



**VII CONGRESSO CATARINENSE
DE OBSTETRÍCIA E GINECOLOGIA**
II Congresso Catarinense de Perinatologia

25 a 27 de junho de 2015 | Expoville | Joinville | SC

Marina Crippa

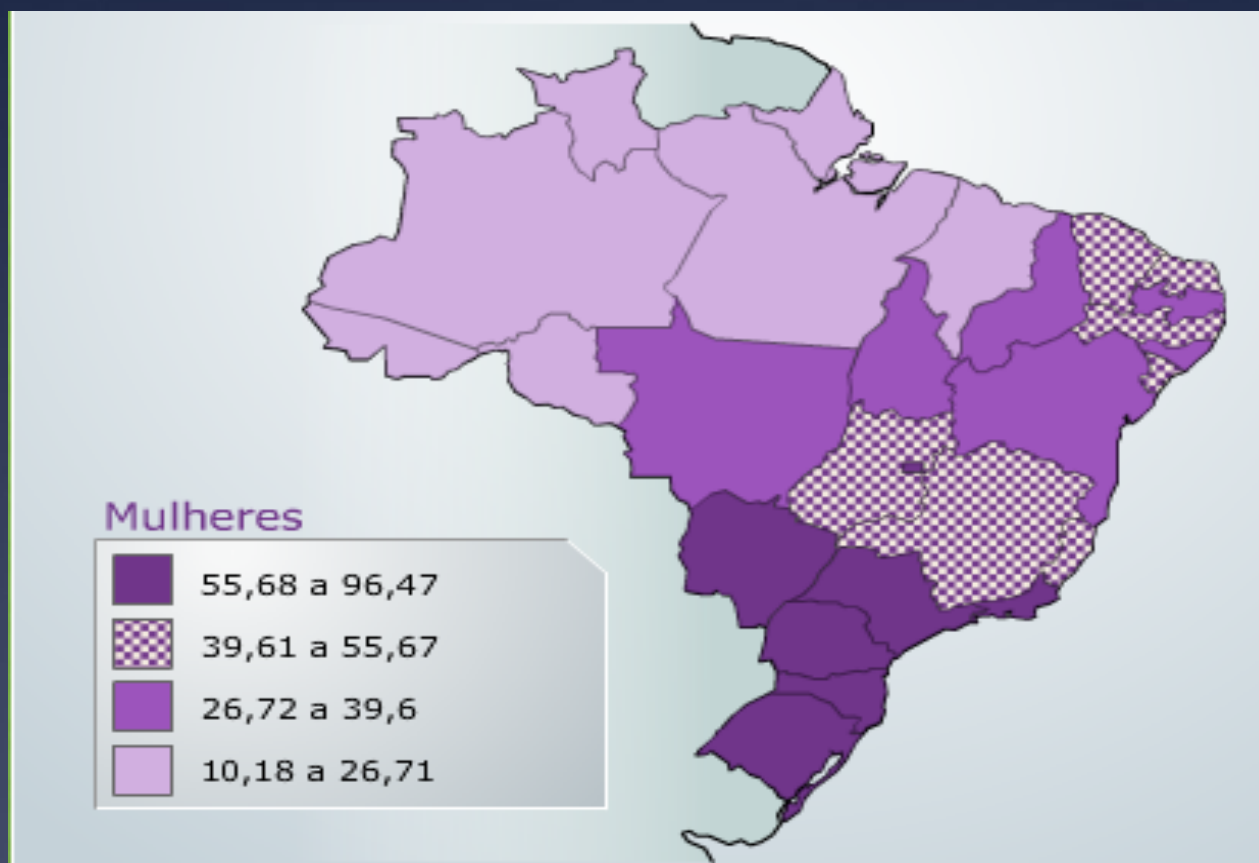
Declaração de conflito de interesse

Não recebi qualquer forma de pagamento ou auxílio financeiro de entidade pública ou privada para pesquisa ou desenvolvimento de método diagnóstico ou terapêutico ou ainda, tenho qualquer relação comercial com a indústria farmacêutica

NUTRIÇÃO E PROTEÇÃO CONTRA O CÂNCER DE MAMA

Nutricionista Marina Crippa

Representação espacial das taxas brutas de incidência do câncer de mama por 100 mil mulheres, estimada para o ano de 2014, segundo unidade da Federação



Somente cerca de 5% dos casos dos cânceres e outras doenças são exclusivamente devido a hereditariedade genética, enquanto 95% ocorrem devido a interação entre os genes e o ambiente, dieta e estilos de vida variáveis

PEREIRA, F.P. Environment and Cancer: Who are susceptible? Science, 278:1068-73,1997

Genética não é destino

American Institute for Cancer Research
Estilo de vida e risco de câncer

- 30 a 40% de todos os casos de cânceres estão diretamente ligados
 - aos alimentos que comemos
 - aos exercícios que fazemos
 - ao peso que temos
- 30% dos cânceres podem ser prevenidos apenas “não usando o tabaco”

The international report on cancer prevention from American Institute of Cancer Research, Food, Nutrition and the Prevention of Cancer: a global perspective. Disponível em: http://www.aicr.org/site/PageServer?pagename=dc_diet

FATORES DE RISCO MODIFICÁVEIS

Uso de álcool/tabaco
Alimentação
inadequada
Alimentos
contaminados
Exposição a radiação
Grau de gordura
corporal
Sedentarismo

FATORES DE RISCO NÃO MODIFICÁVEIS

Menarca precoce
Menopausa tardia
Paridade
Nuliparidade
Etnias ou raça
Hereditariedade

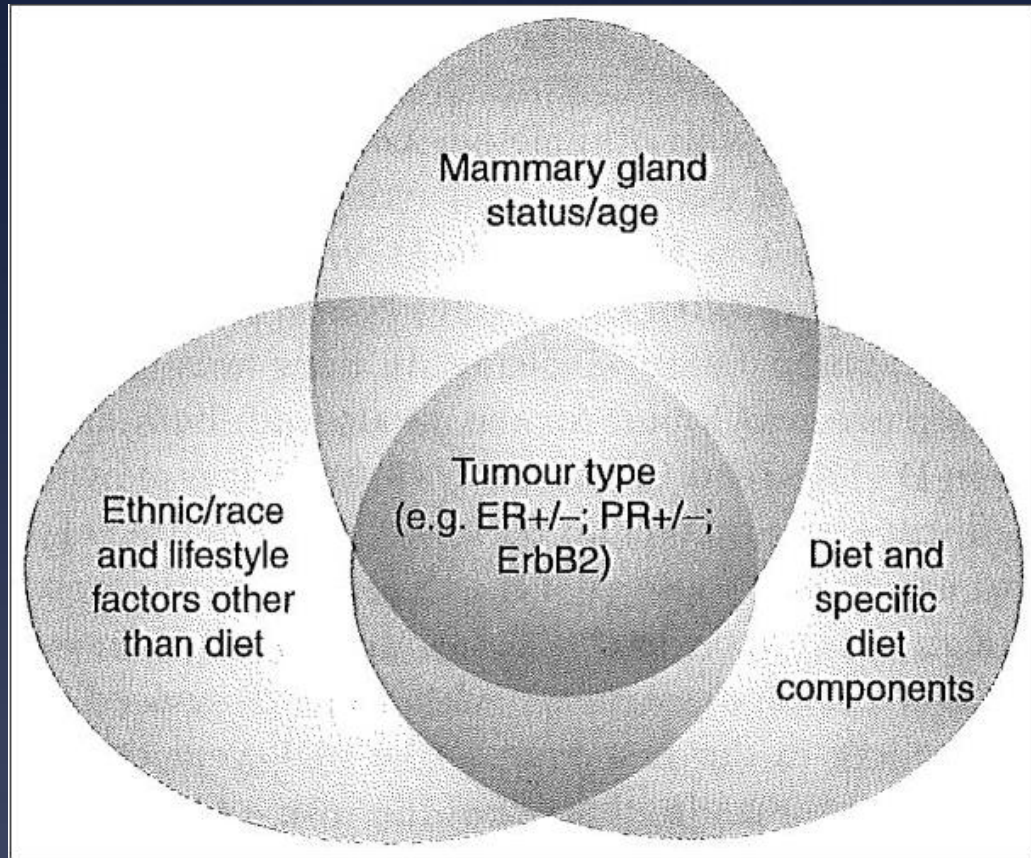


Diagrama de Venn de uma relação entre dietas / componentes alimentares e fatores que influenciam o seu impacto no risco de câncer de mama

MÁ NUTRIÇÃO E CÂNCER DE MAMA

Dtsch Med Wochenschr. 2011 Mar;136(12):575-81. doi: 10.1055/s-0031-1274541. Epub 2011 Mar 16.

[Nutrition patterns in German breast cancer patients].

[Article in German]

Reuss-Borst M¹, Kötter J, Hartmann U, Füger-Helmerking G, Weiss J.

+ Author information

Abstract

BACKGROUND: Several studies could demonstrate an association between nutrition and the risk of breast cancer.

PATIENTS AND METHODS: In this study we examined the daily diet of German patients with breast cancer approximately 12 months after diagnosis. In a prospective trial nutritional habits were evaluated in 165 breast cancer patients on admittance to an inpatient medical rehabilitation program.

RES
cons
hypo

Dieta pobre em grãos, vegetais, frutas e peixes e rica em carne e carne processada tem impacto no desenvolvimento do câncer de mama

CONCLUSION: Our results underscore the need for nutritional counselling of breast cancer patients, as they show a relatively unfavourable nutrition pattern which differs from currently available advice. An inpatient rehabilitation programme could be an adequate starting point for this purpose.

Meat consumption and risk of breast cancer in the Cohort Study

EF Taylor¹, VJ Burley¹, DC Greenwood² and JE Cade^{*1}

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We performed a survival analysis to assess the effect of meat consumption and meat type on the risk of breast cancer in the Women's Cohort Study. Between 1995 and 1998 a cohort of 35 372 women was recruited, aged between 40 and 69 years, with a wide range of dietary intakes, assessed by a 217-item food frequency questionnaire. Hazard ratios (HRs) were estimated by multivariate regression adjusted for known confounders. High consumption of total meat compared with none was associated with an increased risk of premenopausal breast cancer, HR = 1.20 (95% CI: 0.86–1.68), and high non-processed meat intake compared with none was associated with an increased risk of postmenopausal breast cancer, HR = 1.64 (95% CI: 0.86–1.68). Larger effect sizes were found in postmenopausal women for all meat types, with high total, processed and red meat consumption. Processed meat showed the strongest HR = 1.64 (95% CI: 0.86–1.68) compared with none. Women, both pre- and postmenopausal, who consumed the most red meat had the highest risk of breast cancer.

British Journal of Cancer (2007) 96, 1139–1146. doi:10.1038/sj.bjc.6603689 www.bjcancer.com
 © 2007 Cancer Research UK

Keywords: prospective studies; breast neoplasms; meat; risk factors

Although evidence that links meat consumption with an increased risk of cancer of the stomach, colorectum and pancreas is increasing (Gonzalez *et al*, 2006; Larsson *et al*, 2006; 2006), studies of meat consumption and breast cancer have produced more conflicting results. A meta-analysis of case-control and cohort studies published before 2003 found an increase in risk associated with the highest meat intake (Boyd *et al*, 2003). However, a pooled analysis of data from eight prospective cohort studies from Canada and Western Europe was unable to detect an association (Missmer *et al*, 2002).

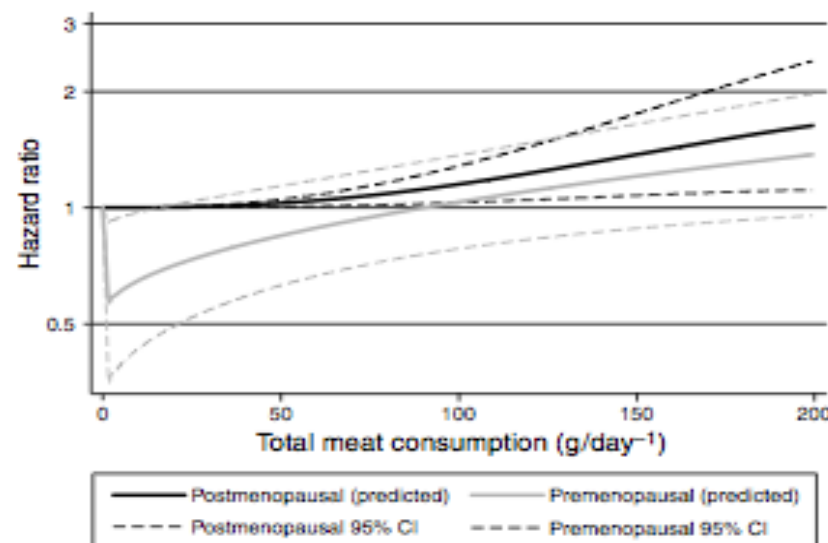


Figure 1 Association between total meat intake and breast cancer for pre- and postmenopausal women.

- ❑ Estudo de coorte com 35372 mulheres na pré e pós-menopausa por 8 anos
- ❑ 28% das mulheres eram vegetarianas
- ❑ Mulheres na pré e pós-menopausa que consumiam mais carne tiveram maior risco de Ca de mama
- ❑ O consumo de carne vermelha e processada teve aumento significativo do risco para Ca de mama somente nas mulheres pós-menopausa

Premenopausal dietary fat in relation to pre- and post-menopausal breast cancer

Maryam S. Farvid · Eunyong Cho ·
Wendy Y. Chen · A. Heather Eliassen ·
Walter C. Willett

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Abstract We examined the association between dietary fat intake and breast cancer incidence in the Nurses' Health Study. We followed 88,804 women aged 26–45 years in 1991, who were assessed by questionnaires in 1991, 1995, 2001, and 2007. We examined the association between total, premenopausal, and postmenopausal fat intake and breast cancer incidence. Multivariable-adjusted Cox proportional hazards models were used to estimate relative risks and 95 % confidence intervals (95 % CI). During follow-up, 2,830 incident invasive breast cancers were diagnosed. Total fat intake was not associated with breast cancer overall. After adjustment

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Department of Community Nutrition, Faculty of Nutrition

- ❑ 88804 mulheres acompanhadas de 1991 – 2011
- ❑ Idade entre 26-45 anos – pré-menopausa
- ❑ **Ingestão total** de gordura **não** foi associada com risco de Ca de mama na pré e pós-menopausa
- ❑ Gordura animal, saturada e monoinsaturada: **associação modesta** com risco de Ca de mama na pré-menopausa
- ❑ Gorduras polinsaturadas, gorduras trans e gorduras de produtos lácteos: não foram associadas com o risco de Ca de mama
- ✧ As associações de gordura saturada, animal e monoinsaturadas foram atenuadas e não significativas após ajuste para o consumo de carne vermelha

Keywords Fat intake · Animal fat · Breast cancer

HOJE, NOSSA NUTRIÇÃO É DESEQUILIBRADA

Gordura; Açúcar; Sal; Hormônios;
Toxinas; Carboidratos; Álcool;
Drogas (medicamentos).



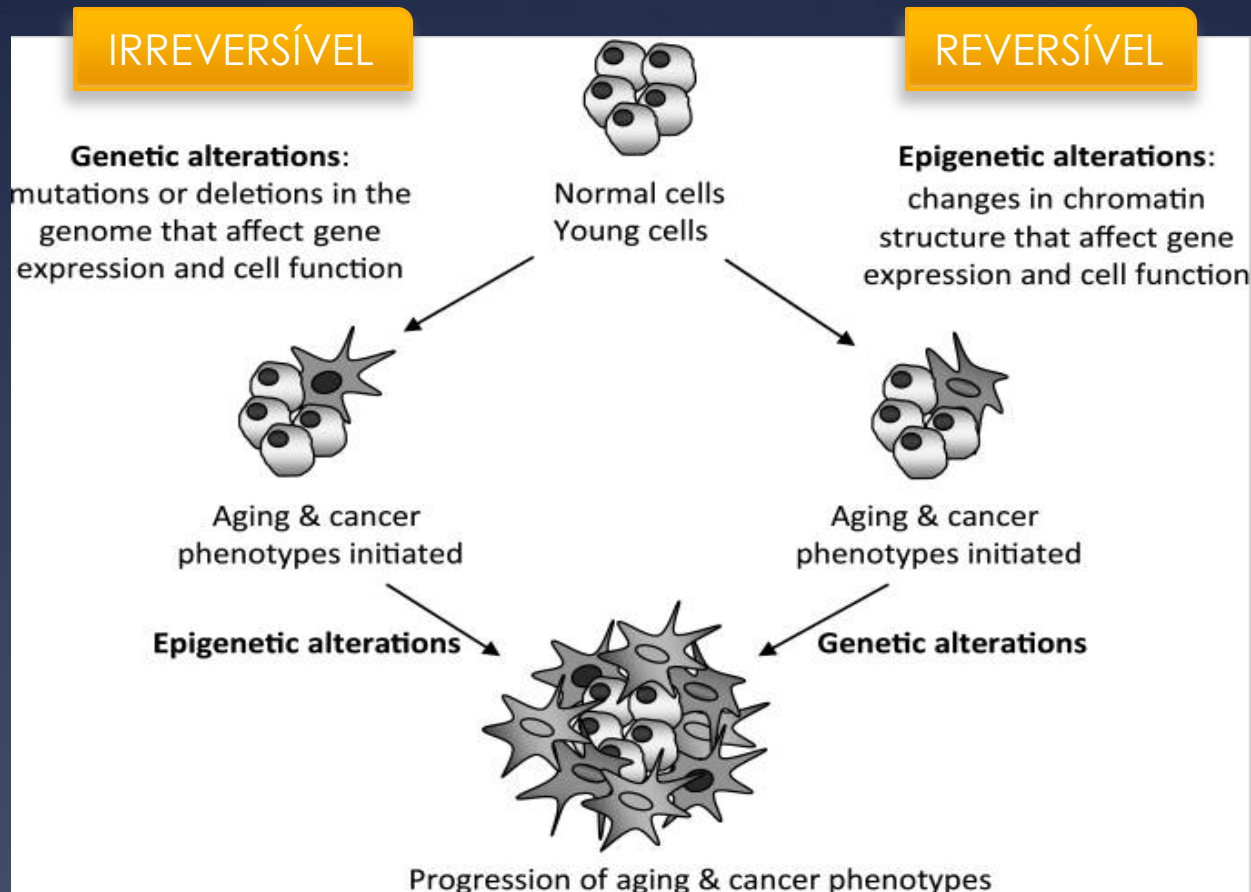
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OFERTA

BAIXA
OFERTA

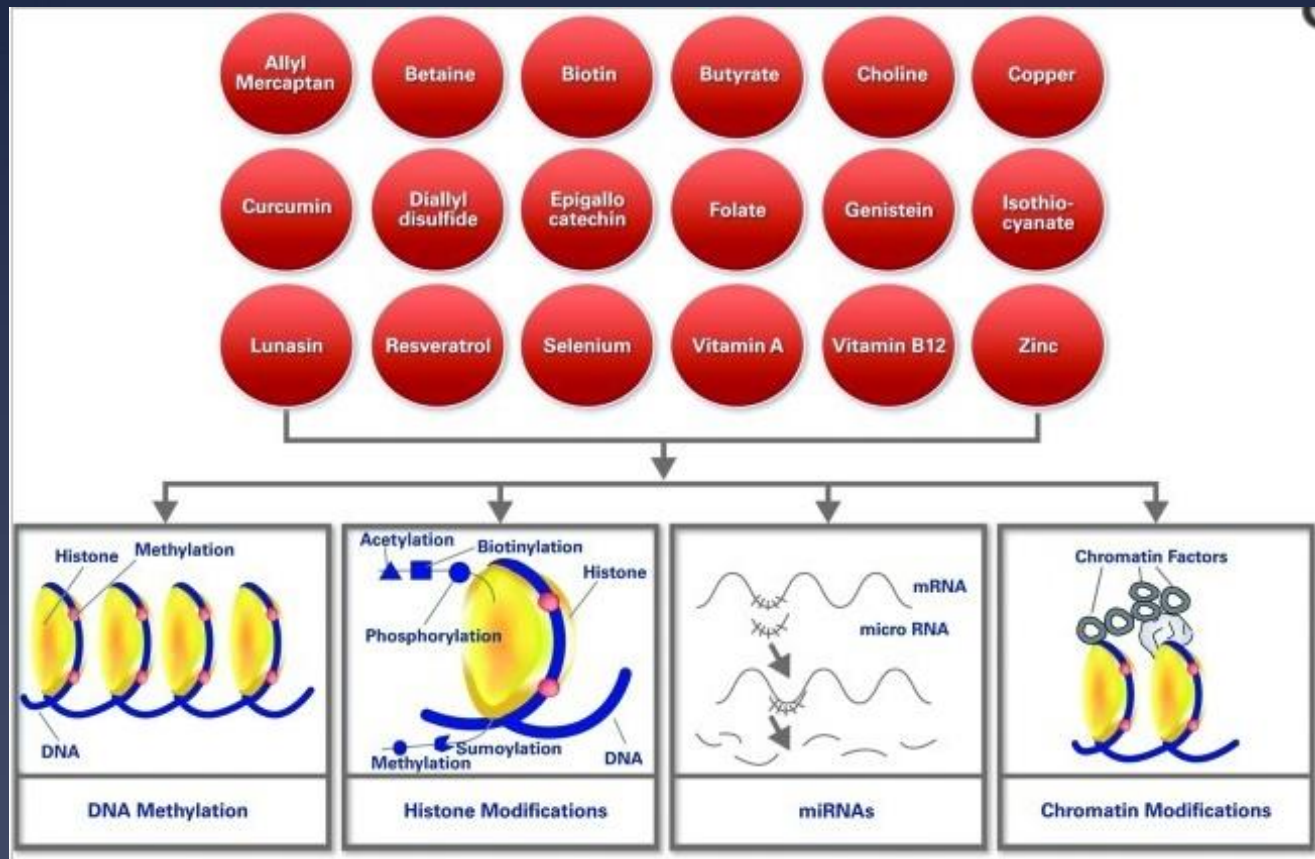


Vitaminas; Minerais;
Proteínas vegetais; Fibras;
Fatores botânicos; Água.

Compostos cancerígenos interagem com o DNA causando sua mutação e induzindo tumores. Após contato com o meio ambiente de risco ocorrem mudanças epigenéticas em uma célula que pode contribuir para a progressão do câncer



Componentes da dieta e suas interações com a regulação epigenética



VERMA, M; Antioxid Redox signal. 17(2): 355-354, 2012

DNA Methylation: Essential for Normal Functioning of an Organism

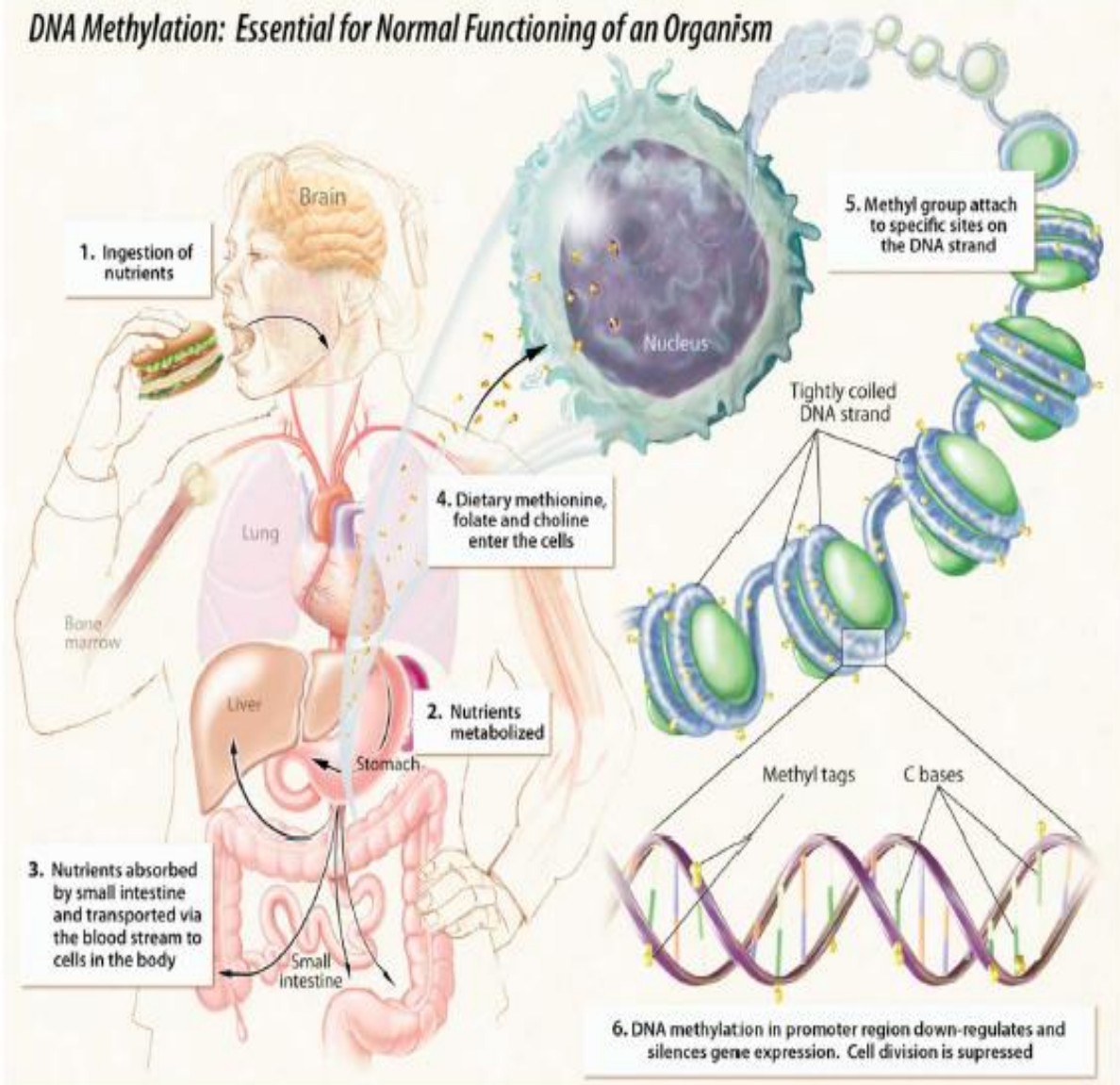


Figure 5. Dietary factors and the regulation of DNA methylation.

CÂNCER

→ HIPERMETILAÇÃO DO DNA – **silenciamento** de genes supressores tumorais e silenciamento de genes de reparo de DNA

→ HIPOMETILAÇÃO GLOBAL DO DNA – **ativação** de oncogene e instabilidade cromossômica

DOADORES DE RADICAL METIL:

- folato, vitamina B12, vitamina B6, metionina, colina e betaína

Methylation Inhibitors

Hesperidin
(Tomato)

Phloretin
(Apple)

Lycopene
(Tomato)

Methylation and Histone Deacetylase Inhibitors

Caffeic Acid
(Coffee)

Coumaric
Acid
(Cinnamon)

Curcumin
(Turmeric)

EGCG
(Tea)

Genistein
(Soybean)

Isothiocyanates
(Broccoli)

Histone Deacetylase Inhibitors

Anacardic
Acid
(Cashew
nut)

Resveratrol
(Grapes)

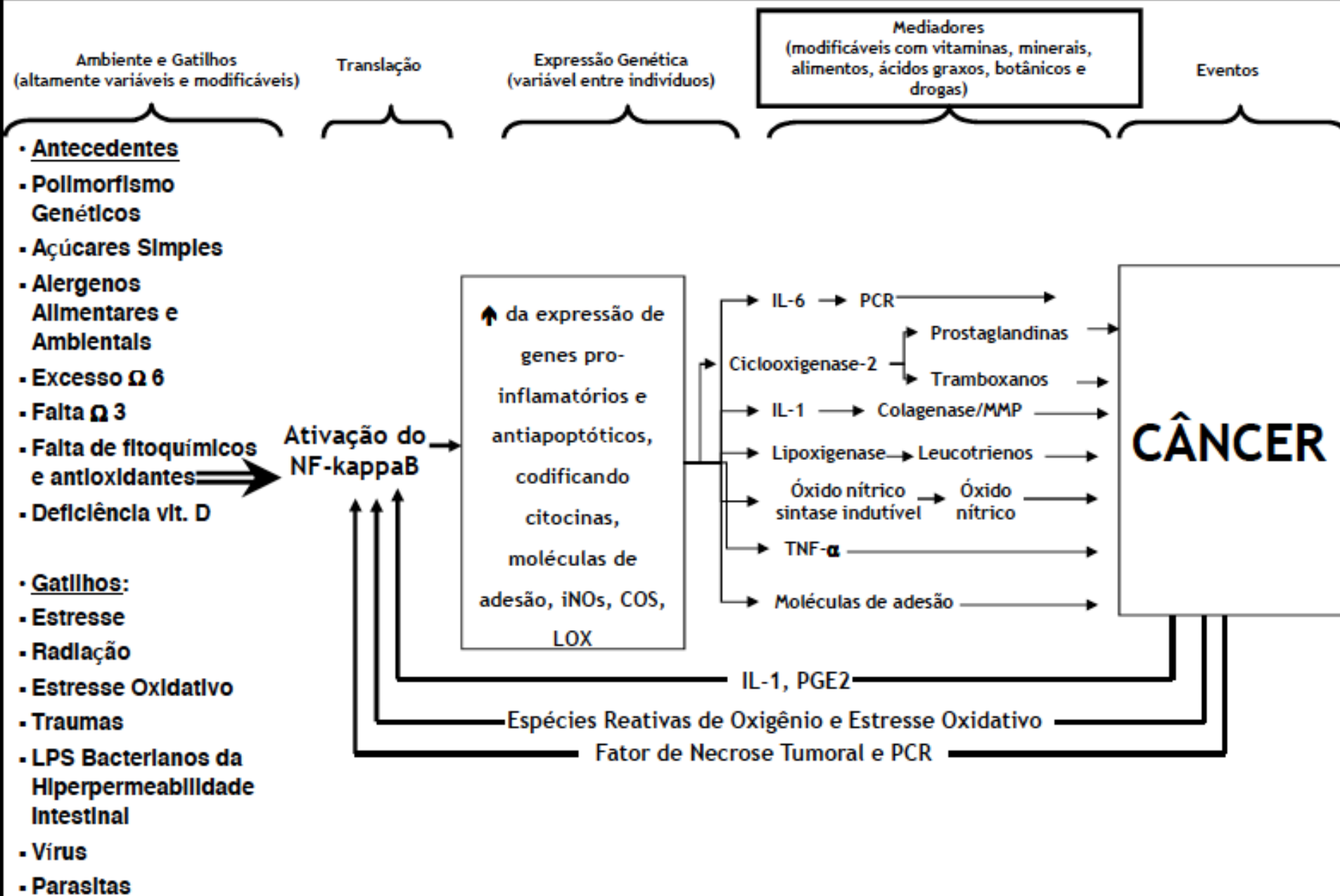
Allyl
Mercaptan
(Garlic)

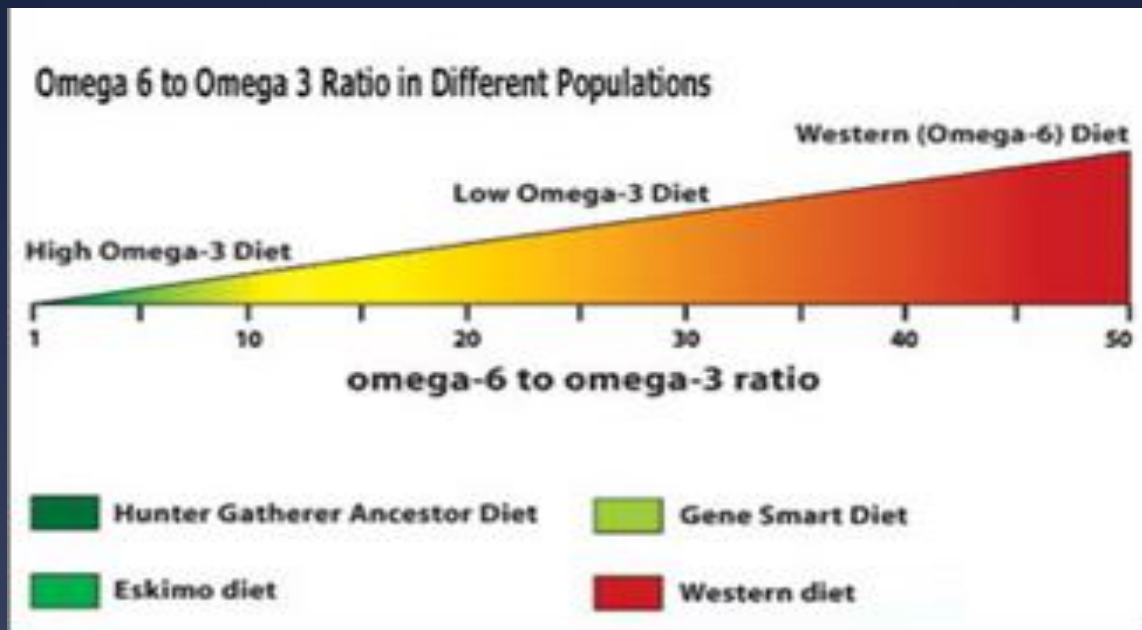
GENES HIPERMETILADOS (SILENCIADOS) NO CÂNCER DE MAMA

- Receptor Estrogênio (RE)
- Receptor de Progesterona (RP)
- E-caderina – hipermetilado em 72% dos carcinomas ductais
- RASSF1A – hipermetilado em 60-77%
- SCGB3A1
- TWIST1
- CICLINA D2
- RAR β
- THR β
- BRCA1

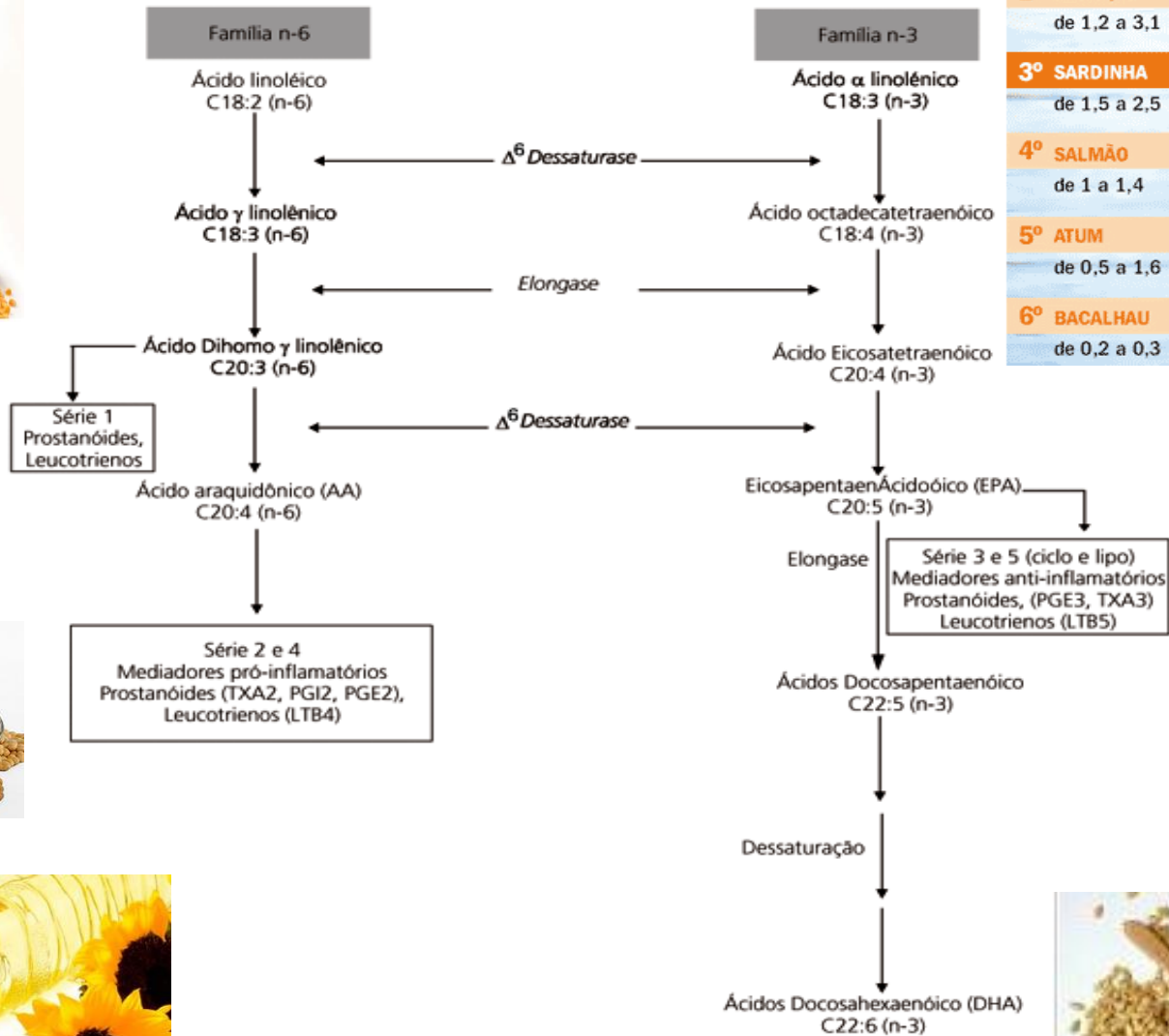
Ainda não está bem esclarecido o que leva ao aumento da metilação de determinadas células. O que se observa é uma ocorrência aumentada de hipermetilação em células mais velhas ou que sofreram ação de fatores ambientais como a radiação, o fumo, o níquel, entre outros agentes químicos diversos.

O PROCESSO INFLAMATÓRIO





PROPORÇÃO DE ω -6: ω -3 EM QUE SE OBSERVA
BAIXA INCIDÊNCIA DE DOENÇAS
CARACTERIZADAS PELA INFLAMAÇÃO
CRÔNICA: 1:1 – 2:1



matização da via de biossíntese dos ácidos graxos poliinsaturados.

| | |
|--------------------|--|
| 1º CAVALA | |
| de 1,8 a 5,1 | |
| 2º ARENQUE | |
| de 1,2 a 3,1 | |
| 3º SARDINHA | |
| de 1,5 a 2,5 | |
| 4º SALMÃO | |
| de 1 a 1,4 | |
| 5º ATUM | |
| de 0,5 a 1,6 | |
| 6º BACALHAU | |
| de 0,2 a 0,3 | |



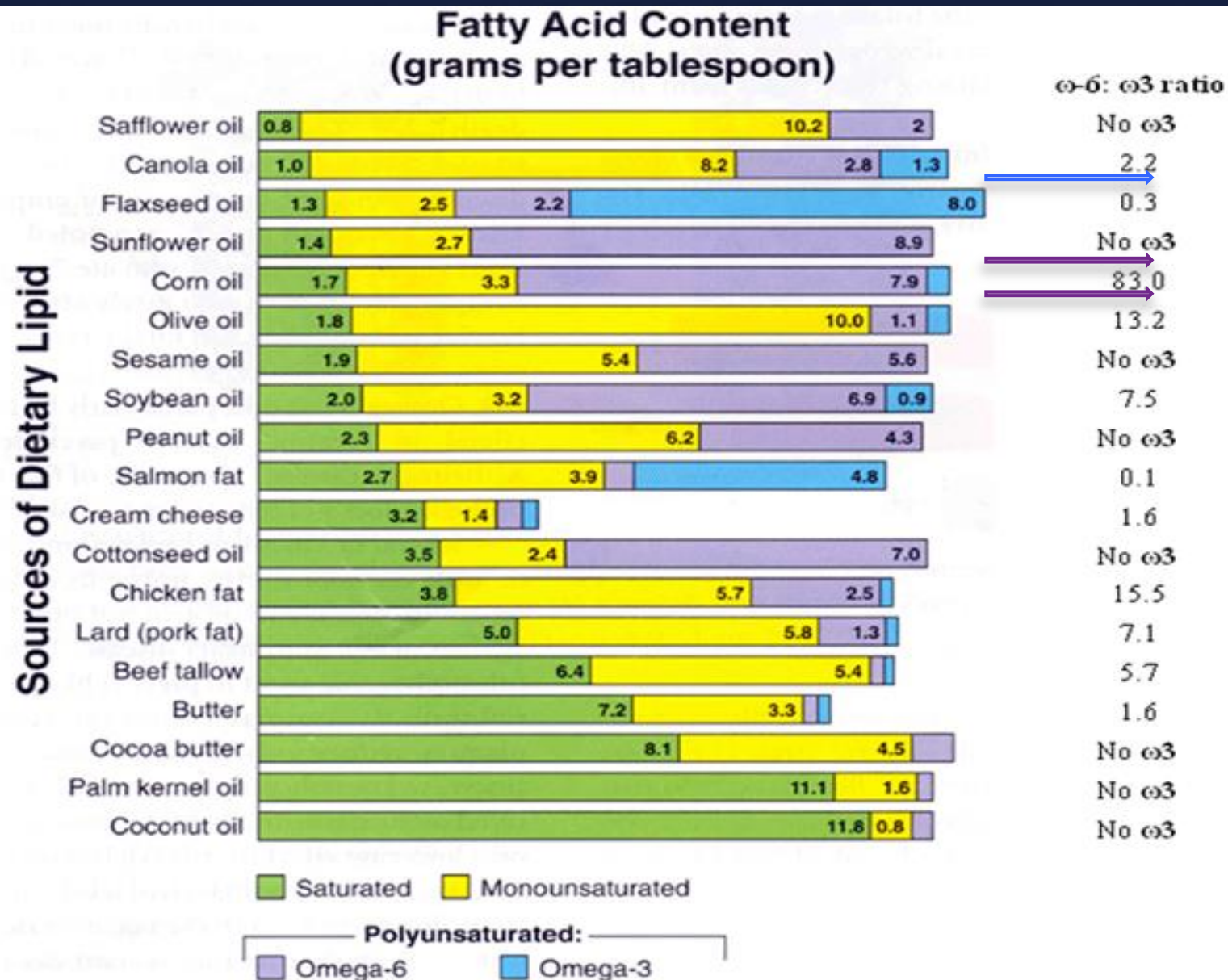


Figure 2. The fatty acid composition and ω -6: ω -3 ratio in most common dietary fat.

ÔMEGA-3 E CÂNCER DE MAMA

❑ Trabalhos mostrando evidências na redução do risco de câncer de mama com aumento na ingestão de ω -3 e/ou melhorando a proporção ω -6 : ω -3:

✧ 1 meta-análise de 16 estudos de coorte prospectivos

✧ 1 meta-análise de 6 estudos caso-controle e 5 estudos de coorte

❑ CASTRO, R.C (2013) verificou *In Vitro*, a ação do DHA em eventos epigenéticos em linhagens de Ca de mama humano (MDA-MB-231, SKBR-3, MCF-7)

✧ DHA induziu acetilação de histonas em MCF-4 ($p=0,04$) e MDA-MB-231 ($p=0,03$)

✧ Aumentou a expressão do gene RASSF1A silenciado anteriormente por metilação em MCF-7 ($p=0,03$) e SKBR3 ($p=0,03$)



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Dietary Fat in Breast Cancer Survival

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Abstract

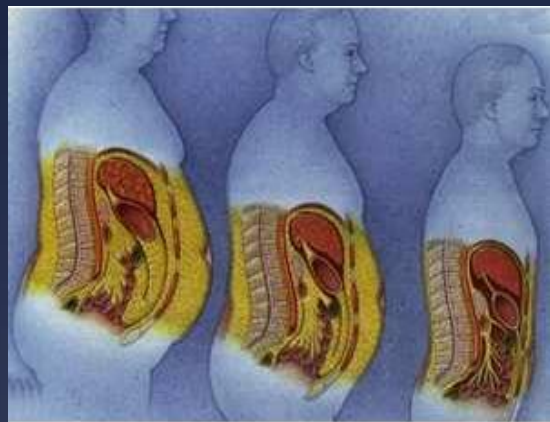
Laboratory evidence suggests that dietary fat influences cancer risk. We conducted a systematic literature review of total dietary fat and fat subtypes in relation to breast cancer-specific and all-cause mortality. We included studies that were in English, had a prospective design, and reported hazard ratios (HRs) for breast cancer-specific and all-cause mortality. We found 10 studies for breast cancer-specific mortality and 10 studies for all-cause mortality. Most studies suggested that higher intake of total dietary fat was associated with an increased risk of breast cancer-specific mortality. Two studies evaluating omega-3 fatty acids suggested that higher intake was associated with lower mortality. Although there is evidence that high consumption of saturated fat may cause mortality, whereas omega-3 fatty acids may reduce mortality, warrants research to assess the role of dietary fat in breast cancer survival and mortality.

❑ Revisão sistemático sobre o total de gordura e tipos de gorduras na dieta em relação a **mortalidade** de mulheres com Ca de mama:

- Gordura total: maioria dos estudos não mostra relação
- Gordura Saturada: aumento da mortalidade na pós-menopausa – 23-65%
- Gordura Monoinsaturada: resultados inconsistentes
- Gordura Poliinsaturada: redução em 37% no risco de mortalidade por câncer de mama com o uso de ômega-3

OBESIDADE E CÂNCER DE MAMA

ADIPÓCITO



Aumento do risco de Ca de mama em mulheres na pós-menopausa:

→ IMC > 30

→ Relação C/Q > 0.85

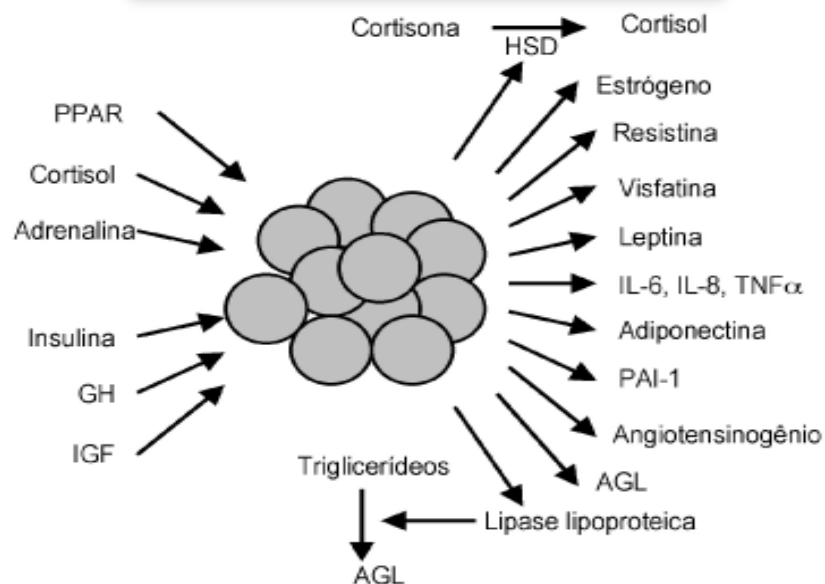


Figura 1. Representação esquemática do tecido adiposo como um órgão endócrino.

PPAR: *peroxisome proliferator-activated receptor*; GH: hormônio do crescimento; IGF-1: *insulin growth factor 1*; AGL: ácidos graxos livres; PAI-1: *plasminogen activator inhibitor 1*; IL: interleucina; TNF: fator de necrose tumoral; HSD: hidroxisteróide desidrogenase.

Effect of obesity and other lifestyle factors on mortality in women with breast cancer

Luigino Dal Maso^{1*}, Antonella Zucchetto¹, Renato Talamini¹, Diego Serraino^{1,2}, Carmen F. Stocco³, Marina Vercelli⁴, Fabio Falcini⁵ and Silvia Franceschi⁶ for Prospective Analysis of Case-control studies on Environmental factors and health (PACE) study group

¹Unità di Epidemiologia e Biostatistica, Centro Riferimento Oncologico, Aviano, Italy

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³Registro Tumori del Veneto, Istituto Oncologico Veneto (IOV) IRCCS, Padova, Italy

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⁵Registro Tumori della Romagna, IRST, Meldola, Italy

⁶International Agency for Research on Cancer, Lyon, France

A few lifestyle characteristics before cancer diagnosis suggested to modify the prognosis of breast cancer. Information from 1,453 women with incident invasive breast cancer diagnosed between 1991 and 1994 and interviewed within the framework of an Italian multicenter case-control study was used to assess the effect of obesity and of a large spectrum of other lifestyle factors on breast cancer mortality. Five hundred and thirty-four women, including 398 breast cancer deaths, were identified. Hazard ratios (HR) for all-cause and breast cancer mortality and 95% confidence intervals (CI), were calculated using multivariable hazards models and adjusted for age and other characteristics (stage and receptor status). Increase in breast cancer mortality emerged for body mass index (BMI) ≥ 30 (HR = 1.38; 95% CI: 1.02–1.86), compared to BMI < 25 and WHR ≥ 0.85 (HR = 1.27; 95% CI: 0.98–1.64), ratio (WHR) ≥ 0.85 (HR = 1.27; 95% CI: 0.98–1.64), < 0.80 , and the strongest association was observed for BMI ≥ 30 and high WHR (≥ 0.85), compared to BMI < 25 and WHR < 0.85 (HR = 1.57; 95% CI: 1.08–2.28). The effect of high BMI was similar in women < 65 years of age, whereas it was stronger in women with I–IV stage breast cancer. Low vegetable and fruit intake, current or past smoking were also associated to breast cancer survival. No significant relationship with survival after breast cancer diagnosis emerged for several other major lifestyle factors, including physical activity, alcohol drinking, exogenous hormones use and fat intake. High BMI was the lifestyle risk factor that most consistently modified breast cancer prognosis in our study.

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Key words: body mass index; breast cancer; diet; obesity; smoking

Survival after breast cancer diagnosis greatly depends on tumor characteristics (i.e., tumor size, grade, receptor and lymph node status) and appropriateness of treatment.¹ However, an effect of a few risk factors for breast cancer onset on cancer prognosis has been reported^{2–21} and some of such factors are potentially modifi-

socioeconomic indicators, smoking habits, physical activity at various ages,²⁷ a problem-oriented personal medical history, family history of cancer,²⁸ menstrual and reproductive history²⁹ and history of exogenous hormone use.³⁰

In a detailed section of the questionnaire, study subjects were asked to report their height, weight 1 year before cancer diagnosis and at different ages. BMI was computed as weight (kg) divided by height squared (m^2). The interviewer measured the circumference of the participant's waist (2 cm above the umbilicus) and hip (maximal protrusion); hence, waist-to-hip ratio (WHR) was also computed.³¹

Dietary habits were investigated using a food frequency-consumption section including 78 foods, food groups or recipes²⁶ and alcoholic beverages.³² Satisfactory reproducibility and validity of

❑ 1453 mulheres Ca mama – 10 anos seguimento

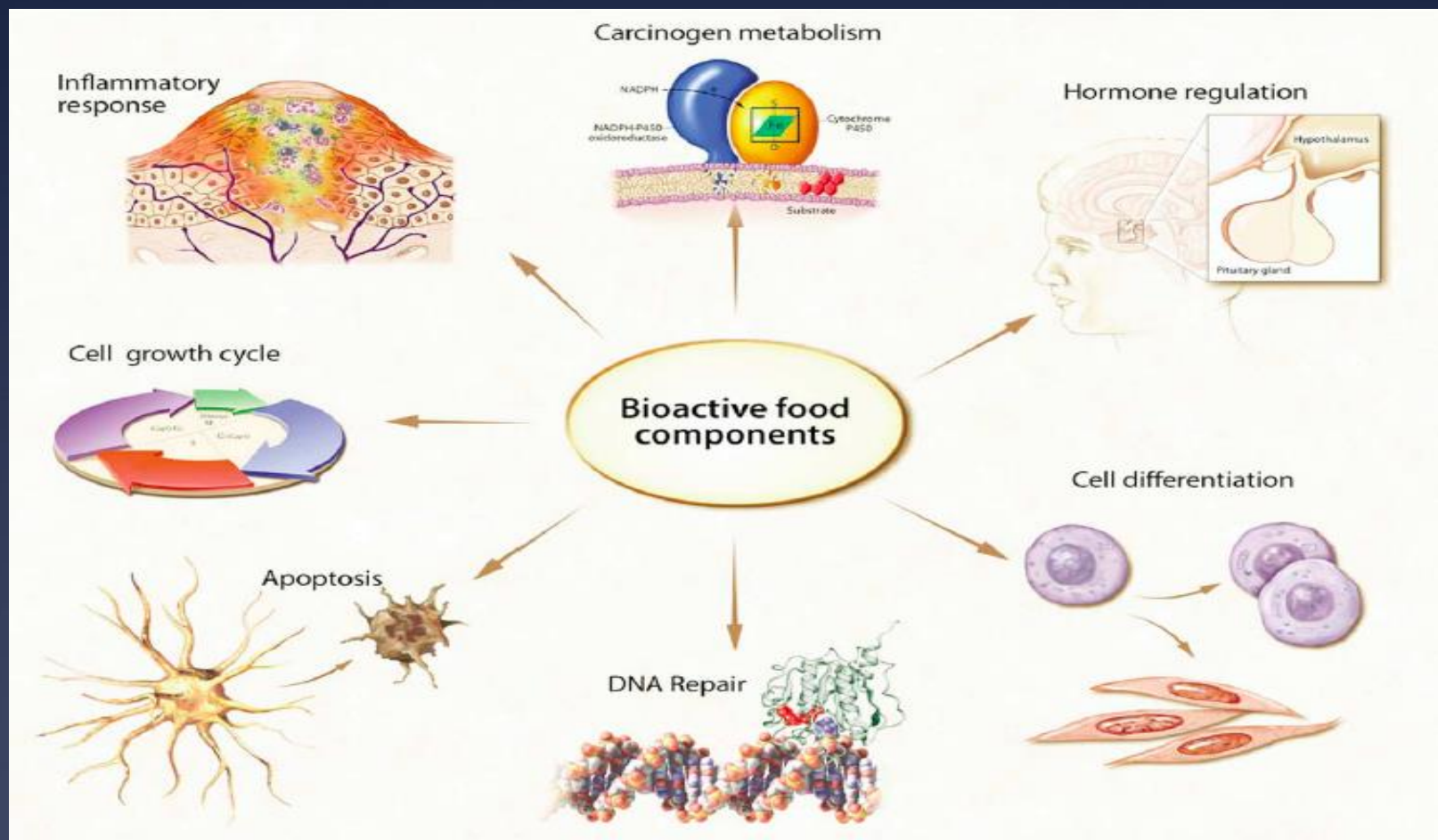
❑ Aumento do risco de morte por Ca de mama:

▪ IMC > 30 (HR 1,38)

▪ Razão C/Q > 0,85 (HR 1,27)

somando ambos (HR 1,57)

Dal Maso L et al. Int J Cancer 2008 123: 2188-94



CHÁ VERDE

COMPOSTO BIOATIVO: ECGC (Epigallocatequina-3-galato)

- ❑ Inibe NF-KappaB → diminuído a expressão gênica de proteínas inflamatórias
- ❑ Modulação da progressão do ciclo celular
- ❑ Induz apoptose das células cancerígenas
 - ✧ Ação sinérgica com SERMs → resposta apoptótica precoce e aumentada em Ca ER+ e ER- (Scandlyn et al, Huang et al, Sakata et al, Chisholm et al, Stiert et al, Sartippouret et al)
- ❑ Inibição do Fator de crescimento Endotelial Vascular (VEGF) → diminui angiogênese e metástase





VEGETAIS CRUCÍFEROS

COMPOSTO BIOATIVO: INDOL-3-CARBINOL E ISOTIOCIANATO

- ❑ Sulfuranos do ITC → inibe enzimas de fase I – Citocromo P450
→ induz enzimas de fase II – Glutathione S Transferase
- ❑ Estudos Clínicos:
 - ✧ Doses de 300-400mg/dia (280-400g repolho/dia) de I3C aumentam significativamente a relação 2-OHE1 : 16- α - OHE1 em mulheres na pré-menopausa
 - ✧ Cada aumento de 10g na ingestão de vegetais crucíferos levou a um aumento de 0,08 na razão 2-OHE1: 16- α - OHE1
- ❑ Estudo In Vitro em células de Ca de mama RE+:
 - ✧ Isotiocianatos agem em sinergismo com o Tamoxifeno e o co-tratamento reduziu a viabilidade e o potencial clonogênico destas células de forma mais eficaz do que qualquer um dos agentes sozinho
 - ✧ Isotiocianatos sensibilizaram T4D e MCF-7 tamoxifeno resistentes (PAULIKA A, et al, 2015)

Association between Soy Isoflavone Intake and Breast Cancer Risk for Pre- and Post-Menopausal Women: A Meta-Analysis of Epidemiological Studies

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1 Department of Epidemiology and Biostatistics, School of Public Health, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China, **2** WuXIPRA Clinical Research (Shanghai) Co., Ltd, Shanghai, China, **3** Jiangxia Maternal and Child Health Hospital, Wuhan, China

Abstract

Background: Conclusions drawn from meta-analyses on the association between soy isoflavone intake and breast cancer risk for pre- and post-menopausal women are not fully consistent. These meta-analyses did not explore the influence of different study designs on the pooled results on the basis of distinguishing between pre- and post-menopausal women.

Methodology and Principal Findings: We performed a meta-analysis of 35 studies which reported results of association between soy isoflavone intake and breast cancer risk for pre- and/or post-menopausal women, calculated pooled odds ratios and their 95% confidence intervals of pre- and post-menopausal women respectively, and further explored soy isoflavone-breast cancer association on the basis of considering different study regions and designs. Summary results suggested that soy isoflavone intake has a protective effect against breast cancer for both pre- and post-menopausal women. However, they are influenced by study design and region. Pooled ORs of studies carried out in Asian countries suggested that soy isoflavone's protective effect exist in both pre- and post-menopausal women (OR = 0.59, 95%CI: 0.48–0.69 for premenopausal women; OR = 0.59, 95%CI: 0.44–0.74 for postmenopausal women). However, there are some differences between the results pooled from different study designs for women in Asian countries (test for consistency, $P = 0.04$). Pooled OR of studies on postmenopausal women in Western countries suggested that soy isoflavone intake has a marginally significant protective effect (OR = 0.92; 95%CI: 0.83–1.00), but further analyses stratifying by study design found no statistically significant association.

CONCLUSÃO: A ingestão de isoflavonas de soja pode reduzir o risco de Ca de mama em mulheres na pré e pós-menopausa em países asiáticos. Porém não há evidências destes mesmos resultados em mulheres nos países ocidentais

Funding: The authors have no support or funding to report.

Competing Interests: Author Tong Guo is employed by a commercial company, WuXIPRA Clinical Research (Shanghai) Co., Ltd., but this does not alter the authors' adherence to all the PLOS ONE policies on sharing data and materials.

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SOJA

COMPOSTO BIOATIVO: GINESTEÍNA

CONTROVÉRSIAS

- ❑ Doses fisiológicas ($< 1\mu\text{M}$) *in vitro* em linhagens com Ca de mama e em células saudáveis e em animais *in vivo*
 - ✧ Causa proliferação celular
 - ✧ Antagoniza o efeito do tamoxifeno

- ❑ Doses farmacológicas ($> 10\mu\text{M}$) *in vitro* e *in vivo*
 - ✧ Atua na angiogênese
 - ✧ Estimula a apoptose celular
 - ✧ Inibe a enzima tirosina quinase



SEMENTE DE LINHAÇA

COMPOSTO BIOATIVO: SEICOISOLARICIRESTROL (SDG)

- ❑ Thompson (2005) em estudo randomizado duplo cego controlado com placebo observou aumento da apoptose e redução do tamanho tumoral com suplementação de 25g de semente de linhaça
- ❑ Chen et. al (2005) demonstrou *in vivo* em ratos que a semente de linhaça inibiu o crescimento do câncer de mama RE+ e realçou o efeito do tamoxidfeno
- ❑ Chen et al.(2004) demonstrou *in vivo* que a suplementação da dieta de ratos com 10% de semente de linhaça pode inibir a metástase, mas não a recidiva



- ❑ 1490 mulheres com Ca mama
- ❑ Acompanhamento iniciou \approx 2 anos após o diagnóstico
- ❑ “FORTE” efeito protetor combinado de exercício mais alta ingestão de frutas e verduras

PIERCE JP, et al. J Clin Onc, 25(17), 2007

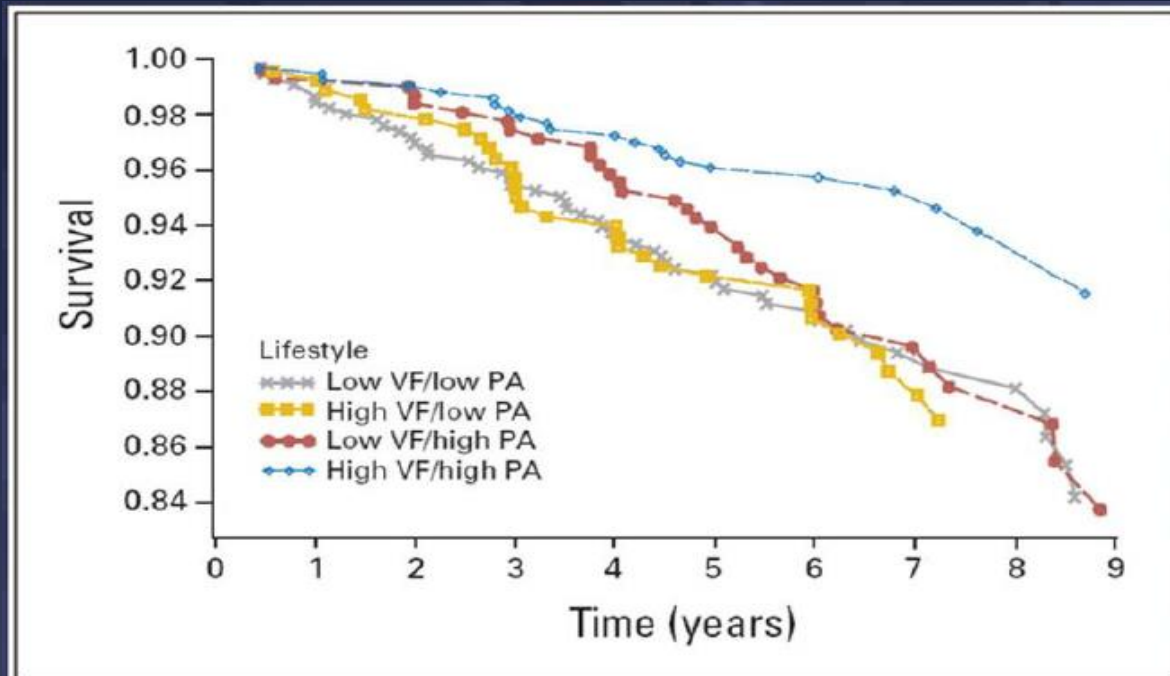
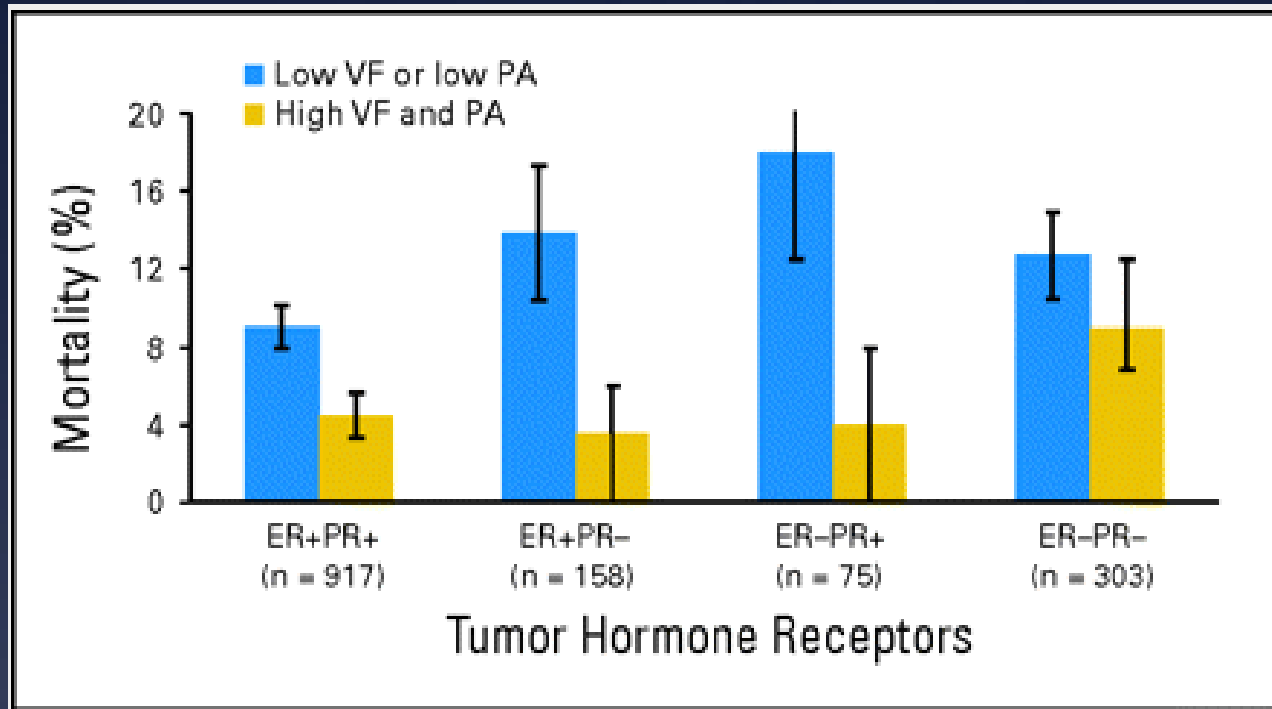


Fig 1. Kaplan-Meier survival after Women's Healthy Eating and Living (WHEL) Study enrollment by four diet and physical activity categories. Low vegetables-fruits (VF), less than 5 servings/d; high VF, ≥ 5 servings/d; low physical activity (PA), less than 540 metabolic equivalent task (MET) -min/wk; high PA, ≥ 540 MET-min/wk. Survival is plotted as a function of number of years enrolled in WHEL Study.

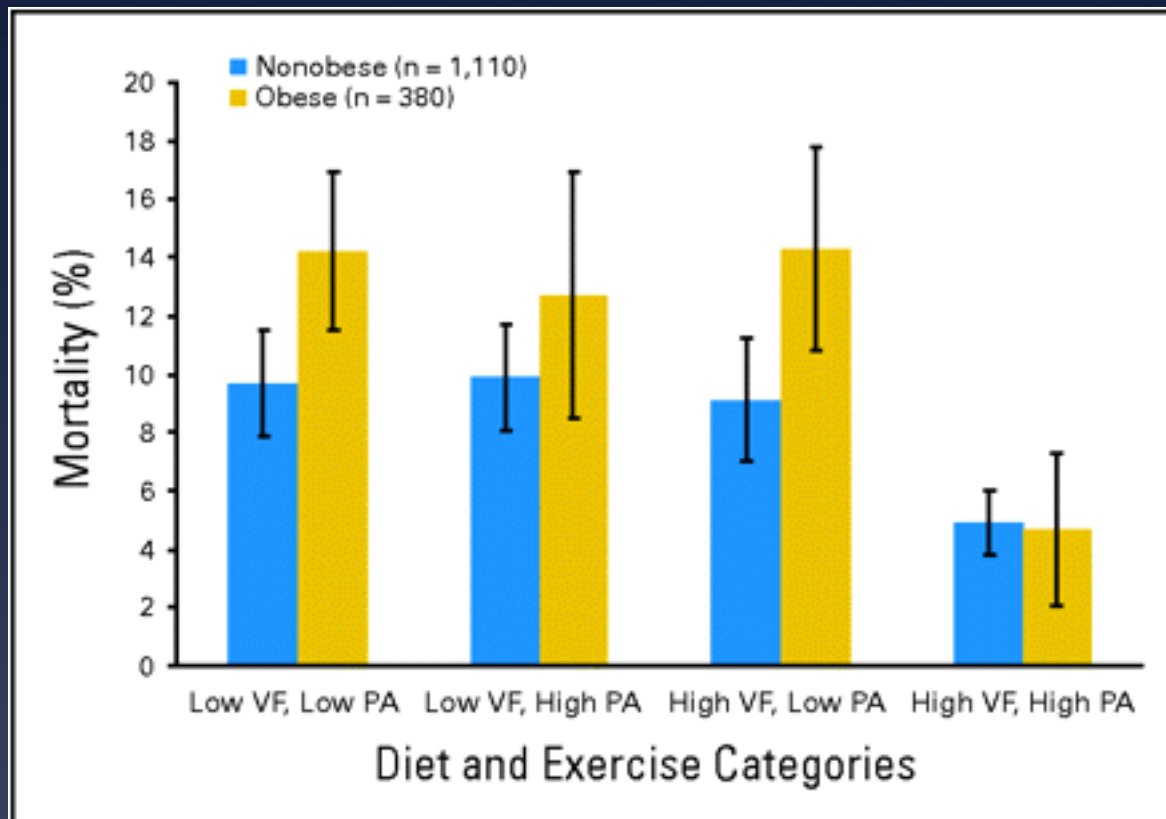
VF = Vegetais e Frutas
 LOW = < 5 porções/dia
 HIGH = ≥ 5 porções/dia

PA = Exercício Físico
 LOW = < 5.4 METS
 HIGH = ≥ 5.4 METS



VF = Vegetais e Frutas
LOW = < 5 porções/dia
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Que seu remédio seja o seu alimento e que seu alimento
seja o seu remédio

Hypócrates

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OBRIGADA