prostaglandins
- **refined and concentrated carbohydrates** - bread, flour, cakes made from refined flours
- **refined sugars and honey** - causes inflammatory reaction
- **alcohol** - consumes vit B stored in the liver
- **caffeine** which is found in tea, coffee, soft drinks -increases abdominal cramps and increases estrogen levels
- **chocolate** - as it contains sugars
- **dairy produce** including all milk and cheese - inflammatory ??
- **fried food, margarine and hydrogenated fats** - can stimulate negative prostaglandins
- **soy products and soy protein products** - tamari can be used in small amounts ??
- **tinned and frozen packaged foods** as little as possible
- **additives and preservatives** - increase chemical load on the system

Alternative sources of calcium can include:

- **Dark green vegetables** (i.e. spinach 菠菜, broccoli, cabbage, bok choy 白菜, greens, beets 甜菜, 糖蘿蔔 are high in calcium)
- **Sesame seeds** 芝麻籽
- **Almonds** 杏仁, 杏核; 杏樹
- **Figs** 無花果; 無花果樹
- **Seaweed** 海草, 海藻, 海菜
- **Tahini zhimajiang** 芝麻醬

若不吃乳製品
如何獲得鈣質?

Fish such as **sardines, salmon, oysters, trout, prawns** 蝦, **and tuna** are all high in calcium. All fruits contain some calcium; **dried figs** and c[illegible]**ked rhubarb** 大黃 are particularly high.

Many different breads and **grain** all contain calcium and so do **nuts, seeds and legumes.**

高鈣食譜-1

素食區			
◎ 蕃茄海苔鮮菇鍋	◎ 起司燉飯	◎ 素海鮮排骨煲	◎ 素魚蒸豆腐
◎ 三色捲豆皮	◎ 豆腐冷盤	◎ 香菇髮菜羹	◎ 黑豆山藥素雞盅

Varieties of soybean seeds, a popular legume

Green almonds

Unshelled (left) and shelled (right) almonds

Blanched almonds

Magnified image of white sesame seeds

A selection of Beta vulgaris, known as beet root, at a grocery store

Varieties of soybean seeds, a popular legume

Green almonds

Unshelled (left) and shelled (right) almonds

Blanched almonds

Magnified image of white sesame seeds

A selection of Beta vulgaris, known as beet root, at a grocery store

Every vegetarian food contains some protein. There are many options that contain the same amino acids that you can find in animal protein.↓

Here are some examples of vegetarian foods with high sources of plant protein:↓

若不吃乳製品 如何獲得蛋白質?

↓

PROTEIN IN LEGUMES/BEANS: Legumes- also called **dried beans** are edible seeds that grow in pods. Beans contain a more complete set of amino acids than other plant-based food and they are high in iron, B vitamins and fiber.↓

豆類

Use legumes as **main dish** items rather than side dishes. A good way to introduce beans to the diet is to replace the meat component in your favorite dishes, like casseroles 砂鍋, 烤鍋, chili, curries, and adding beans to salad dishes. Examples are **chickpeas** 雞豆 or **garbanzo beans** 鷹嘴豆豆, **split peas** 分裂豌豆, **haricot**, **lentils** 兵豆, 濱豆, 小扁豆 (red, green or brown), **kidney beans** 扁豆, **lima beans** 利马豆, **flageolet?** etc.↓

PROTEIN IN GRAINS: **Whole grains** are an excellent source of nutrition, as they contain essential enzymes, iron, dietary fiber, vitamin E, and the B-complex vitamins. Because the body absorbs grains slowly, they provide sustained and high quality energy. Grain can be added to casseroles or used in a side dish. Examples are: **barley** 大麥, **brown rice**, **buckwheat** 蕎麥, **millet** 黍, 稷; 黍的穀粒, **oatmeal**, **quinoa** 藜麥, **wild rice**↓

穀類

Lentils

Black beans and Kidney beans.

Quinoa greens

Quinoa before flowering

Quinoa in flower

Harvested quinoa seeds

Two-row and six-row barley

Green chickpea

Left: Bengal variety; right: European variety

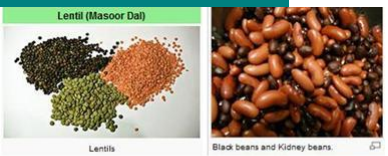
Yellow split peas

Quinoa greens

Quinoa before flowering

Quinoa in flower

Harvested quinoa seeds



Lentils

Black beans and Kidney beans.

Green chickpea

Left: Bengal variety, right: European variety

Yellow split peas

一湯匙藜麥

Two-row and six-row barley

VEGETABLE PROTEIN: GREENS: Nutritionally, greens are very high in protein, calcium, magnesium, iron, potassium, phosphorous, zinc, and vitamins A, C, E and K. They are crammed with fiber, folic acid, chlorophyll and many other micro-nutrients. Simply stir-fry up or steam some broccoli, kale 羽衣甘藍, bok choy, or cabbage. ↓

綠蔬類

PROTEIN IN NUTS AND SEEDS: Nuts are very healthy and nutritious. In addition to being excellent sources of protein, nuts and seeds have many other benefits such as vitamins, minerals, fiber, and other chemicals that may prevent cancer and heart disease. Additionally, nuts are high in essential amino acids and healthy fats and essential fatty acids (like omega 3 and omega 6). Nuts and seeds can be added to salads as well as eaten as a snack. Examples are: **almonds, cashews 腰果, pumpkin seeds, sesame seeds, sunflower seeds, walnuts** (black)↓

果籽類

Fish and Chicken:↓

You are also able to eat **white meat** as in chicken which contains protein, so long as it is organic and does not include the damaging chemicals and hormones that are found in intensively reared chickens↓

白肉類

Fish is also allowed on the endometriosis diet and oily fish like **mackerel** 鯖, 青魚, 青花魚, 馬鮫魚, **trout, sardines and herring** 鯡, 鯡魚 is especially beneficial for the healthy properties found in fish oil. ↵

Cashews ready for harvest in Kollam, India

Cashew nuts, salted

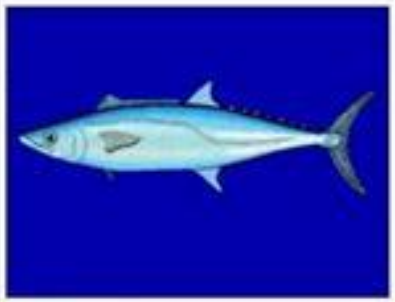
Left: dehulled kernel. Right: Whole seed with hull

Cashews ready for harvest in Kollam, India

Cashew nuts, salted

Left: dehulled kernel. Right: Whole seed with hull

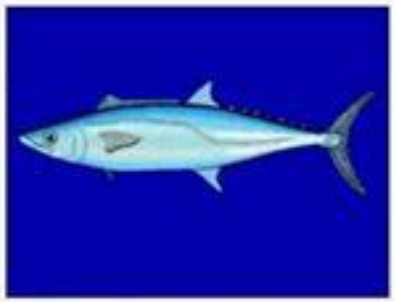
Atlantic Herring



King mackerel

Rainbow trout, *Oncorhynchus mykiss*

Atlantic Herring



King mackerel

Rainbow trout, *Oncorhynchus mykiss*

There are various **herbs** that contain phytoestrogens and the levels of phytoestrogens in herbs are higher than in foods. These include:

較高量植物性雌激素食物

- Clover 三葉草屬
- Red Clover tea
- Licorice 甘草
- Motherwort
- Anise 大茴香
- Hops 蛇麻
- Fennel 小茴香
- Black cohosh 升麻
- Milk thistle 乳薊
- Don Quai 當歸
- Ginseng
- Royal jelly 蜂王漿，又稱蜂皇漿、蜂王乳
- Peony 芍藥屬
- Nettle 蕁麻
- Sage 鼠尾草屬

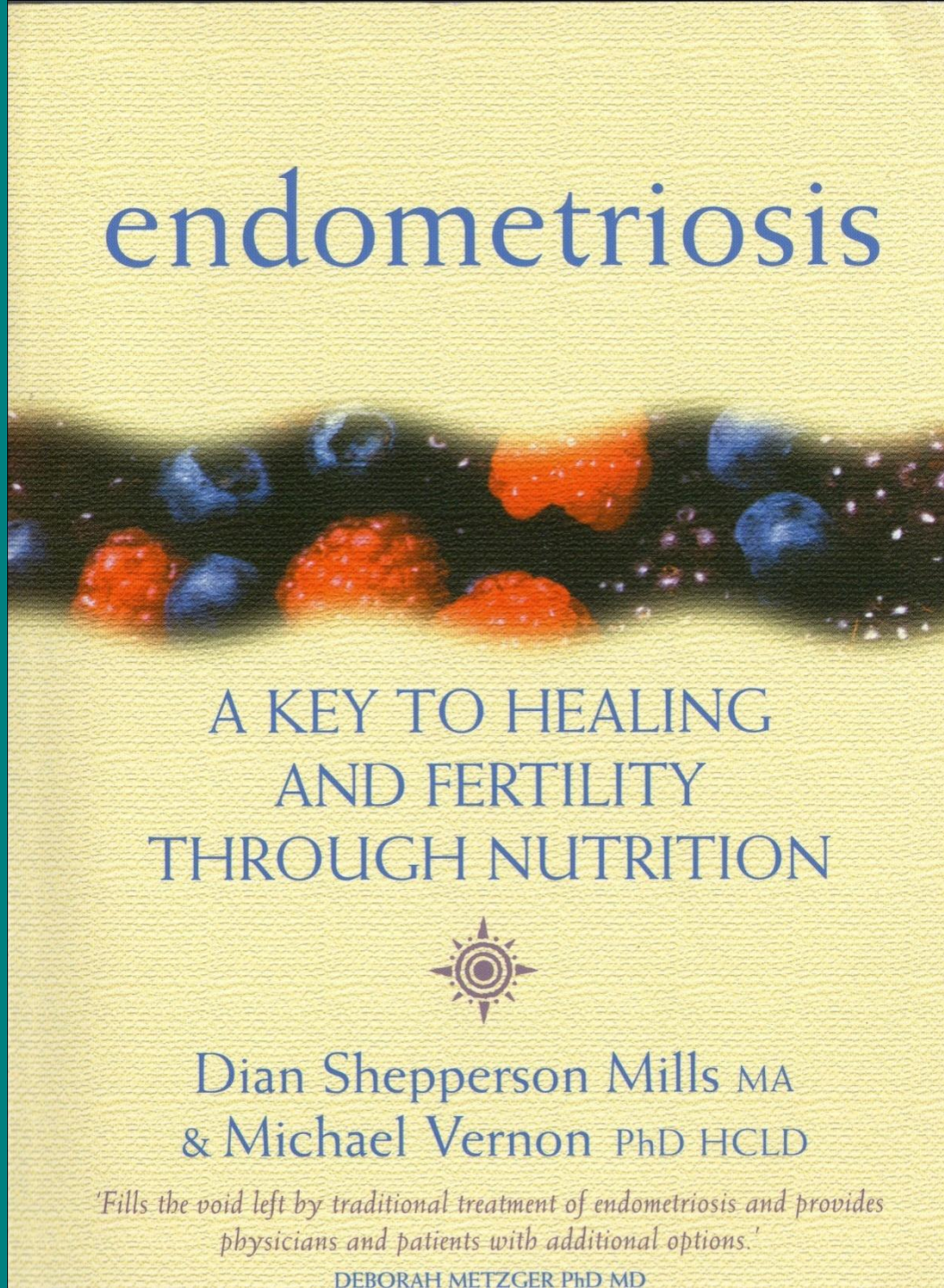
As you can see, these are not the most common herbs for every day culinary uses.

TO SUM UP

- increase omega-3 fatty acids
- avoid meat, dairy products, wheat and sugar
- increase fiber
- modulate estrogen
- avoid caffeine and alcohol
- avoid refined foods, e-numbers, additives
- minimize or avoid soy products as they contain high levels of phytoestrogens, and soy contains a particular toxin which seems to be particularly detrimental for women with Endometriosis
- peel fruit and vegetables to remove toxic chemicals
- eat organic produce wherever possible
- drink lots of filtered or mineral water

內膜異位飲食

專家意見之三



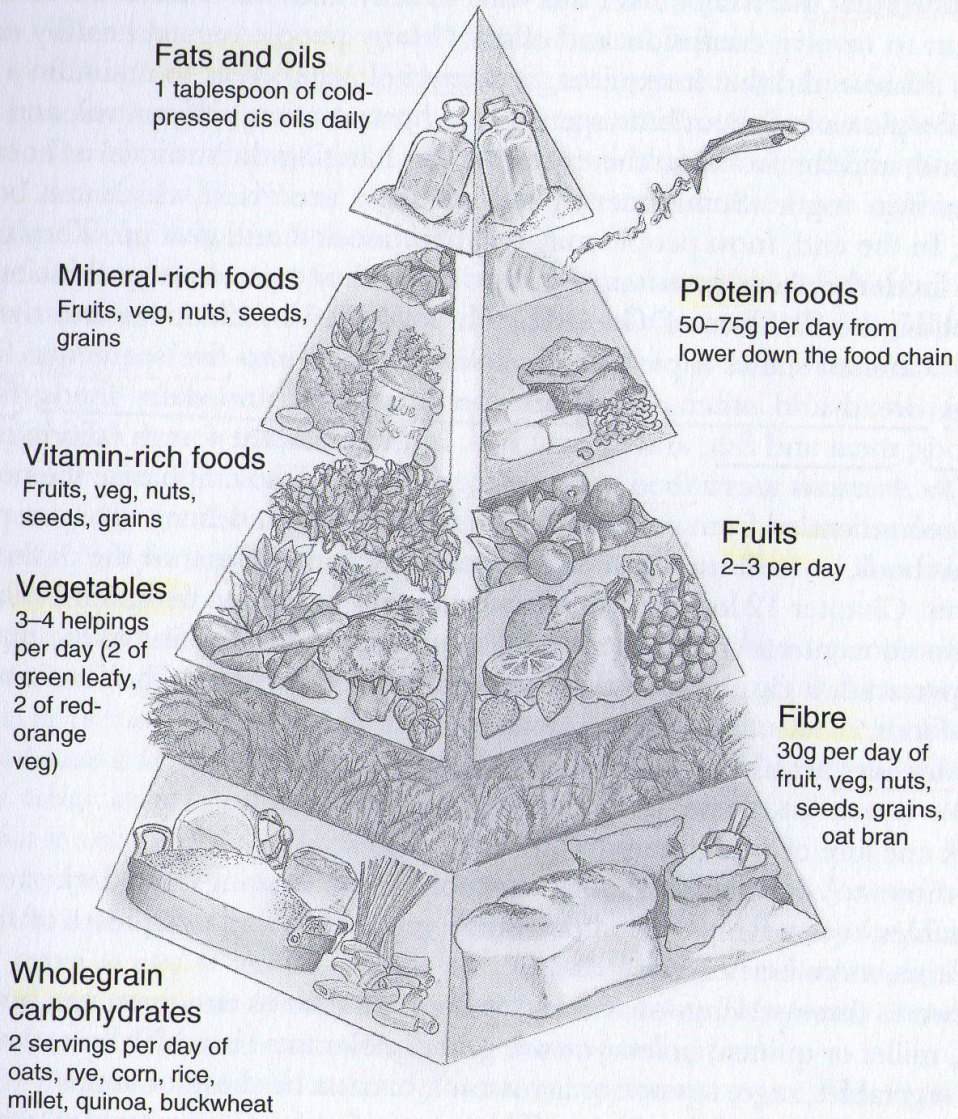


Figure 11.1
The Food Pyramid. A guide to the food groups from which you should pick your daily diet. By choosing the highest quality food you can ensure that the body can reach its optimum health potential. Remember that your body is entirely composed of the food you eat and the water you drink. Reproduced with kind permission of P Holford of ION from Optimum Nutrition Magazine, 9, pp. 3, Autumn 1996

1. Drink one liter of fresh filtered **water** each day.
2. Eat three to four helpings of **vegetables** (two servings of dark-green leafy vegetables, two servings of red or orange vegetables) and two pieces of **fresh fruit** (no citrus 柑橘, more berries 莓果) every day.
3. Eat two to three servings of **wholegrain cereals**, such as rice, oat 燕麦, rye 裸麦，黑麦, buckwheat 蕎麦, corn, millet 黍，稷；黍的穀粒 or quinoa 藜麦, unless you are grain-intolerant – in which case, you can use root vegetables, sago 西穀米；西米, tapioca 樹薯粉，木薯澱粉 or arrowroot 竹芋;粉薯, banana or chestnut 栗子 flours
4. Eat 30g of fiber foods each day. This comes from fruit, vegetables, wholegrain cereal or nuts and seeds.
5. Eat some complex carbohydrate food daily, such as cereals, root vegetables or pulses (legumes 豆科植物) as this supplies slow-releasing sugars into the body to sustain energy levels.
6. Take one tablespoon of fresh cold-pressed cis oil each day (sesame, sunflower, safflower 紅花 or olive oils) or eat seeds and nuts, or take one tablespoon of ground linseeds with breakfast. Avoid trans fats.
7. Eat 50-75 gm of protein foods per day, choosing from a variety of sources – pulses vegetables (legumes), grains, nuts and seeds, eggs, diary foods (cow, goat, ewe), and fresh fish or lean organic meats – so that you take in a wide range of amino acids

營養物質 與 子宮內膜異位症
(營養/飲食) 與 荷爾蒙相關疾病

污染物質 與 子宮內膜異位症
(環境污染物質) 與 生育健康

文獻回顧與探討

Human Reproduction Vol.19, No.8 pp. 1755–1759, 2004
Advance Access publication 14 July, 2004
DOI: 10.1093/humrep/deh395

Selected food intake and risk of endometriosis

F.Parazzini[1,2,4], F.Chiaffarino[1], M.Surace[1], L.Chatenoud[1], S.Cipriani[1], V.Chiantera[1], G.Benzi[3] and L.Fedele[2]

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[4]To whom correspondence should be addressed at: Istituto di Ricerche Farmacologiche 'Mario Negri', via Eritrea, 62–20157 Milano, Italy. E-mail: parazzini@marionegri.it

2004年 人類生殖 雜誌
義大利 米蘭地區
食物攝取與子宮內膜異位症之風險研究

食物攝取與子宮內膜異位症之風險研究

北義大利 1984-1999 504位婦女

子宮內膜異位症病例與對照組比較研究

BACKGROUND: To offer data on the relationship between diet and risk of pelvic endometriosis, we analysed data collected in the framework of two case–control studies. METHODS: Data from two case–control studies conducted in Northern Italy between 1984 and 1999 were combined. Cases were 504 women aged <65 years (median age 33 years, range 20–65) with a laparoscopically confirmed diagnosis of endometriosis, admitted to a network of obstetrics and gynaecology departments in Milan, Brescia and Pavia. Controls were 504 women (median age 34 years, range 20–61) admitted for acute non-gynaecological, non-hormonal, non-neoplastic conditions. RESULTS: Compared to women in the lowest tertile of intake, a significant reduction in risk emerged for higher intake of green vegetables [odds ratio (OR) = 0.3 for the highest tertile of intake] and fresh fruit (OR = 0.6), whereas an increase in risk was associated with high intake of beef and other red meat (OR = 2.0) and ham (OR = 1.8). Consumption of milk, liver, carrots, cheese, fish and whole-grain foods, as well as coffee and alcohol consumption, were not significantly related to endometriosis. CONCLUSIONS: This study suggests a link between diet and risk of endometriosis.

食用綠色蔬菜及新鮮水果會減低風險

食用較多牛肉及其它紅肉及火腿肉會增加風險；其它食物.....則看不出差異

風險程度

較多牛肉及其它紅肉：兩倍風險

Table II. Risk of endometriosis and intake of selected foods

Food item	Frequency of consumption (no. of cases/ no. of controls)[a]			Odds ratio estimates[b] (95% CI)			χ^2 (trend)
	1 (low)	2 (intermediate)	3 (high)	1[b]	2	3	
Milk	80/103	186/174	236/227	1+	1.3 (0.9–2.0)	1.4 (0.9–2.0)	NS
Beef and other red meat	158/202	139/173	206/129	1+	0.9 (0.6–1.3)	2.0 (1.4–2.8)	12.7 ($P = 0.0004$)
Liver	192/242	301/260	–	1+	1.1 (0.8–1.5)		
Carrots	228/192	99/133	172/179	1+	0.7 (0.5–1.1)	0.7 (0.5–1.0)	NS
Green vegetables (all types)	185/121	220/215	99/168	1+	0.6 (0.4–0.8)	0.3 (0.2–0.5)	28.5 ($P = 0.0001$)
Fresh fruit (all types)	116/99	169/139	218/266	1+	0.8 (0.6–1.2)	0.6 (0.4–0.8)	10.0 ($P = 0.002$)
Eggs	110/140	145/111	248/251	1+	1.8 (1.2–2.8)	1.4 (1.0–2.0)	NS
Ham	150/192	109/136	244/176	1+	1.3 (0.9–1.9)	1.8 (1.3–2.5)	11.1 ($P = 0.001$)
Fish	207/167	185/211	112/126	1+	0.7 (0.5–1.0)	0.7 (0.5–1.1)	NS
Cheese	138/133	160/209	206/162	1+	0.6 (0.5–1.0)	0.8 (0.6–1.2)	NS
Whole-grain foods	355/351	82/80	67/73	1+	1.0 (0.7–1.4)	0.8 (0.6–1.3)	NS
Butter	283/332	221/172[c]	–	1+	1.5 (1.0–2.0)		
Margarine	454/453	50/50[c]	–	1+	1.2 (0.7–1.9)		
Oil	97/71	335/372	72/61	1+	0.6 (0.4–0.9)	0.7 (0.4–1.3)	NS
Coffee	204/185	123/119	177/200	1+	0.9 (0.6–1.3)	0.8 (0.5–1.1)	NS
Total alcohol intake	246/247	129/129	129/128	1+	1.0 (0.7–1.4)	0.9 (0.6–1.3)	NS

綠色蔬菜：0.3倍風險

新鮮水果：0.6倍風險

Estrogen Excretion Patterns and Plasma Levels in Vegetarian and Omnivorous Women

Barry R. Goldin, Ph.D., Herman Adlercreutz, M.D., Sherwood L. Gorbach, M.D., James H. Warram, M.D., Johanna T.

28年前文獻：新英格蘭醫學雜誌
素食婦女 血漿雌激素濃度 較低

N Engl J Med 1982; 307:1542-1547 | December 23, 1982

Abstract

We studied 10 vegetarian and 10 nonvegetarian premenopausal women on four occasions approximately four months apart. During each study period, the participants kept three-day dietary records, and estrogens were measured in plasma, urinary, and fecal samples. Vegetarians consumed less total fat than omnivores did (30 per cent of total calories, as compared with 40 per cent) and more dietary fiber (28 g per day, as compared with 12 g). There was a positive correlation between fecal weight and fecal excretion of estrogens in both groups ($P<0.001$), with vegetarians having higher fecal weight and increased fecal excretion of estrogens. Urinary excretion of estriol was lower in vegetarians ($P<0.05$), and their plasma levels of estrone and estradiol were negatively correlated with fecal excretion of estrogen ($P = 0.005$). Among the vegetarians the β-glucuroni-dase activity of fecal bacteria was significantly reduced ($P = 0.05$). We conclude that vegetarian women have an increased fecal output, which leads to increased fecal excretion of estrogen and a decreased plasma concentration of estrogen. (N Engl J Med 1982; 307: 1542–7.)

IA IN THIS ARTICLE

FIGURE 1

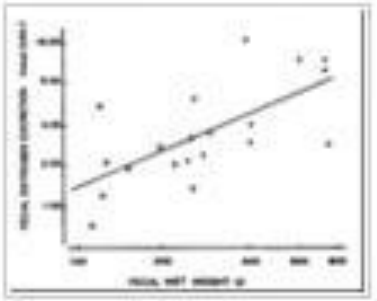


FIGURE 1. A LOG–LOG PLOT OF THE CORRELATION BETWEEN 24-HOUR FECAL EXCRETION OF ESTROGEN (SUM OF ESTRONE, ESTRADIOL, AND ESTRIOL) AND 24-HOUR OUTPUT OF FECAL WET WEIGHT.

The individual points (O denotes omnivore and V denotes vegetarian) are the geometric mean values from four different fecal collections taken in one year. The correlation is significant ($P<0.002$).

Infertility in women and moderate alcohol use
Grodstein, Francine; Goldman, Marlene B; Cramer, Daniel W
American Journal of Public Health; Sep 1994; 84, 9; ABI/INFORM Global
pg. 1429

Infertility in Women and Moderate Alcohol Use

1994年美國公共衛生雜誌

飲酒婦女不孕症機率增加

排卵因素：1.3~1.6倍

子宮內膜異位症：

：1.6~1.5倍

Results. We found an increase in infertility, due to ovulatory factor or endometriosis, with alcohol use. The odds ratio for ovulatory factor was 1.3 (95% confidence interval [CI] = 1.0, 1.7) for moderate drinkers and 1.6 (95% CI = 1.1, 2.3) for heavier drinkers, compared with nondrinkers. The risk of endometriosis was roughly 50% higher in case subjects with any alcohol intake than in control subjects (OR = 1.6, 95% CI = 1.1, 2.3, at moderate levels; OR = 1.5, 95% CI = 0.8, 2.7, at heavier levels).

Conclusions. Moderate alcohol use may contribute to the risk of specific types of infertility. (*Am J Public Health.* 1994;84:1429–1432)

2000年歐洲癌症雜誌
飲食與乳癌風險

PERGAMON

European Journal of Cancer 36 (2000) 636–646

European Journal of Cancer

www.ejconline.com

Meta-analysis of studies on breast cancer risk and diet: the role of fruit and vegetable consumption and the intake of associated micronutrients

S. Gandini [a,*], H. Merzenich [a,b], C. Robertson [a], P. Boyle [a]

A meta-analysis was carried out, in order to summarise published data on the relationship between breast cancer, fruit and vegetable consumption and/or the intake of beta-carotene and vitamin C. Relative risks were extracted from 26 published studies from 1982 to 1997. Random and fixed effects models were used. Between studies, heterogeneity was found for vegetables, fruit, vitamin C but not for beta-carotene. Summary relative risk (RR) estimates based upon a random effects model, except for beta-carotene, for 'high consumption' compared with 'low consumption', derived from the studies satisfying the inclusion criteria were as follows: vegetable consumption: RR = 0.75 (95% CI (confidence interval) 0.66–0.85) from 17 studies; fruit consumption: RR = 0.94 (95% CI 0.79–1.11) from 12 studies; vitamin C: RR = 0.80 (95% CI 0.68–0.95) from 9 studies; beta-carotene: RR = 0.82 (95% CI 0.76–0.91) from 11 studies. This analysis confirms the association between intake of vegetables and, to a lesser extent, fruits and breast cancer risk from published sources. Increasing vegetable consumption might reduce the risk of breast cancer.

多吃蔬菜減低乳癌風險：相對風險0.75

維他命C：相對風險0.80

B-胡蘿蔔素：相對風險0.82

2001年流行病學雜誌

Dietary Folate Intake, Alcohol, and Risk of Breast Cancer in a Prospective Study of Postmenopausal Women

Thomas A. Sellers,[1] Lawrence H. Kushi,[2] James R. Cerhan,[1] Robert A. Vierkant,[1] Susan M. Gapstur,[3] Celine M. Vachon,[1] Janet E. Olson,[1] Terry M. Therneau,[1] and Aaron R. Folsom[4]

Low B-vitamin intake may increase risk of breast cancer through decreased DNA repair capacity. Alcohol intake increases risk for breast cancer, with evidence from prospective studies of an interaction between alcohol and folate. We explored dietary intake of folate and other B vitamins with risk of breast cancer in a cohort study of 34,387 postmenopausal women. To measure diet, we mailed a food frequency questionnaire; we estimated nutrient intakes and categorized them into four levels: <10th, 11th–30th, 31st–50th, and >50th percentiles. Through 12 years of follow-up, we identified 1,586 cases of breast cancer in the cohort at risk. We estimated relative risks (RRs) and 95% confidence intervals (CIs) through Cox regression models adjusted for age, energy, and other risk factors. Women in the lowest 10th percentile of folate intake from diet alone were at modestly increased risk of breast cancer relative to those above the 50th percentile: RR = 1.21 (95% CI = 0.91–1.61). We examined the joint association of folate intake and alcohol use on risk of breast cancer, with the reference group defined as women with high folate (>50th percentile) and no alcohol use. The RRs of breast cancer associated with low dietary folate intake were 1.08 (95% CI = 0.78–1.49) among nondrinkers, 1.33 (95% CI = 0.86–2.05) among drinkers of ≤4 gm per day, and 1.59 (95% CI = 1.05–2.41) among drinkers of >4 gm per day. These results suggest that the risks of postmenopausal breast cancer may be increased among women with low intakes of folate if they consume alcohol-containing beverages. (EPIDEMIOLOGY 2001;12:420–428)

飲酒之停經婦女若葉酸攝取不足則乳癌風險增加

NUTRITION AND CANCER, *39*(1), 19–28

2001年營養與癌症雜誌

Intakes of Selected Nutrients and Food Groups and Risk of Ovarian Cancer

Susan E. McCann, Kirsten B. Moysich, and Curtis Mettlin

減低卵巢癌風險

高植物性飲食：

多攝取飲食纖維

維他命A,E

B-胡蘿蔔素

類胡蘿蔔素

多攝取水果及蔬菜

in the few years before admission were collected with a self-administered questionnaire. Odds ratios (OR) and 95% confidence intervals (CI) were estimated by unconditional logistic regression adjusting for age, education, region of residence, regularity of menstruation, family history of ovarian cancer, parity, age at menarche, oral contraceptive use, and energy intake. Women in the highest vs. the lowest quartile of total energy had a weak increase in risk (OR = 1.25, 95% CI = 0.90–1.73). Significantly reduced risks were associated with higher intakes of dietary fiber (OR = 0.57, 95% CI = 0.38–0.87), vitamin A (OR = 0.66, 95% CI = 0.45–0.98), carotenoid (OR = 0.64, 95% CI = 0.43–0.93), vitamin E (OR = 0.58, 95% CI = 0.38–0.88), β-carotene (OR = 0.68, 95% CI = 0.46–0.98), and total fruit and vegetable intake (OR = 0.62, 95% CI = 0.42–0.92). Our findings suggest that a diet high in plant foods may be important in reducing risk of ovarian cancer.

1995年歐洲臨床營養學雜誌

Eur J Clin Nutr. 1995 Jul;49(7):508-16.

Menstrual pain in Danish women correlated with low n-3 polyunsaturated fatty acid intake.

Deutch B.

Aarhus University, Denmark.

丹麥婦女

Abstract

OBJECTIVES: The hypothesis tested was that menstrual discomfort, e.g. dysmenorrhoea, known to be prostaglandin-mediated, can be influenced by the dietary ratio of n-3 and n-6 polyunsaturated fatty acids. The prostaglandins derived from marine n-3 fatty acids are normally less aggressive and therefore expected to be associated with milder symptoms.

DESIGN: The question was surveyed in an epidemiological study based upon self-administered questionnaires concerning menstrual history, present symptoms, general health, socioeconomic factors, and general dietary habits. Two (prospective) 4-day dietary records were used to estimate average daily nutrient intake.

SUBJECTS: The subjects were recruited by advertising (about 220 volunteered); 181 healthy Danish women were selected, aged 20-45 years; they were not pregnant and did not use oral contraceptives.

RESULTS: No correlations were found between socioeconomic or anthropometric data and menstrual problems. On the contrary certain dietary habits, e.g. low intake of animal and fish products, and intakes of specific nutrients, were correlated with menstrual pain. The average dietary n-3/n-6 ratio of women with menstrual pain was 0.24. It was significantly higher among those with low intake of B12 coincident with low intake of n-3 (0.42, $P < 0.001$) (chi-square), with low n-3 intake coincident with low n-3/n-6 ratio (0.42, $P < 0.005$), and finally with low intake of B12 coincident with low n-3/n-6 ratio (0.47, $P < 0.001$).

CONCLUSION: The results were highly significant and mutually consistent and supported the hypothesis that a higher intake of marine n-3 fatty acids correlates with milder menstrual symptoms.

經痛與社經狀況與人體測量無關

與飲食形態有關聯

攝食較低量維他命B12及較低量n-3(即低n-3/n-6比率〉經痛發生機率較高

1996年美國婦產科醫學會雜誌

Supplementation with omega-3 polyunsaturated fatty acids in the management of dysmenorrhea in adolescents

多元不飽和脂肪酸 與 青少女之經痛

Zeev Harel, MD,[a] Frank M. Biro, MD,[a, b] Renee K. Kottenhahn, MD,[a] and Susan L. Rosenthal, PhD[a, b]

Cincinnati, Ohio

魚油〈含多元不飽和脂肪酸及維生素E〉吃兩個月

OBJECTIVES: The purpose of the study was to examine whether dietary supplementation with omega-3 fatty acids can relieve symptoms of dysmenorrhea in adolescents.

STUDY DESIGN: Forty-two adolescents with dysmenorrhea were randomly allocated to two groups. In the first group 21 girls received fish oil (1080 mg icosapentaenoic acid, 720 mg docosahexaenoic acid, and 1.5 mg vitamin E) daily for 2 months followed by a placebo for an additional 2 months. In the second group 21 girls received placebo for the first 2 months, followed by fish oil for 2 more months. The Cox Menstrual Symptom Scale was used to assess response to treatment.

RESULTS: There were no significant differences in the Cox Menstrual Symptom Scale between the two groups at baseline after 2 months of placebo administration. After 2 months of treatment with fish oil there was a marked reduction in the Cox Menstrual Symptom Scale from a baseline mean value of 69.9 to 44.0 ($p < 0.0004$).

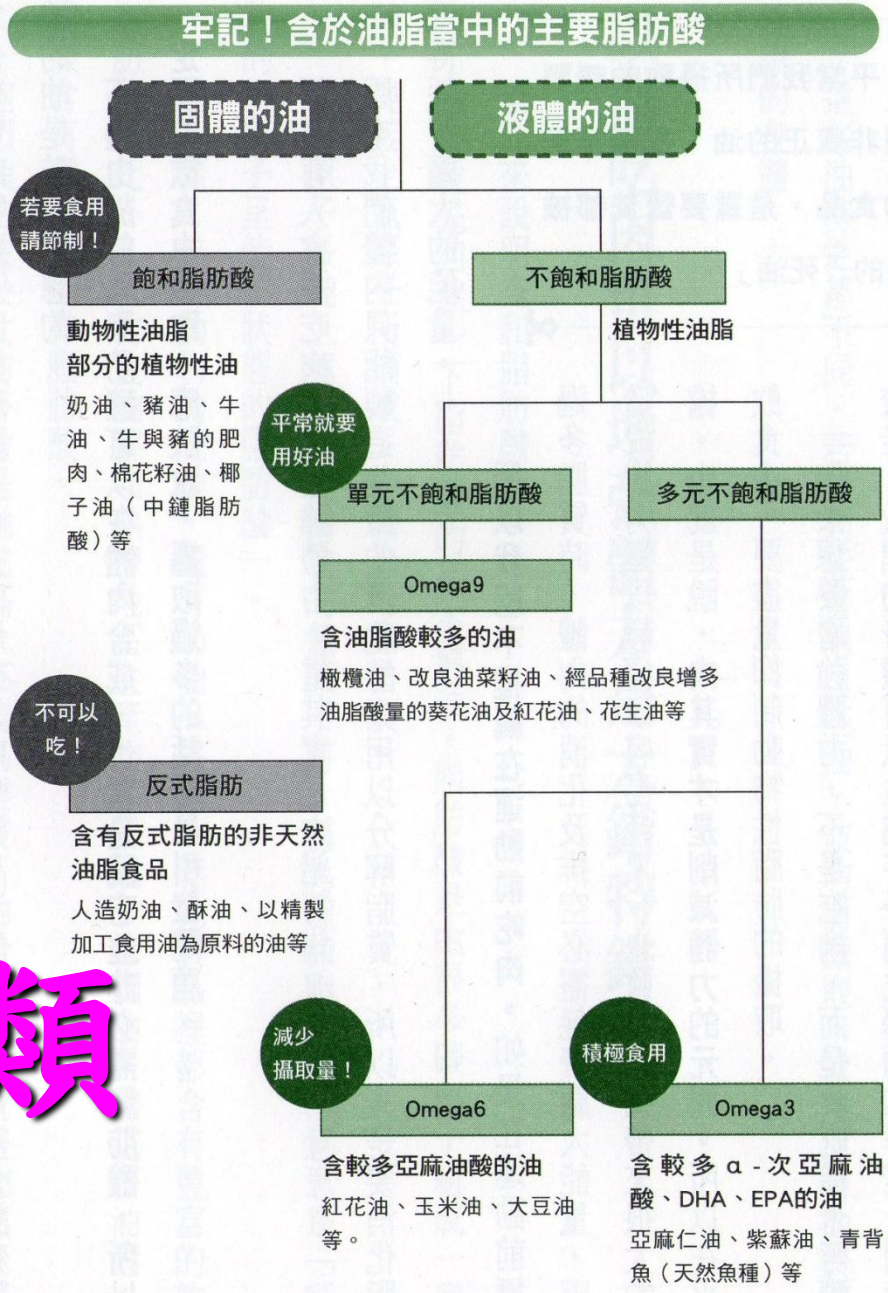
經痛減緩三分之一

CONCLUSIONS: This study suggests that dietary supplementation with omega-3 fatty acids has a beneficial effect on symptoms of dysmenorrhea in adolescents. (Am J Obstet Gynecol 1996;174:1335-8.)

Types of fats in food

- Unsaturated fat
  - Monounsaturated fat
  - Polyunsaturated fat
  - Trans fat
  - Cis fat
  - Omega fatty acids:
    - ω-3
    - ω-6
    - ω-9
- Saturated fat
  - Interesterified fat

油脂類



2010年 人類生殖 雜誌
美國 哈佛大學醫學院

human reproduction

ORIGINAL ARTICLE *Reproductive epidemiology*

A prospective study of dietary fat consumption and endometriosis risk

Stacey A. Missmer[1,2,3,*], Jorge E. Chavarro[1,4], Susan Malspeis[1,3], Elizabeth R. Bertone-Johnson[5], Mark D. Hornstein[2], Donna Spiegelman[3,6], Robert L. Barbieri[2], Walter C. Willett[1,3,4], and Susan E. Hankinson[1,3]

[1]Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA 02115-5804, USA [2]Department of Obstetrics, Gynecology, and Reproductive Medicine, Brigham and Women's Hospital and Harvard Medical School, 181 Longwood Avenue, Boston, MA, USA [3]Department of Epidemiology, Harvard School of Public Health, Boston, MA, USA [4]Department of Nutrition, Harvard School of Public Health, Boston, MA, USA [5]Department of Public Health, University of Massachusetts, Amherst, MA, USA [6]Department of Biostatistics, Harvard School of Public Health, Boston, MA, USA

*Correspondence address. Tel: +1-617-525-2021; Fax: +1-617-525-2008; E-mail: stacey.missmer@channing.harvard.edu

Submitted on May 20, 2009; resubmitted on January 15, 2010; accepted on January 25, 2010

飲食中之油脂攝取與子宮內膜異位症之風險研究

1199案例 追蹤 586153人年

BACKGROUND: Endometriosis is a prevalent but enigmatic gynecologic disorder for which few modifiable risk factors have been identified. Fish oil consumption has been associated with symptom improvement in studies of women with primary dysmenorrhea and with decreased endometriosis risk in autotransplantation animal studies.

METHODS: To investigate the relation between dietary fat intake and the risk of endometriosis, we analyzed 12 years of prospective data from the Nurses' Health Study II that began in 1989. Dietary fat was assessed via food frequency questionnaire in 1991, 1995 and 1999. We used Cox proportional hazards models adjusted for total energy intake, parity, race and body mass index at age 18, and assessed cumulatively averaged fat intake across the three diet questionnaires.

RESULTS: During the 586 153 person-years of follow-up, 1199 cases of laparoscopically confirmed endometriosis were reported. Although total fat consumption was not associated with endometriosis risk, those women in the highest fifth of long-chain omega-3 fatty acid consumption were 22% less likely to be diagnosed with endometriosis compared with those with the lowest fifth of intake [95% confidence interval (CI) = 0.62–0.99; *P*-value, test for linear trend (Pt) = 0.03]. In addition, those in the highest quintile of *trans*-unsaturated fat intake were 48% more likely to be diagnosed with endometriosis (95% CI = 1.17–1.88; Pt = 0.001).

CONCLUSION: These data suggest that specific types of dietary fat are associated with the incidence of laparoscopically confirmed endometriosis, and that these relations may indicate modifiable risk. This evidence additionally provides another disease association that supports efforts to remove *trans* fat from hydrogenated oils from the food supply.

Key words: endometriosis / cohort study / diet / epidemiology / fats

攝食較高量長鍊0-3脂肪酸者被診斷子宮內膜異位減少22%

攝食較高反式不飽和脂肪酸者被診斷子宮內膜異位增加48%

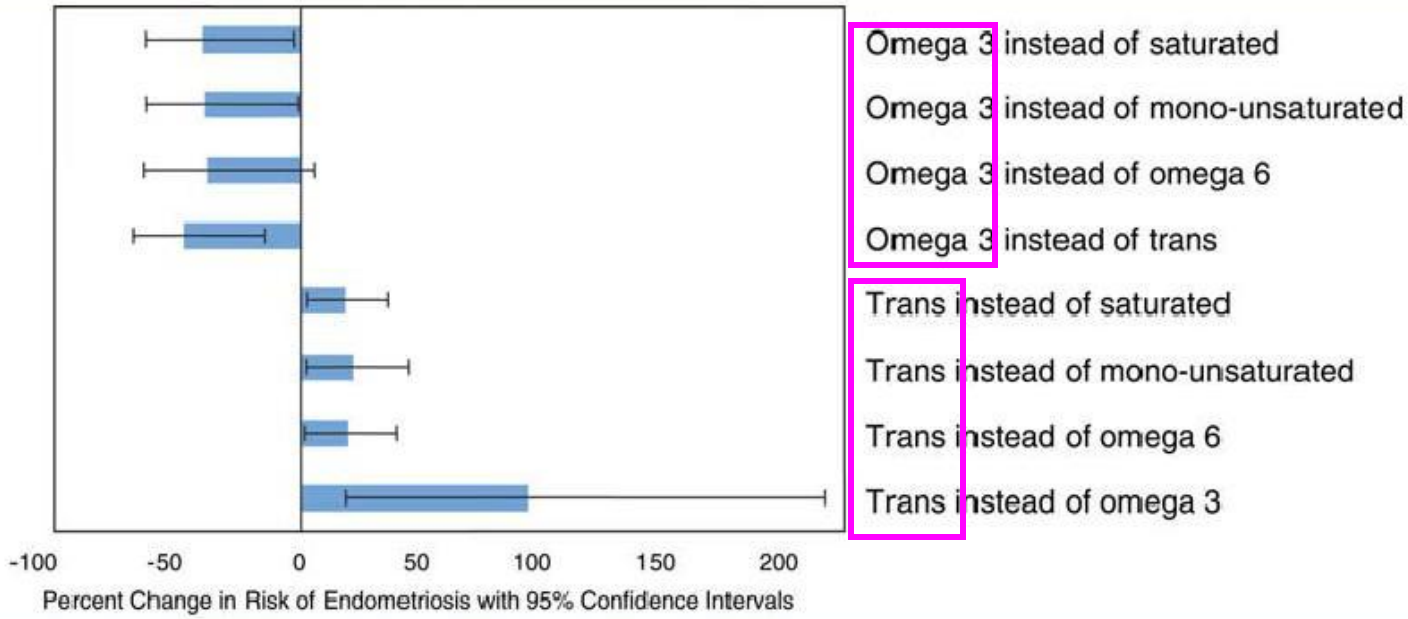


Figure 1 Impact of fatty acid substitution on the risk of endometriosis.

Estimated percent changes in the risk of laparoscopically confirmed endometriosis associated with isocaloric substitutions of 1% of energy from one dietary component for another. The I bars represent 95% CIs.

攝食較高量長鍊0-3脂肪酸者被診斷子宮內膜異位減少22%

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Within this population of USA registered nurses, the major dietary contributors to long-chain omega-3 fatty acids included salad dressing, tuna and dark fish, although the major contributors to *trans*-unsaturated fatty acids were commercially (i.e. away from home) fried foods, margarine and crackers. Seventy-eight percent of the *trans* fat contributors were likely industrially produced due to partial hydrogenation of vegetable oils. The primary contributors to palmitic acid consumption were animal products—meats and dairy foods—which perhaps supports the observation of increased endometriosis likelihood with greater red meat consumption observed within the sole human study published to date (Parazzini *et al.*, 2004). In this

長鍊0-3脂肪酸之來源：沙拉醬料、鮪魚、深色魚

反式不飽和脂肪酸之來源：油炸食物、人造黃油(麥淇淋)、餅乾

植物奶油

維基百科，自由的百科全書

汉 漢▼

植物奶油（Margarine）是一種利用氫化了的植物油來模擬奶油的產品代替品。植物奶油早期傳入中國時，音譯作**麥淇淋**、**瑪琪琳**、**馬芝蓮**、**乳瑪琳**。

一碗瑪琪琳

參見 [編輯]

- 奶油
- 代可可脂
- 氫化脂肪
- 反式脂肪

植物奶油是一個與**食材**或**調味料**相關的小作品。你可以透過編輯或修訂擴充其內容。

Margarine

From Wikipedia, the free encyclopedia

Margarine (pronounced /ˈmɑrdʒərɪn/, /ˈmɑrgərɪn/, /ˈmɑrdʒrɪn/, or /ˈmɑrdʒəriːn/), as a generic term, can indicate any of a wide range of butter substitutes. In many parts of the world, the market share of margarine and spreads has overtaken that of butter. Margarine is an ingredient in the preparation of many foods and, in recipes and colloquially, is sometimes called **oleo**, short for **oleomargarine**.

Margarine naturally appears white, or almost white, and by forbidding the addition of artificial coloring agents, legislators in some jurisdictions found that they could protect their dairy industries by discouraging the consumption of margarine. Bans on adding color became commonplace in the U.S., Australasia and Canada and, in some cases, those bans endured for almost 100 years. It did not become legal to sell colored margarine in Australia, for example, until the 1960s.

Contents [hide]

Margarine in a tub

聯合新聞網 udn.com 更新日期:2010/09/13 09:36 修瑞瑩

液態植物油氫化後變成固態，脂肪酸的化學結構也會由順式變為反式，稱為反式脂肪。

氫化過程可提高植物油的穩定性與可塑性，延長產品保存的期限，更耐高溫、不易酸敗、便於塗抹，因此食品業者經常使用氫化的棕櫚油來油炸。

除了化學作用可產生反式脂肪外，另一種來源則是微生物作用，例如牛、羊等反芻動物胃中的微生物，會把牧草發酵合成脂肪酸，其中即有反式脂肪，因此牛、羊的肉、奶及奶油中都有反式脂坊。

攝取過多的反式脂肪，容易造成人體內壞的膽固醇（ＬＤＬ）上升，好的膽固醇（ＨＤＬ）下降，易形成粥狀動脈硬化，血液易阻塞，引起心血管疾病。

「怎麼可能這些食品都沒有反式脂肪呢？」台南市營養師公會理事長張麗娟每次逛賣場時，都會注意食品的營養標示，像餅乾、洋芋片及奶精、乳瑪琳等食品，反式脂肪含量相當高，包裝上卻標示為零。

她懷疑廠商標示不實，很多可能含有大量反式脂肪的食品標示為零，讓消費者放心買回家，事實上已把反式脂肪吃下肚。

兩罐乳瑪琳，左方產品標示反式脂肪是零點五公克、右方標示為零公克。
記者修瑞瑩／攝影

本報記者向食品業者查證，業者不願證實，只低調表示「如果標示有反式脂肪，你是消費者你會買嗎？」還有業者稱「大家都沒有標示出來，如果你乖乖標出來反而很傻」。

含有大量反式脂肪的前十大食物

	名稱	食品範例
1	抹醬 （塗抹於麵包等食品）	人造奶油 酥油
2	預拌粉	蛋糕用麵粉
3	速食麵 速食湯	杯麵
4	速食	薯條
5	冷凍食品	冷凍雞肉
6	烘焙食品	甜甜圈 磅蛋糕
7	零食點心	洋芋片
8	早餐穀片	燕麥麩
9	餅乾 巧克力	巧克力餅乾
10	調味醬	鮮奶油霜、咖啡奶球、調味醬汁

上表為美國國內的調查結果，可以看出來各式各樣加工食品裡都含有反式脂肪。

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上表為美國國內的調查結果，可以看出來各式各樣加工食品裡都含有反式脂肪。

脂肪酸（Omega-3 fatty acids）又稱*n*−3脂肪酸，是一類不飽和脂肪酸。由於從分子中距離羧基最遠的甲基碳數起時，這一類化合物均具有
間的雙鍵（即第三根鍵為雙鍵），因此稱為ω−3脂肪酸，其中ω是指離羧基最遠的碳原子。

的ω−3必需脂肪酸包括α-亞麻酸、二十碳五烯酸、二十二碳六烯酸，這三者均為多不飽和脂肪酸。人體內無法從頭合成ω−3脂肪酸，但可以
年為原料，合成二十碳的不飽和ω−3脂肪酸（如EPA）及二十二碳的不飽和ω−3脂肪酸（如DHA）。上述反應與ω−6脂肪酸的合成反應互為
的脂肪酸。ω−3與ω−6脂肪酸均為必須從食物中獲取的必需營養素。

論・編	脂肪酸
飽和	乙酸（醋酸）・丙酸・丁酸・戊酸・己酸・庚酸・辛酸・壬酸・癸酸・月桂酸（十二酸）・肉豆蔻酸（十四酸）・棕櫚酸（軟脂酸、十六酸）・硬脂酸（十 油酸
不飽和	α-亞麻酸・十八碳四烯酸・二十碳五烯酸（EPA）・二十二碳六烯酸（DHA）
不飽和	亞油酸・γ-亞麻酸・花生四烯酸
不飽和	油酸・反油酸・芥酸・神經酸

List of *n*−3 fatty acids

This table lists several different names for the most common *n*−3 fatty acids found in nature.

Common name	Lipid name	Chemical name
n/a	16:3 (*n*−3)	*all-cis*-7,10,13-hexadecatrienoic acid
α-Linolenic acid (ALA)	18:3 (*n*−3)	*all-cis*-9,12,15-octadecatrienoic acid
Stearidonic acid (SDA)	18:4 (*n*−3)	*all-cis*-6,9,12,15-octadecatetraenoic acid
Eicosatrienoic acid (ETE)	20:3 (*n*−3)	*all-cis*-11,14,17-eicosatrienoic acid
Eicosatetraenoic acid (ETA)	20:4 (*n*−3)	*all-cis*-8,11,14,17-eicosatetraenoic acid
Eicosapentaenoic acid (EPA)	20:5 (*n*−3)	*all-cis*-5,8,11,14,17-eicosapentaenoic acid
Docosapentaenoic acid (DPA), Clupanodonic acid	22:5 (*n*−3)	*all-cis*-7,10,13,16,19-docosapentaenoic acid
Docosahexaenoic acid (DHA)	22:6 (*n*−3)	*all-cis*-4,7,10,13,16,19-docosahexaenoic acid
Tetracosapentaenoic acid	24:5 (*n*−3)	*all-cis*-9,12,15,18,21-tetracosapentaenoic acid
Tetracosahexaenoic acid (Nisinic acid)	24:6 (*n*−3)	*all-cis*-6,9,12,15,18,21-tetracosahexaenoic acid

ω−3脂肪酸（Omega-3 fatty acids）又稱*n*−3脂肪酸，是一類不飽和脂肪酸，由於從分子中距離羧基最遠的甲基碳數起時，這一類化合物均具有第三個碳原子與第四個碳原子之間的雙鍵（即第三根鍵為雙鍵），因此稱為ω−3脂肪酸，其中ω是指離羧基最遠的碳原子。

重要的ω−3必需脂肪酸包括α-亞麻酸、二十碳五烯酸、二十二碳六烯酸，這三者均為多不飽和脂肪酸，人體內無法從頭合成ω−3脂肪酸，但可以使用十八碳的ω−3脂肪酸α-亞麻酸作為原料，合成二十碳的不飽和ω−3脂肪酸（如EPA）及二十二碳的不飽和ω−3脂肪酸（如DHA）。上述反應與ω−6脂肪酸的合成反應互為競爭反應，後者是從亞油酸衍生出的脂肪酸。ω−3與ω−6脂肪酸均為必須從食物中獲取的必需營養素。

族・論・編	脂肪酸	隱藏▲
飽和	乙酸（醋酸）・丙酸・丁酸・戊酸・己酸・庚酸・辛酸・壬酸・癸酸・月桂酸（十二酸）・肉豆蔻酸（十四酸）・棕榈酸（軟脂酸、十六酸）・硬脂酸（十八酸）・花生酸・山嵛酸・木焦油酸	
n−3不飽和	α-亞麻酸・十八碳四烯酸・二十碳五烯酸（EPA）・二十二碳六烯酸（DHA）	
n−6不飽和	亞油酸・γ-亞麻酸・花生四烯酸	
n−9不飽和	油酸・反油酸・芥酸・神經酸	

Dietary sources [edit]

ALA, EPA, DHA可提供保護心血管疾病

Daily values [edit]

As macronutrients, fats are not assigned recommended daily allowances. Macronutrients have AI (acceptable intake) and AMDR (acceptable macronutrient distribution range) instead of RDAs. The AI for *n*−3 is 1.6 grams/day for men and 1.1 grams/day for women[92] while the AMDR is 0.6% to 1.2% of total energy.[93]

A growing body of literature suggests that higher intakes of α-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA) may afford some degree of protection against coronary heart disease. Because the physiological potency of EPA and DHA is much greater than that for α-linolenic acid, it is not possible to estimate one AMDR for all *n*−3 fatty acids. Approximately 10 percent of the AMDR can be assumed as EPA and/or DHA. There was insufficient evidence as of 2005 to set a UL (upper tolerable limit) for *n*−3 fatty acids.[92]

n-3來源食物

A perceived risk of fish oil *n*−3 supplementation has been dietary poisoning by the bioaccumulation of traces of heavy metals, in particular mercury, lead, nickel, arsenic and cadmium as well as other contaminants (PCBs, furans, dioxins, PBDEs), which potentially might be found especially in less-refined fish oil supplements. However, in reality, heavy metal toxicity from consuming fish oil supplements is highly unlikely. This is because heavy metals selectively bind with protein in the fish flesh rather than accumulate in the oil. An independent test in 2006 of 44 fish oils on the US market found that all of the products passed safety standards for potential contaminants.[94] The FDA recommends that total dietary intake of *n*−3 fatty acids from fish not exceed 3 grams per day, of which no more than 2 grams per day are from nutritional supplements.[5]

n-3強化食品

Historically, the Council for Responsible Nutrition (CRN) and the World Health Organization (WHO) have published acceptable standards regarding contaminants in fish oil. The most stringent current standard is the International Fish Oils Standard (IFOS). The Global Organization for EPA and DHA Omega-3 (GOED)[95] has also published standards for omega-3 products. Fish oils that typically make this highest grade are those that are molecularly distilled under vacuum, and have virtually no measurable level of contaminants (measured parts per billion and parts per trillion).

n−3 supplementation in food has been a significant recent trend in food fortification, with global food companies launching *n*−3 fortified bread, mayonnaise, pizza, yogurt, orange juice, children's pasta, milk, eggs, confections and infant formula.

The most widely available source of EPA and DHA is cold water oily fish such as salmon, herring, mackerel, anchovies and sardines. Oils from these fish have a profile of around seven times as much *n*−3 as *n*−6. Other oily fish such as tuna also contain *n*−3 in somewhat lesser amounts. Consumers of oily fish should be aware of the potential presence of heavy metals and fat-soluble pollutants like PCBs and dioxin which may accumulate up the food chain. After extensive review, researchers from Harvard's School of Public Health reported in the *Journal of the American Medical Association* (2006) that the benefits of fish intake generally far outweigh the potential risks. As fish oil supplements are bought for their healthful Omega-3 fatty acid content, it is therefore vital that manufacturers and suppliers of these products ensure that they do not contain high levels of dioxins and other toxins.[96]

Even some forms of fish oil may not be optimally digestible. Of four studies that compare bioavailability of the triglyceride form of fish oil vs. the ester form, two have concluded that the natural triglyceride form is better, and the other two studies did not find a significant difference. No studies have shown the ester form to be superior although it is cheaper to manufacture.[97][98]

Although fish is a dietary source of *n*−3 fatty acids, fish do not synthesize them; they obtain them from the algae (microalgae in particular) or plankton in their diet.[99]

冷水油魚：鮭魚、鯡魚、鯖魚、鯷魚、沙丁魚

Grams of *n*−3 per 3oz (85g) serving of popular fish.[100]

Common name	grams *n*−3
Tuna	0.21–1.1
Pollock	0.45
Salmon	1.1–1.9
Cod	0.15–0.24
Catfish	0.22–0.3
Flounder	0.48
Grouper	0.23
Halibut	0.60–1.12

Grouper	0.23
Halibut	0.60–1.12
Mahi mahi	0.13
Orange roughy	0.028
Red snapper[*disambiguation needed*]	0.29
Shark	0.83
Swordfish	0.97
Tilefish	0.90
King mackerel	0.36

Botanical sources [edit]

植物來源

Six times richer than most fish oils in *n*−3,[105] albeit in the short chain form lacking EPA and DHA, flax (or linseed) (*Linum usitatissimum*) and its oil are perhaps the most widely available botanical source of *n*−3. Flaxseed oil consists of approximately 55% ALA (alpha-linolenic acid). Flax, like chia, contains approximately three times as much *n*−3 as *n*−6.

Purslane contains more Omega-3 fatty acids (alpha-linolenic acid in particular[106]) than any other leafy vegetable plant. Purslane has .01 mg/g of Eicosapentaenoic acid (EPA), this is an extraordinary amount of EPA for vegetable sources.

Table 1. ALA content as the percentage of *n*−3 in the seed oil.[107]

Common name	Alternative name	Linnaean name	% *n*−3
Chia	chia sage 奇異子	*Salvia hispanica*	64
Kiwifruit	Chinese gooseberry	*Actinidia chinensis*	62
Perilla	shiso 紫蘇	*Perilla frutescens*	58
Flax	linseed	*Linum usitatissimum*	55
Lingonberry	Cowberry 越橘	*Vaccinium vitis-idaea*	49
Camelina	Gold-of-pleasure	*Camelina sativa*	36
Purslane	Portulaca	*Portulaca oleracea*	35
Black Raspberry		*Rubus occidentalis*	33
Hemp		*Cannabis Sativa*	19
Hempseed	*Cannabis sativa*	8.7
Walnuts	*Juglans regia*	6.3
Pecan nuts	*Carya illinoinensis*	0.6
Hazel nuts	*Corylus avellana*	0.1

Common name	Linnaean name	% *n*−3
Flaxseed	*Linum usitatissimum*	18.1
Butternuts	*Juglans cinerea*	8.7
Hempseed	*Cannabis sativa*	8.7
Walnuts	*Juglans regia*	6.3
Pecan nuts	*Carya illinoinensis*	0.6

亞麻子

Flax seeds prod
very high *n*−3 c

Chia Seeds 被印度人稱爲窮人食物，泡在水中會產生膠質並膨脹幾十倍，讓人食用後有飽腹之感，與俗稱魔芋的蒟蒻異曲同工。Chia Seeds一來熱量低，二來又含有豐富的食物纖維和Omega-3脂肪酸，對心臟血管和消化排毒很有益。

Excellent sources of the omega-3 fatty acid producing oils are

1. evening primrose 報春花; 歐洲櫻草
2. Walnut oil 胡桃
3. flax seeds/oil 亞麻

Chia seeds 的中文譯名有好幾個，例如

野鼠尾草籽
墨西哥鼠尾草種子
纖雅奇異子
吉意子
奇異子
明列子
飽腹子

1. It is also important to decrease intake of those fatty acids that will stimulate the bad guys which are found in saturated fats, butter, animal and organ meat, lard. 豬油

Eggs

雞蛋：餵食綠葉及昆蟲之雞隻（非餵食玉米或黃豆

Eggs produced by chicken fed a diet of greens and insects produce higher levels of *n*−3 fatty acids (mostly ALA) than chicken fed corn or soybeans.[110] In addition to feeding chickens insects and greens, fish oils may be added to their diet to increase the amount of fatty acid concentrations in eggs.[111] The addition of flax and canola seeds to the diet of chickens, both good sources of alpha-linolenic acid, increases the omega-3 content of the eggs.[112] However, the Center for Science in the Public Interest reports that "the omega-3s that FDA considers healthful (DHA and EPA) are not found in plants such as flax seed." It also reports that "Eggs contain too much saturated fat and cholesterol to meet FDA's definition of healthy."[113] The addition of green algae or seaweed to the diet boosts the content of DHA and EPA omega-3 content, which are the forms of omega-3 that are approved by the FDA for medical claims.

Meat [edit]

牛肉：餵食草之牛隻（非餵食穀類）

The *n*−6 to *n*−3 ratio of grass-fed beef is about 2:1, making it a more useful source of *n*−3 than grain-fed beef, which usually has a ratio of 4:1.[114]

In most countries, commercially available lamb is typically grass-fed, and thus higher in *n*−3 than other grain-fed or grain-finished meat sources. In the United States, lamb is often finished (i.e. fattened before slaughter) with grain, resulting in lower *n*−3.[115]

The omega-3 content of chicken meat may be enhanced by increasing the animals' dietary intake of grains that are high in *n*−3, such as flax, chia, and canola.[116]

紐西蘭草飼牛

讓消費者安心 自然健康的紐西蘭牛肉

紐西蘭的牛隻都是被飼養在空氣清新、開闊的戶外，以大量充足的綠草為食物。放牧牛隻的主要天然食物就是牧草。大量

About New Zealand Beef

紐西蘭草飼牛採天然放牧，生長在空氣清新、以天然牧草為主食的開闊空間，加上嚴格的衛疫，所以從未發生口蹄疫或狂牛症事件。消費者可以安心享用自然健康的紐西蘭牛肉。

草飼牛對健康更有益

以天然放牧、牧草飼育的紐西蘭牛隻，其肉質比餵食穀物的牛肉，有更低的含脂量及熱量；平均來說，草飼牛含脂量只有穀飼牛肉的三分之一，修去脂肪的瘦紐西蘭牛肉甚至只有5%的脂肪。含脂量低代表熱量也低，對於食用者維持健康及身材曲線，都有正面助益。

最新研究並發現，草飼牛所含的Omega 3脂肪酸（EPA，DHA及 DPA），比穀飼牛肉多2至4倍！而Omega 3脂肪酸被認為有助減少心血管疾病、降低中風及心臟病發的機率，並有益腦部健康，避免憂鬱症、老年痴呆症、失智症，也有助兒童腦部發育，降低閱讀障礙及過動症的發生。另外草飼牛肉也比穀飼牛含有多出3至5倍的CLA共軛亞麻油酸（Conjugated Linoleic Acid），這種營養素可幫助我們降低罹癌的機率；營養專家建議，想要攝取充足的CLA，選擇吃一塊草飼牛排就對了！

除此之外，草飼牛肉比穀飼牛多了2至4倍的維他命E，能幫助身體抗氧化及癌病變；草飼牛也有豐富的蛋白質、維生素B群、鋅和鐵質，是營養豐富且完整的優質肉品。

草飼牛對環境更有益

在紐西蘭遼闊潔淨的好山好水中，牛群自在活動，靠食用茂盛的青草生長，完全不需大量成本生產穀物飼料、建置集中式畜舍，對節能減碳自有積極貢獻。同時牛隻與草地彼此滋養、共同生息，不僅符合自然生態，最新研究還指出，牛隻放牧飼育會比集中圈養的方式，產生較少的甲烷，間接降低溫室效應。

草飼牛是更安心的肉品選擇

紐西蘭牛群在清新自然的環境中，食用茂盛的青草生長，既不需人工輔助飼料，也不受牲畜疾病威脅，而能生產出高品質、高營養、無有害殘留物的優質牛肉。同時因紐西蘭實施嚴格的檢疫法規、人道飼育及宰殺、嚴謹的溫控及品管制度，使紐西蘭牛肉不僅品質更佳、風味更優良，更是全球餐飲業者零污染食材的首選。世界動物衛生組織*（OIE）也於2006年5月24日，在巴黎總部舉行的第74屆年會上，正式宣告紐西蘭為非狂牛症疫區。在此之前，歐盟也評估紐西蘭為「最不受狂牛症威脅」的國家之一。

動物產品之軟脂酸會增加子宮內膜異位症之罹病風險

棕櫚酸，又稱**軟脂酸**，IUPAC名**十六（烷）酸**，是一種在動物及植物內最普遍發現的脂肪酸之一。從名字可見，它的主要成份是從棕櫚樹所來的油，即棕櫚油及棕仁油。牛油、乳酪、牛奶及肉類均有著這種脂肪酸。棕

However, intakes of saturated fat and monounsaturated fat, the major components of animal fat, were not associated with endometriosis risk. Interestingly, palmitic acid intake, a saturated fat primarily contributed by animal products, was significantly related to increased endometriosis risk when all other dietary components were held constant [RR = 1.52 comparing the fifth to first quintile of intake (95% CI = 0.94–2.46; Pt = 0.008; data not shown)]. No other saturated (myristic, stearic) and monounsaturated (oleic, palmitoleic) fatty acids was significantly related to endometriosis risk (data not shown).

（棕櫚酸、軟脂酸）

intake. Within our study, we observed the suggestion of an increased risk of endometriosis with animal fat consumption and specifically a significantly increased risk of nearly 80% with palmitic acid intake.

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2007年 人類生殖 雜誌 義大利 米蘭

Vitamin D reserve is higher in women with endometriosis

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子宮內膜異位症與較高血清濃度維他命D有關

BACKGROUND: An immune-mediated defect in recognition and elimination of endometrial fragments refluxed in the peritoneal cavity has been hypothesized to play a crucial role in endometriosis development. Since vitamin D is an effective modulator of the immune system, we have hypothesized that the vitamin D status may have a role in the pathogenesis of endometriosis. **METHODS:** Women of reproductive age selected for surgery for gynecological indications were enrolled in this prospective cohort study. Serum levels of 25-hydroxyvitamin-D_3, 1,25-dihydroxyvitamin-D_3 and Ca^{2+} were assessed. **RESULTS:** Eighty-seven women with endometriosis and 53 controls were recruited. Mean ($\pm$ SD) levels of 25-hydroxyvitamin-D_3 in women with and without endometriosis were 24.9 $\pm$ 14.8 ng/ml and 20.4 $\pm$ 11.8, respectively ($P = 0.05$). The Odds Ratio (95% Confidence Interval) for endometriosis in patients with levels exceeding the 75th percentile of the serum distribution of the molecule (28.2 ng/ml) was 4.8 (1.7–13.5). A positive gradient according to the severity of the disease was also documented. A trend towards higher levels of 1,25-dihydroxyvitamin-D_3 and Ca^{2+} was observed in women with endometriosis, but differences did not reach statistical significance. As expected, serum concentrations of 25-hydroxyvitamin-D_3 and 1,25-dihydroxyvitamin-D_3, but not Ca^{2+}, are influenced by the season ($P < 0.001$, $P = 0.004$, $P = 0.57$, respectively), while levels of the three molecules did not vary according to the phase of the menstrual cycle. **CONCLUSIONS:** Endometriosis is associated with higher serum levels of vitamin D.

Women with endometriosis improved their peripheral antioxidant markers after the application of a high antioxidant diet

Jennifer Mier-Cabrera[1], Tania Aburto-Soto[2], Soraya Burrola-Mendez[2],

2009 生殖生物及內分泌雜誌 墨西哥
研究高抗氧化飲食：維他命A, C, E

Abstract

Background: Oxidative stress has been identified in the peritoneal fluid and peripheral blood of women with endometriosis. However, there is little information on the antioxidant intake for this group of women. The objectives of this work were 1) to compare the antioxidant intake among women with and without endometriosis and 2) to design and apply a high antioxidant diet to evaluate its capacity to reduce oxidative stress markers and improve antioxidant markers in the peripheral blood of women with endometriosis.

維他命A 1050微克, C 500毫克, E 20毫克 共四個月

Methods: Women with (WEN, n = 89) and without endometriosis (WWE, n = 80) were interviewed using a Food Frequency Questionnaire to compare their antioxidant intake (of vitamins and minerals). Then, the WEN participated in the application of a control (n = 35) and high antioxidant diet (n = 37) for four months. The high antioxidant diet (HAD) guaranteed the intake of 150% of the suggested daily intake of vitamin A (1050 μg retinol equivalents), 660% of the recommended daily intake (RDI) of vitamin C (500 mg) and 133% of the RDI of vitamin E (20 mg). Oxidative stress and antioxidant markers (vitamins and antioxidant enzymatic activity) were determined in plasma, erythrocytes.

子宮內膜異位症患者服用較少量抗氧化食物

Results: Comparison of antioxidant intake between WWE and WEN showed a lower intake of vitamins A, C, E, zinc, and copper by WEN ($p < 0.05$, Mann Whitney Rank test). The selenium intake was not statistically different between groups. During the study, the comparison of the 24-hour recalls between groups showed a higher intake of the three vitamins in the HAD group. An increase in the vitamin concentrations (serum retinol, alpha-tocopherol, leukocyte and plasma ascorbate) and antioxidant enzyme activity (superoxide dismutase and glutathione peroxidase) as well as a decrease in oxidative stress markers (malondialdehyde and lipid hydroperoxides) were observed in the HAD group after two months of intervention. These phenomena were not observed in the control group.

服用兩個月後抗氧化酵素提昇

Conclusion: WEN had a lower intake of antioxidants in comparison to WWE. Peripheral oxidative stress markers diminished, and antioxidant markers were enhanced, in WEN after the application of the HAD.

Table 1: "Vegetable A" and "Fruit A" groups; standardized food portions that supply 300 μg of retinol[1] (150% SDI) and 100 mg of vitamin C[1] (660% RDI).

Vegetables "A"	Net Weight (g)	Vitamin A (μgER)	Vitamin C (mg)	Energy (Kcal)	Carbs (g)	Prot (g)	Fat (g)	Example[2]
Boiled swiss chard 唐莧菜(一種甜菜)	14	300	81	20.0	3.6	2.2	0.2	1/3 cup
Boiled broccoli	18	300	96	57.5	10.6	6.5	0.5	3/4 cup
Boiled spinach	5	300	48	15.0	1.6	2.7	0.4	1/2 cup
Mexican pepperleaf	25	300	162	24.1	3.7	1.9	0.8	1/4 cup
Tomato	13	300	57	11.2	2.5	0.4	0.1	1/2 piece
Edible cactus leaves	17	300	81	31.2	6.5	2.0	0.3	3/4 cup
Lambsquarters	15	300	96	20.0	3.2	2.4	0.3	1/3 cup
Romeritos	15	300	84	27.0	4.7	3.5	0.2	1/2 cup
Purslane 馬齒莧	15	300	78	28.0	5.3	2.5	0.3	3/4 cup
Carrot	32	300	132	19.8	4.7	0.2	0.1	1/2 cup
Mean	-	300	92	25.4	4.6	2.4	0.3	-
SD	-	0	34	12.8	2.5	1.7	0.2	-
FRUIT "A"								
Strawberries	114	0.8	100	52.6	12.3	1.1	0.7	15 pieces
Guava	366	1.2	100	27.9	6.5	0.4	0.3	1/2 piece
Kiwi	196	0.8	100	62.2	15.2	1.0	0.4	1 piece
Lemon	154	0.6	100	26.0	13.9	1.6	0.4	5 pieces
Cantaloupe 羅馬甜瓜	84	0.6	100	66.7	15.7	1.7	0.7	1 cup
Orange	106	0.2	100	88.7	22.3	1.7	0.2	2 pieces
Orange juice	100	0.4	100	90.0	20.8	1.4	0.4	1/2 cup
Papaya	124	0.2	100	62.9	15.8	1.0	0.2	1 cup
Grapefruit	106	0.8	100	86.8	20.9	1.5	0.8	1 piece
Black sapotas	166	0.2	100	67.5	17.5	1.0	0.1	1/2 cup
Mean	-	0.58	100	63.1	16.1	1.2	0.4	-
SD	-	17.222	0	22.9	4.7	0.4	0.2	-

1). Vitamin E-rich foods constituted the "Seeds" group. Sunflower seeds and peanuts supplied this vitamin at a low cost. Four tablespoons of sunflower seeds and three tablespoons of peanuts supply 16.75 mg and 3.25 mg of α-tocopherol, respectively.

營養物質 與 子宮內膜異位症
(營養/飲食) 與 荷爾蒙相關疾病

污染物質 與 子宮內膜異位症
(環境污染物質) 與 生育健康

文獻回顧與探討

2006年環境研究雜誌 比利時研究環境/宿主因素

有機氯暴露與子宮內膜異位症之罹病風險無關？

表淺型子宮內膜異位症：可能無關

深部浸潤型子宮內膜異位症：可能與戴奧辛及多氯聯苯之暴露有關（環境因素）

Environmental and host-associated risk factors in endometriosis and deep endometriotic nodules: A matched case–control study ☆

（宿主因素）飲酒明顯增加風險

低體力活動工作亦然

Jean-François Heilier[a,*], Jacques Donnez[b,c], Fabienne [illegible], Violaine Verougstraete[a], Katrin Rosenkranz[a], Olivier Donnez[c], Frédéric Grandjean[c], Dominique Lison[a], René [illegible]

Peritoneal endometriosis (PE) and deep endometriotic nodules (DEN) are gynecological diseases recently shown to be associated with elevated serum concentrations of organochlorines. The objective of the present study was to compare risk factors associated with both forms of the disease, with a particular attention to potential sources of organochlorine exposure. This matched case–control study with prospective recruitment included 88 triads (PE–DEN–control). All women were face-to-face interviewed with a standardized questionnaire, and serum dioxin and polychlorinated biphenyl measurements were available for 58 of them. Alcohol consumption (odds ratio (OR): 5.82 [confidence interval at 95% (95%CI) 1.20–28.3]) in DEN and low physical activity at work for DEN (OR: 4.58 [95%CI 1.80–11.62]) and PE (OR: 5.61 [95%CI 1.90–16.60]) were traced as significant risk factors. Organochlorine-related factors (use of tampons, occupational or environmental exposure) were not related to the disease. The current consumption of foodstuffs that were more likely to contribute to organochlorine body burden did not differ among the groups. Only some of these fatty foodstuffs (marine fish, pig meat) were traced by multiple regression analysis as significant determinants of organochlorine body burden, explaining only a small fraction (20%) of the interindividual variation of organochlorine body burden. We conclude that PE and DEN share similar patterns of risk or protective factors.

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2008年 人類生殖 雜誌 美國研究

The association between heavy metals, endometriosis and uterine myomas among premenopausal women: National Health and Nutrition Examination Survey 1999–2002

重金屬與子宮內膜異位症及子宮肌瘤之關係

L.W. Jackson[1,3], M.D. Zullo[1] and J.M. Goldberg[2]

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有荷爾蒙活性之重金屬

鎘米？ 鉛 鎘 汞

BACKGROUND: It has been hypothesized that exposure to exogenous estrogens may be associated with endometriosis and uterine myomas. We sought to investigate the association between heavy metals which have been shown to be hormonally active and these disorders using data from the National Health and Nutrition Examination Survey, 1999–2002. **METHODS:** Women aged 20–49 years who had data on metals and the outcomes of interest, were premenopausal and neither pregnant nor breastfeeding were eligible ($n = 1425$). Lead, cadmium and mercury were measured in whole blood. Diagnosis of outcomes was based upon self-report. Logistic regression was used to examine the association between tertiles of heavy metals and disease adjusting for age, race/ethnicity, use of birth control pills prior to diagnosis and smoking status at diagnosis. **RESULTS:** A dose–response association between cadmium and endometriosis was observed [tertile 2 versus 1: adjusted odds ratio (OR) = 1.94, 95% confidence interval (CI): 0.73–5.18; tertile 3 versus 1: adjusted OR = 3.39, 95% CI 1.37–8.40]. This association persisted in subanalyses: (i) limiting analysis to women diagnosed in the past 10 years and (ii) limiting analysis to women diagnosed since last pregnancy, although limited by sample size. **CONCLUSIONS:** These results must be interpreted with caution given the cross-sectional study design. The observed association between cadmium and endometriosis deserves further investigation in properly designed studies.

鎘汙染和子宮內膜異位症可能有關聯

應用[1][2] [編輯]

- 鎳鎘電池
- 塑膠製造
- 金屬電鍍
- 顏料、油漆、染料、印刷油墨等中某些黃色顏料
- 車胎
- 某些發光電子組件
- 核子反應爐

對健康的影響 [編輯]

對健康有不良的影響，多個國家列鎘為可致癌物。

- 腎
- 肺
- 肝
- 骨
- 癌
- 生育

Cadmium	Used in industry and consumer products, mainly batteries, pigments, metal coatings, plastics, and some metal alloys.

顏色和外表	銀灰色金屬 
地殼含量	3×10^{-5} %
原子屬性	
原子量	112.411 原子量單位
原子半徑（計算值）	155（161）pm
共價半徑	148 pm
范德華半徑	158 pm
價電子排布	[氪]$4d^{10}5s^2$
電子在每能級的排布	2，8，18，18，2
氧化價（氧化物）	**2**（弱鹼性）
晶體結構	六方密排晶格
物理屬性	

1930-1960年代，日本富山縣神通川流域部分鎘污染.
事緣煉鋅廠排放的含鎘廢水污染了周圍的耕地和水源

其他事件:
中國楊桃過半數鎘含量屬嚴重超標
中華人民共和國廣州中山大學生物科技學院聯同香港浸會大學生物系在2006年3至4月期間，
抽查化驗中港兩地市面出售的楊桃，51%鎘含量屬嚴重超標。[4]

和各國對鎘的安全標準 [編輯]

歐盟

歐盟列鎘為高危害有毒物質和可致

美國[6]

美國環境保護署限制排入湖、河、
因此不允許殺蟲劑中含有鎘。
美國環境保護署允許飲用水含有1(
美國食品和藥物管理局限制食用色
美國職業安全衛生署也限定工作環
煙霧為100微克鎘/M3及鎘塵為200
美國職業安全衛生署打算限制所有
因為呼吸到鎘可能會引起肺癌，
美國國家職業安全和衛生研究所希望讓工人盡量少呼吸到鎘。

美國環境保護署允許飲用水含有10ppb的鎘，並打算把限制減到5ppb。
美國食品和藥物管理局限制食用色素的含鎘量爲15ppm。
美國職業安全衛生署也限定工作環境空氣中的鎘含量，
煙霧爲100微克鎘/M3及鎘塵爲200微克鎘/ M3。
美國職業安全衛生署打算限制所有鎘化合物在1到5微克/ M3。

摩爾體積	$13.00\times10^{-6}m^3/mol$
汽化熱	100 kJ/mol
熔化熱	6.192 kJ/mol
蒸氣壓	14.8 帕（597K）
聲速	2310 m/s（293.15K）
其他性質	
電負性	1.69（鮑林標度）
比熱	233 J/(kg·K)
電導率	13.8×10^6/(米歐姆)
熱導率	96.8 W/(m·K)
第一電離能	867.8 kJ/mol
第二電離能	1631.4 kJ/mol
第三電離能	3616 kJ/mol

最穩定的同位素

同位素	丰度	半衰期	衰變模式	衰變能量 MeV	衰變產物
^{108}Cd	0.89 %	穩定			

Proceedings of the *Summit on Environmental Challenges to Reproductive Health and Fertility*: executive summary

2008年生育及不孕雜誌 美國研究

環境對生育健康之挑戰高峰會議

Tracey J. Woodruff, Ph.D., M.P.H.,[a] [illegible],[b] [illegible], M.P.H.,[a] and Linda C. Giudice, M.D., Ph.D.[c]

環境污染物質

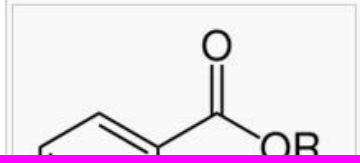
Contaminant	Sources	with exposure during adulthood	exposure during development
Pesticides	Broad category that includes many classes of insecticides, fungicides, herbicides, rodenticides, and fumigants. Pesticides are used on food, in residential and industrial settings. Exposures can occur through food, drinking water, or from home use.	menstrual irregularities[c] (133, 166) reduced fertility[b] (147, 148, 188, 192) decreased semen quality[a] (189, 193–195) miscarriage in female partner (151, 153, 196, 197) sperm chromosome abnormalities (198, 199) hormonal changes (100, 193, 200)	altered sex ratio (H,A) (100, 201) altered puberty onset (202–204) malformations of reproductive tract[d] (205–207) reduced fertility (193, 208) fetal growth, IUGR (209–211)
Phthalates	Plasticizers added to soften plastics like PVC; also found in cosmetics, perfumes, toys, pharmaceuticals, medical devices, lubricants and wood finishers.	altered (earlier) menarche onset (127) estrous cycle, ovulatory irregularities (187) decreased semen quality[a] (212) reduced fertility[b] (213) fetal loss[d] (187) endometriosis (141, 142)	shortened anogenital distance (214) malformations of reproductive tract (215) hormonal changes (215) decreased semen quality[a] (215)
Solvents	Benzene, toluene, xylene, styrene, 1-bromopropane, 2-bromopropane, perchloroethylene, trichloroethylene, and others. Solvents include some of the top production volume chemicals in the US Used in plastics, resins, and nylon, synthetic fibers, rubbers, lubricants, dyes, detergents, drugs, pesticides, glues, paints, paint thinners, fingernail polish, lacquers, detergents, printing and leather tanning processes, insulation, fiberglass, food containers, carpet backing, cleaning products, and a component of cigarette smoke. Exposure is primarily through breathing contaminated air.	hormonal changes(100, 187, 216) menstrual irregularities[c] (187, 188, 193) decreased semen quality[a] (100, 188, 217, 218) reduced fertility[b] (188, 218–222) fetal loss[d] (187, 188, 193, 223) miscarriage in female partner (188)	
Cigarette smoke	Includes active and/or passive smoking	hormonal changes (219, 224) decreased semen quality[a] (219) reduced fertility[b] (188, 219) miscarriage (219) early menopause (219)	IUGR (225) Low birth weight (225) Preterm delivery (225) decreased semen quality[a] (124, 226)

鄰苯二甲酸酯：增塑劑

化妝品, 香水, 玩具, 藥品, 衛材, 潤滑劑, 木器

鄰苯二甲酸酯
維基百科，自由的百科全書

鄰苯二甲酸酯(Phthalates)，又稱**酞酸酯**，縮寫PAEs，統稱**鄰苯二甲基酯類**。它主要做為增塑劑使用，PAE類是使用最廣泛、品種最多、產量最大的增塑劑。其產量約佔80%。當被用作塑料增塑劑時，一般指的是鄰苯二甲酸與4～15個碳的醇形成的酯。其中鄰苯二甲酸二辛酯是最重要的品種。



目錄 [隱藏]
1 性質

暴露途徑 [編輯]

一般人容易會在塑膠製品包裝中接觸到鄰苯二甲酸酯類，在生活中有很多食物在**加工、加熱、包裝、盛裝**的過程裡可能會造成**DEHP**的溶出且滲入食物中。

例如:塑膠玩具、覆蓋食物微波加熱的保鮮膜、盛裝食物的塑膠容器、室內裝潢或家庭產品亦多數屬於塑膠材質、吃手扒雞的塑膠手套、醫療用的塑膠手套或輸血袋等，都可見鄰苯二甲酸酯類的蹤影。

例子 [編輯]

- 鄰苯二甲酸二辛酯；鄰苯二甲酸二(2-乙基己基)酯（DEHP）
- 鄰苯二甲酸二丁酯（DBP）

這一類物質是塑料工業中最常見的增塑劑/軟化劑/可塑劑，廣泛添加於日常及工業的高分子塑膠產品的生產，它被普遍應用於玩具、食品包裝材料、醫用血袋和膠管、清潔劑、潤滑油、個人護理用品、乙烯地板和壁紙等很多材料之中。

對健康之影響 [編輯]

由於鄰苯二甲酸酯增塑劑與塑料主體結構之間不以化學鍵相結合，故在使用過程中會不斷從塑料中釋放出來，污染環境。近些年來的研究表明鄰苯二甲酸酯可通過呼吸道、消化道和皮膚等途徑進入人體，是一種重要的內分泌干擾素，會使男性精子數量減少、活動能力低下，干擾男性生殖道的正常發育，以及增加女性患乳腺癌的幾率等等。目前美國、歐盟已針對鄰苯二甲酸酯類建立規範，以減少鄰苯二甲酸酯類對人體造成進一步的危害。

鄰苯二甲酸酯類被WHO（世衛）公告爲一種環境荷爾蒙，具有雌性荷爾蒙的作用，在體內會干擾人體的內分泌系統。有研究指出，孕婦體內的鄰苯二甲酸酯濃度愈高，產下的男嬰生殖器官陰莖短小、陰莖先天畸型、尿道下裂與隱睪症的風險就愈高。若在成年男性體內鄰苯二甲酸酯濃度愈高，精子的數量就會愈少，精子品質和活動力也愈差。

此類可塑劑／軟化劑／增塑劑，能透過油脂而進入人體。可塑劑危害人體健康在國際間的研究甚多。目前台灣環保署將DEHP及DBP列爲第四類毒性化學管制物質，DNOP爲第一類毒性化學管制物質，因此消費者應重視塑膠內含有之可塑劑產生的危害。[1]

2006年生育及不孕雜誌　子宮內膜異位症患者

High plasma concentrations of polychlorinated biphenyls and phthalate esters in women with endometriosis: a prospective case control study

血漿中有較高濃度之多氯聯苯及鄰苯二甲酸酯

The objective of this study was to detect the probable association between polychlorinated biphenyls (PCBs) and phthalate esters (PEs), and the occurrence of endometriosis in a prospective case control study. We found that PCBs and PEs may be instrumental in the etiology of endometriosis. (Fertil Steril® 2006;85:775–9. ©2006 by American Society for Reproductive Medicine.)

外來雌激素

Xenoestrogens concentration in control and different stages of endometriosis group and one-way analysis of variance between stages (ANOVA).

Congener	Control group (μg/mL)	Endometriosis group (μg/mL)				F value between groups (ANOVA)
		Stage I	Stage II	Stage III	Stage IV	
Mono-ortho substituted						
PCB-1 (co-planar)	0.04 ± 0.13	0.23 ± 0.26	0.42 ± 0.29	0.60 ± 0.27	0.84 ± 0.56	55.57[a]
PCB-5 (co-planar)	0.01 ± 0.05	0.10 ± 0.12	0.24 ± 0.22	0.62 ± 0.39	0.75 ± 0.43	87.29[a]
PCB-29 (co-planar)	0.02 ± 0.09	0.13 ± 0.15	0.02 ± 0.31	0.50 ± 0.34	0.99 ± 0.54	71.87[a]
Di-ortho substituted						
PCB-98 (Non-co-planar)	0.00 ± 0.02	0.03 ± 0.10	0.11 ± 0.19	0.37 ± 0.32	0.26 ± 0.31	30.64[a]
Phthalate esters						
Di-*n*-butyl phthalate	0.11 ± 0.21	0.19 ± 0.17	0.29 ± 0.23	0.52 ± 0.18	1.05 ± 0.44	48.88[a]
Butyl benzyl phthalate	0.14 ± 0.26	0.28 ± 0.38	0.67 ± 0.50	0.98 ± 0.59	1.27 ± 0.61	42.76[a]
DEHP	0.48 ± 0.77	1.49 ± 1.48	1.78 ± 1.68	1.51 ± 1.08	4.39 ± 3.22	28.81[a]
Di-*n*-octyl phthalate	0.03 ± 0.16	1.78 ± 1.47	2.55 ± 1.97	3.85 ± 1.86	5.35 ± 2.76	94.88[a]

多氯聯苯屬於致癌物質[1]，容易累積在脂肪組織，造成腦部、皮膚及內臟的疾病，並影響神經、生殖及免疫系統。

多氯聯苯不溶於水，易溶於有機溶劑及脂肪，常用作加熱或冷卻時的熱載體、電容器及變壓器內的絕緣材料，也常作爲塗料及溶劑使用，應用的範圍很廣。

糠油中毒事件，原因是在生產過程中有多氯聯苯漏出，污染米糠油。

多氯聯苯

戴奧辛

Perfluorinated compounds (PFOS, PFOA)	Used to make fabrics and carpets stain-resistant and water-repellant; in coating of cooking pans, floor polish, insecticides, food wrap coatings. Accumulate in the environment and the food chain.	hormonal changes (229) reduced birth weight (230) fetal loss (230, 231)
Polybrominated Diphenyl Ethers (PBDEs)	Flame retardants found in furniture foam, mattresses, textiles, computers and electronics. Accumulate in the food chain.	decreased semen quality[a] (232)
Octylphenol, Nonylphenol	Used to make surfactants (detergents), pesticides, paints, and other formulated products, and also as plasticizers and UV stabilizers in plastics. Primary exposure is from drinking water contaminated by sewage and wet-weather runoff.	hormonal changes (227) altered puberty onset (233)
Chlorinated Hydrocarbons		
Dioxins/Furans	Byproducts of the manufacture and burning of products that contain chlorine.	menstrual irregularities[c] (132, 134, 137, 140, 166, 187, 236) hormonal changes (138–140, 187, 193, 236) reduced fertility[b] (187, 236) endometriosis (187, 237, 238)
Polychlorinated biphenols (PCBs)	Industrial insulators and lubricants. Banned in the US in 1976. Persist for decades in the environment. Accumulate up the food chain.	
Organochlorine pesticides	Class of pesticides used largely as insecticides. (ex: DDT, chlordane, HCB.) Largely banned in the US Persist for decades in the environment. Accumulate up the food chain.	
Pentachlorophenol	Wood preservative for utility poles, railroad ties, and wharf pillings. Formerly used as a pesticide.	

malformations of reproductive tract[d] (227, 228)
altered hormone response (228)
menstrual irregularities[c] (H, A) (187, 227)
reduced fertility[b] (H, A) (187, 227)
uterine fibroids (227)
miscarriage (187)

戴奧辛是一種致癌物質，具脂溶性可累積於人體脂肪組織之中[1]，又會引起多種健康問題。人體脂肪組織每單位只需含一萬億分之一戴奧辛，已可使內分泌失調、免疫力下降及肝腎受損等症

當有機物質在含有氯的環境下燃燒，會產生少量的戴奧辛，其中氯可以是有機氯化物或是以離子的方式存在，它們多在垃圾焚化爐中產生。

如燃燒聚氯乙烯（PVC，國際回收碼 3）就會產生戴奧辛。

戴奧辛也可以透過非燃燒的環境中產生，例如在漂白紙張或布料、生產含氯苯酚，其過程均會產生戴奧辛。

吸煙也有戴奧辛，因吸煙時燃燒含氯的煙紙。

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Dioxin concentrations in women with endometriosis

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The concentrations of the enviromental pollutant 2,3,7,8-tetrachlorodibenzo-*p*-dioxin were measured in the blood of 44 infertile women with endometriosis (study group), and in 35 age-matched women with tubal infertility (control group). Eight women with endometriosis (18%) were dioxin positive as compared to one woman (3%) in the controls ($P = 0.04$). Although the concentrations of dioxin did not seem to be directly correlated with the severity of endometriosis, these observations contribute to the accumulating data linking dioxin to endometriosis in humans.

Key words: dioxin/endometriosis

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