

# Cancer Risk factors & Prevention

Bangkok 2019

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Cancer can be simplified as the

Balance between Oncogenes versus Tumour suppressing genes

But genes are not fixed - the Epigene influences how genes are expressed via DNA methylation, histone modification & non-coding RNA-associated gene silencing

Major factors influencing the Epigene are environmental factors like maternal & paternal diets, maternal undernutrition & toxicity, malnutrition, the patient's diet, environmental pollution & life style

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## Common genes/signalling molecules

Increasing apoptosis reduces cancer growth risk:

**p53** tumour suppressor gene → DNA repair or Apoptosis (if severe cellular damage),

increased by vitamin E, Genistein, Quercetin, Conjugated Linoleic Acid, optimise Methylation

p53 mutations can enable cancer ie when not working properly

AMPK AMP-activated kinase energy sensor enzyme family that inhibits cancer & inflammation, regulates glucose, aids mitochondrial biogenesis - increased by Bitter Melon & Metformin

BAX gene → increases Apoptosis

Caspases gene family → increase Apoptosis

## 4 Common genes/signalling molecules

These genes & signalling molecules increase cancer growth:

HIF-1 Hypoxia Inducible Factor allows cell survival during hypoxia, encourages angiogenesis, metastasis, resistance & early death

BCL-2 gene → generally inhibits Apoptosis increased in Lymphoma, Prostate cancer

MMPs family of enzymes which degrade collagen → spread, inhibited by Quercetin, Bromelain, EGCG, Curcumin

Heat Shock Proteins families of proteins that are over expressed in cancer → spread, metastasis, chemoRx resistance, Rx Cantharidin/TCM, Curcumin (also neuroprotective, multiple mechanisms)

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## Common genes/signalling molecules

**Ras** oncogene signalling molecule family overactive in cancer, suppressed by Simvastatin, curcumin, EGCG, omega -3, Vitamin E, Kyolic, limonene

mTOR/mammalian target of Rapamycin - signalling pathway activated by growth factors, nutrients, **excess** protein, energy & stress, increases proliferation & HIF, & reduces apoptosis, inhibited by Metformin, Berberine, fasting, ketogenic diet, n acetyl cysteine, resveratrol, quercetin, genistein, astragalus & andrographis

**NF-kB** nuclear factor kappa-light-chain-enhancer of activated B cells protein transcription factor → regulates DNA, inflammation & cell survival ie cancer cells have mis-regulated NF-kB which turns on cancer growth genes

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## Common genes/signalling molecules

VEGF vascular endothelial growth factor family - signalling glycoproteins that make new BVS, increase endothelial migration & MMP, chemotactic, vasodilatory, allow cancer growth

EGFR - epidermal growth factor receptor family too low → Alzheimer's, & too high → Cancer, blocking EGFR slows cancer growth

Survivin transcription factor that inhibits apoptosis & enables cancer growth eg Prostate cancer

PMC full text: [Cancer Metastasis Rev. 2014; 33\(1\): 217–229.](#)

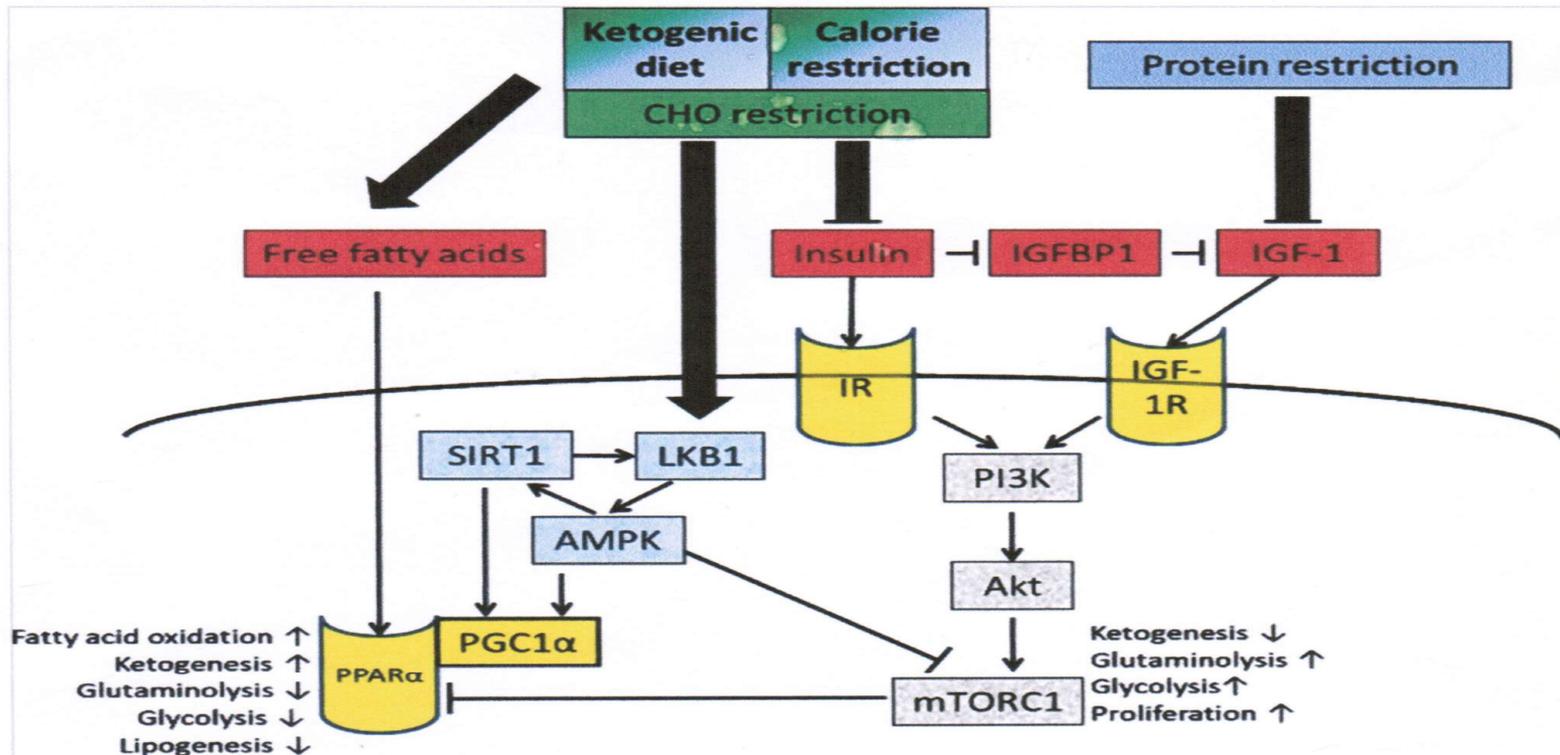
Published online 2014 Jan 17. doi: [10.1007/s10555-014-9495-3](https://doi.org/10.1007/s10555-014-9495-3)

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**Fig. 2**



Calorie restriction (CR) and a ketogenic diet (KD) target the same molecular pathways that are also targeted individually by drugs to improve cancer treatment outcomes. *Arrows* indicate activation, *truncated lines* inhibition. Carbohydrate (CHO) restriction up-regulates fatty acid oxidation and ketogenesis (beneficial for normal tissues) and impairs glycolysis and glutaminolysis (detrimental to tumor cells). See Section 2 for more details

**Images in this article**

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## Major factors in cancer

Genes 5-10% - gene expression can be altered/Epigenetics

Diet & weight >35% - alterable, diet 35%, weight 14-20%

Environment 25% - alterable

Lifestyle 30% - alterable

*L Alschuler -The definitive guide to cancer*

*A Okey - An aryl hydrocarbon receptor odyssey to the shores of toxicology  
Toxicol Science 7/2007 (Dioxins → Oncogenes)*

Cancer personality ~ rescuer

Exercise → 20-50% increased survival & Telomere length

Age - biggest risk factor for cancer ie > 60 yo

Ageing/oxidative damage → increases NFkB → reduces  
Apoptosis & increases COX-2 enzyme → increases VEGF

Ageing → Inflammation → DNA damage, Immune suppression via  
eg Hg, toxins, nutrient depletion, excess omega 6 : 3

## 9 Environmental influences

Herbicides, pesticides, GM crops eg soy, corn

Hormones in food eg Oestrogens, Xeno-oestrogens

Radiation - ionising & non ionising

Smoking and 2<sup>nd</sup> hand smoke (> 4000 chemicals)

Chemicals in soil, air, water eg Asbestos, Lead, Benzene, flame retardants eg Polybrominated diphenyl ethers

Chemicals in cosmetics, hair products eg Parabens, Phthalates, talc, Propylene, Paraphenylenediamine

Cleaning products eg Chlorinated hydrocarbons, Trihalomethanes & Chloroform

Virus eg HPV - Cervical cancer & oral cancers?

Environmental influences - bladder cancer, leukaemia, bowel cancer & Trihalomethanes - from chlorinated water; lung cancer & polyaromatic hydrocarbons; leukaemia & pesticides; Sarcomas & Dioxins; blood cancers & heavy metals

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Natural anti-cancer foods:

Folate - protects against cell mutations eg leafy greens, asparagus, sunflower seeds ie mainly uncooked as folate is heat sensitive (even gentle heating)

Vitamin D - midday sun, salmon, prawns, cod, eggs

Kaempferol - tea flavonoid Rx ovarian & breast cancer

Cruciferous vegetables stimulate Nrf-2(Nuclear Factor Erythroid 2-related factor) transcription factor → detoxifies & balances oxidation via Antioxidant Response Element ~ Indole3carbinol, Glucosinolates, vitamin C eg 2-minutes steamed brassica vegetables for colon prostate, breast cancers

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## Natural anti-cancer foods

Curcumin in curries & with coconut/olive oil to reduce oxidation, multiple mechanisms

Ginger - gingerols & shogaols - anti-inflammatory, autophagy & apoptosis

Bromelain digestive enzyme from pineapple

Egg yolk phosphatidyl choline, phosphorylethanolamines → increase immunity, but eggs are a common intolerance on testing

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## Super Foods

Wheatgrass - drink most immediately & the rest 4 hrs later

Coconut oil - 50% lauric acid kills bugs, increases immunity, lowers weight? (MCT may be better for weight loss)

Olive oil - add turmeric when cooking to reduce olive oil oxidation

Garlic - contains allicin, s-allyl cysteine & selenium → reduces liver carcinogens, increases apoptosis, immunity & anti-inflammatory eg increases NK/natural killer cells, antioxidant, anti-angiogenesis, multiple mechanisms

*S Ngo Does garlic reduce risk of colorectal cancer? a systematic review 2007  
jn.nutrition.org*

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## Super Foods

Ginger - inhibits tumour growth, anti-inflammatory, anti-angiogenesis, anti-platelet, anti-oxidant, helps maintain Glutathione (during stress), analgesic, increases bile, multiple effects eg 6-Shagaol kills cancer stem cells, also i/v Dr Jurgen Arnhold, Germany

Germanium - increases oxygenation, chelates Hg & Pb, increases t cells, b cells & NK/natural killer cells

Spirulina - repairs DNA, detoxifier eg Microhydrin Plus ~ silica crystals plus multiple antioxidants (ALA, NAC, EGCG, silymarin, ascorbyl palmitate/fat soluble vitamin C, niacinamide, selenium, quercetin)

limited studies for Spirulina, but used by NASA astronauts

*P. Karkos et al - Spirulina in Clinical Practice, Evid based comp alt med 2011 , 531053*

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## Increase cancer risk

Sugar (reduces WBC phagocytosis > 5 hours), acidic foods,  
soft drinks & cola

transfats/saturated fats?

processed foods

aspartame, MSG, nitrites, pesticides, glyphosate/Roundup

pasteurised dairy

flour/gluten

chlorine (trihalomethanes - bladder cancer, miscarriage)

fluoride

mycotoxins/aflatoxins (peanuts, rice, barley - block tumour  
suppressor p53 gene, especially vegans) reduced by

Rutin/Quercetin

**Smoking → silences tumour suppressor genes & increases  
cancer risk**

*A Sanchez-Role of sugar in human neutrophilic phagocytosis Am J of  
Clinical Nutrition 1/11/73*

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## Nuclear factor Kappa B

NF-kB is a transcription factor family & signalling molecule for DNA, Cytokines and cell survival that also regulates cell response to infection & inflammation

ie **Inflammatory**, increases VEGF, adhesion/stickiness & MMPs, controls **Epithelial → Mesenchymal Transition** for cancer cell spread via blood vessels (circulating tumour cell testing measures these cells)

NF-kB reducers :

Anthocyanidins/berries, Curcumin, green tea/EGCG, Resveratrol, vitamin B3, vitamin C, vitamin E, NAC/glutathione, SAME, zinc, ALA, DHA/EPA, soy/Genistein & Tegarane (Zhen Hua), liquorice root extract, capsaicin, clove extract, ginger, basil, rosemary, garlic, pomegranate, cocoa polyphenols 40 grams, Melatonin, i3C, Selenium, probiotics, Salvestrols

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## Insulin Resistance

Insulin → increases tyrosine kinase → proliferative & inflammatory  
ie cellular growth factor and “conveyor of glucose” into the cell  
eg some with IR don't become diabetic, but the high Insulin  
level makes them more susceptible to cancer, promotes weight  
gain, inhibits weight loss, pro-inflammatory

Insulin also binds to IGF-1 receptors → proliferative

Cancer cells have higher density of Insulin receptors

**Metabolic Syndrome - the ultimate carcinogen?** *Metagenics*

Triggers for insulin resistance

genetic, high CHO diet, adrenal stress, steroids, low vitamin D,  
chronic liver disease, selenoprotein P/hepatokines, excess  
caffeine, poor sleep, smoking/nicotine

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## Vitamin B1 & B2 concerns

Supplemental Vitamin B1 may contribute to cancer cell survival, proliferation & chemo resistance:

*K Lu'o'ng et al The role of thiamine in cancer Cancer genomics & proteomics 7/2013*

Doubts about high dose B2 and cancer:

Inhibiting B2 as FMN & FAD-dependent enzymes reduced cancer stem cell growth

*B Ozsvari et al Targeting flavin-containing enzymes eliminates cancer stem cells by inhibiting mitochondrial respiration: Vitamin B2 in cancer therapy Aging 16/12/2017*

Until more information comes to light, avoid supplement doses of vitamin B1 & B2, but food doses are ok

**But** Multivitamins reduce initial cancer by 8%

Multivitamins (which included B1 & 2) in middle-aged male USA doctors reduced cancer by 8% & recurrence by 27%

*J M Gaziano et al Multivitamins in the prevention of cancer in men JAMA 14/11/2012*

- 1 Juicing - **beetroot**, carrot, celery with ginger, turmeric, coriander
- 2 Coffee enemas - you tube videos for demo. Do straight after bowels have been opened, lie on left side on a towel on bathroom floor, not as bad as it sounds
- 3 Detox protein powder but caution if high glutamine, can increase ammonia, & Glutamine may feed cancer - *Dr T Seyfried*
- 4 St Mary's thistle/Silybinin, & possibly pink grapefruit (naringenin) to slow phase 1
- 5 Liver support of Phase 2 eg Glycine, Taurine, LM2 (Orthoplex), many brands, NAC/Glutathione, Vitamin C, ALA
- 6 Infra-red sauna
- 7 Activated charcoal: adsorbs toxins but separate from supplements by 2 hours either side, & ensure no constipation

Laughter, exercise, meditation, probiotics, Gastro prebiotic, Astragalus, Andrographis, Artemisinin injections, Black cumin seed oil, Coriolus Grifola, NAC or Glutathione, ImmunActiv Restore, 5 mushroom blend and AHCC, Immune Senescence or Reishi Cistanche, IP6 Gold, Kyolic, Lactoferrin, Lipoic acid, Echinacea, Melatonin, NK cell activator (modified rice bran), Ribraxx /Biobran, PeakImmune 4?, Shark liver oil, Silymarin, Vitamin B12, Vitamin D, Zinc, Kangalaite capsules, Super antigens HAS, GC MAF, Cimetidine, Avemar  
Magic Chinese herbs? check with herbalist

use 3 - 5 of these at a time and measure NK cells monthly?

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## Pre-biopsy Rx

Professor Ben Pfeifer 2009 **CTCs increase after breast & prostate cancer biopsy**

4-22% risk of needle track metastasis with Radiofrequency ablation/RFA and biopsies

Core biopsy safer than Fine Needle Aspiration?

Rx pre biopsy and for 6 weeks to 1 yr later?

Biobran/MGN3/Ribraxx/Lentin Plus/BRM4 (rice bran w shitake)

Cimetidine

MCP modified citrus pectin reduces cell adhesion & metastasis

Flax hull lignans breast biopsy 2/52 before and > 4/52 after, & increase cancer apoptosis when used before surgery

Intravenous vitamin C straight after, **but no vitamin C during the 24 hrs before any operation as may interfere with anaesthetic**

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## Caution

Excess folic acid **may increase cancer**, so **<500 mcg**,  
as excess folate may be oestrogenic?

Mammograms 1% breast cancer risk/year, if BRCA1 and 2 genes  
increased cancer aggression with mammograms,  
**maybe** Mammogram, Thermogram (10% false positive) and  
MRI alternating? **Not an official recommendation**  
2 hrs before and ½ hr after mammogram can use vitamin D, E,  
NAC, ALA, spirulina, selenium ? **use 3 of these, theoretical  
only**

Breast examination if done repeatedly may increase cell spread to  
LN?

**Stress** → COMT enzyme activates adrenaline rather than  
methylating oestrogen, shrinks thymus, lowers NK cells

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Increase risk of Metastasis:

Stress → reduces Immunity

Inflammation, Insulin Resistance,

Hypoxia

Hyper-coagulation (measure fibrinogen, keep midrange)

Suboptimal nutrients

Increased NF-kB activity

Surgery (increases VEGF too, primary cancer makes anti-angiogenesis factors) & chemoRx? **Controversial**

Increased MMPs

Heavy metals/environmental Toxins eg pesticides, herbicides, chlorine/organochlorines (swimming pools, showers), fluoride, asbestos, fibreglass insulation,

Radiation (uranium mining half-life 80,000 yrs),

Morphine (reduces NK cells & increases angiogenesis),  
so use **Tramadol for pain where possible**

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## Prevention

1 Life style & stress - alter gene expression/Epigenetics ie diet & detoxification. High carbohydrate, gluten, sugar, Frankenfoods (ie fake or artificial) are stressful, so switch to whole foods

Can measure 24 hour urine cortisol, salivary cortisol, many Psychometric tests to assess stress level

Avoid smoking, limit alcohol, adequate sleep

2 Diet - under eat but don't skip meals as this can lead to malnutrition & Muscle loss (*Julia Ross - multiple books*). Largely plant based diet with optimal, regular protein portions

Spices can help prevent - garlic, curcumin, ginger, boswellia

Mediterranean diet seafood, vegetables, slow cooking, lower omega 6 & socialisation

Raw foods & vegetable juice 2-3/week, salads

Fibre 25-40 grams per day - psyllium, vegetables

3 Detoxification - veg juices, Herbals - St Mary's Thistle, glycine, taurine, many supplement multis - Now: Liver Refresh, Coffee enemas, infra red sauna, activated charcoal

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## Prevention

4 Prevent Visceral obesity < 0.8 waist/hip ratio for women, < 0.9 waist/hip ratio for men. Mainly low carb diet, sometimes keto diet  
*dietdoctor.com*

5 Exercise helps build muscle, opens up capillaries, aids sleep, increases endorphins. 30 mins exercise reduced colon cancer risk by 35%, breast cancer risk by 20-30%

*I Lee Physical activity and cancer prevention Med & Sc 1/11/2003*

6 Oral antioxidants green tea, coffee, coloured vegetables & fruit, extra vitamins A,C,E, selenium, resveratrol & pterostilbenes, plus multi minerals - magnesium, zinc, iodine, chromium

7 Vitamin D - modulates many genes, not just a vitamin

8 Dental hygiene - reducing Periodontal disease & inflammation

*M Meyer et al A review of the relationship between tooth loss, periodontal disease and cancer Cancer Causes 14/5/2008*

9 Immune Senescence & cancer risk is increased > 60 years old  
reduced t cells, reduced function of memory t cells, decreased  
natural killer cell activity, stealth infections (CMV,EBV)

Rx reishi mushrooms & B-glucans, Biobran/Ribraxx, zinc,  
probiotics, theaflavins (black tea), Pu-erh tea extract (camellia  
sinensis), DHEA, vitamins C & E

*K Steinmetz et al Vegetables, fruit and cancer prevention: a review J of Am  
Dietetic Assocn 10/1996*

*D Birt et al Dietary agents in cancer prevention: flavonoids and isoflavonoids  
Pharm & Therapeutics May/June 2001*

*L Kushi et al American cancer society guidelines on nutrition and physical  
activity for cancer prevention CA 24/2/2009*

## Diet, digestion, detox & treat Insulin Resistance

Digestive enzymes and probiotics (increase immunity)

Vitamin A or mixed carotenoids, Niacinamide, vitamins B5, B6, C, D & E, bromelain, R-ALA

Coenzyme Q 10

Curcumin , Green tea/EGCG and phytonutrients - Pomegranate extract, garlic, ginger, thyme, parsley, mustard, cinnamon, mushrooms, citrus peel/limonene

Flaxseed, onions, cruciferous/brassica vegetables, blueberries

Garlic & vegetables with BBQ meat protective?

Selenium, Calcium, Folate, vitamin B12, Chlorophyll

Chronic stress → increases SNS → increases tumour growth, so reduces prognosis. If poor sleep Rx treat pyrroles, meditation/relaxation, melatonin, 5HTP

(Adenosine increases WBC after chemoRx, but not for large/hypoxic tumours)

*Michael Donaldson Nutrition & Cancer - A review of the evidence for an anticancer diet Oct 2004*

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## My patients - anecdotal

- 1 No boundaries - givers to the point of their own detriment
- 2 Impaired glucose tolerance, Insulin Resistance or frank diabetes
- 3 Major emotional stress 7-10 years before cancer was diagnosed - divorce, unemployment, severe depression, other family stress
- 4 Toxicity commonly mercury from amalgams, in Asia more likely to be from seafood eg Mahi mahi. Periodontal & gum disease, also plastics/phthalates, glyphosate, benzene
- 5 Poor sleep hygiene - stress, EMF/EMR sensitivity (wired & tired)
- 6 Macronutrient inadequacy - protein, fibre
- 7 Micronutrient insufficiency - vitamins A, C, D, E, zinc, magnesium, iodine
- 8 Suboptimal Thyroid function, so test T4 & T3, reverse T3
- 9 Iodine deficiency, often zinc & magnesium too
- 10 High copper/zinc ratio

*Weston-Price Foundation Copper-zinc imbalance 14/2/2008*

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