

Nutrition for cancer support and chronic inflammatory patients

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Improving nutrition for cancer support

The opinions are my own - where it isn't, it is clearly marked. I am not a cancer-specific doctor, but have been supporting advanced cancer patients for over 25 years. Integrative GPs are not allowed to treat cancer

I have included many references but some of this material is anecdotal - in my opinion experience does count

An important principle – in unwell patients, *one* major negative factor eg excessive alcohol, food intolerance, heavy metal toxicity etc can overcome *several* aspects of the patient's disease you might correct

You might emphasise optimal digestion, diet and detoxification but if the sensitive patient is not getting adequate sleep or is exposed to 24-hour EMF, getting them better may be a struggle

Improving nutrition for cancer support

I have had cancer patients stable on intravenous vitamin C, GC-MAF, mistletoe etc, switch to an internet trend - eg only intravenous bicarbonate, & die quickly (*Simoncini once advocated this*).

Another patient has been following a fruit only diet under the supervision of an overseas clinician and her breast cancer markers have risen consistently over 6 months ie ca 15.3, cea and LDH

I try to support patients in their decisions but sometimes.....

I do the betaine hydrochloride test on all new patients, 1, 2 and 3 - **explain**; and generally put them on Thorne Biogest or similar; if symptoms of reflux, wasted, very sick patients heal the gut first, then use betaine hydrochloride, prebiotics, probiotics (d-lactate free probiotic for patient with stable myeloma and fatigue → developed petit mal epilepsy, presumably severe leaky gut, these absence attacks stopped 2-3 weeks after probiotic was ceased)

Improving nutrition for cancer support

Optimum **lean weight** and high **natural killer cells** (CD 57 NK cells) are two very important factors in cancer support ([lifeextension.com > health protocols > cancer & NK cells to cure cancer \(2019\)](https://lifeextension.com/health-protocols/cancer-nk-cells-to-cure-cancer-2019) PMID 31085114)

S Fraser et al – The effects of exercise training on lean body mass in breast cancer patients: a systematic review and meta-analysis, PMID 34559724

17 studies, 1743 patients ‘given the physiological and functional importance of lean body weight in women with breast cancer ... regular exercise training & resistance training’ should be encouraged

S Jeong et al – Predicted lean body mass, fat mass and risk of lung cancer incidence: prospective US cohort study, PMID 31754943

‘predicted lean body mass had an inverse association for lung cancer incidence, especially amongst current or past smokers’

More on the importance of lean weight ie muscle

*C Prado et al (2008) – Prevalence and clinical implications of **sarcopenic obesity** in patients with solid tumours of the resp and gastrointestinal tracts: a population-based study, Lancet Oncology, PMID 18539529*

*H Xue et al (2022) – Association between **fat mass to lean body mass ratio** and **all-cause mortality** among middle-aged and elderly cancer patients without obesity: a multi-center observational study, frontiersin.org doi.org/10.3389/fnut.2022.914020*

*Over 3 days in hospital → 1 kg lean weight loss, which can take **months** to recover, especially for those having chemoRx*

*muscle is a reservoir of amino acids for **optimal metabolism & detoxification***

Walter Crinnion – Clean, green & lean, get rid of the toxins that make you fat 2010

low muscle mass cancer patients have longer hospital stays, more complications & **lower survival**

Supplements for increasing lean weight ie muscle – evolving story

HMB (Orthoplex) hydroxy methylbutyrate is a metabolite of leucine (BCAA family), usually considered a major stimulation of cancer growth

While it stimulates mTOR, HMB *appears to be safe in cancer in a mouse model* (K Liu – *Pancreatic cancer and cachexia: effects of leucine and HMB supplementation, Texas scholar works, Austin, 2017*)

Seemed to decrease pancreatic cancer signalling & proliferation, & enhance gemcitabine

Mixture of HMB, arginine & L-glutamine reduced wasting **but** only 24 week follow up & no mention of long term mortality P *May et al – Reversal of cancer-related wasting PMID 11975938*

Low muscle mass is common in cancer & a predictor of adverse outcomes. **5 of 7 studies using HMB showed increased survival**

C Prado et al (2022) – Effects of HMB supplementation on muscle mass, function, and other outcomes in patients with cancer: a systematic review, doi.org/10.1002/jcsm.12952

Natural Killer cells – NK *activity* can be measured in research labs

S Wu et al – NK cells in cancer biology & therapy, Mol Cancer. 2020, PMID32762681

‘NK cells ...kill... tumour cells (and virus-infected cells) at a very early stage’

1 cNK conventional NK cells in peripheral blood and migrate to where needed (our blood test)

2 trNK tissue-resident NK cells

NK cells are recruited and activated quickly, contributing to innate and adaptive immunity;

‘dysfunction of NK cells ..leads.. to proliferation of tumour cells and formation of distant mets’

‘lipid accumulation in the liver, abnormal glucose metabolism and lifestyle contribute to tumour genesis and cancer progression’ ie fatty liver & dysregulated glucose ~ inflammation

‘breast cancer risk is increased by obesity, high mental pressure → affecting lipid & glucose metabolism’

Control of metastasis by NK cells – PMID 28810142

the impact of NK cells on early oncogenesis may have been underestimated

NK cell boosters – in bold are my preferences, these are anecdotal

Exercise, laughter, meditation

Probiotics - L casei, bulgaricus, saccharomyces boulardii

astragalus, andrographis, echinacea, astaxanthin

artemisinin (preferable as intravenous or intramuscular)

black cumin seed oil, chlorella, **coriolus grifola** (eg maitake/dancing mushroom), other mushroom blends (eg agaricus/sun, turkey tail/PSK, reishi/Ganoderma lucidum, shiitake), N-acetyl cysteine, kyolic, lactoferrin

IP6 Gold, lipoic acid, melatonin, **biobran** (**Ribraxx**), resveratrol/pterostilbenes, shark liver oil (increases low platelets too), silymarin

vitamin A, B12, **IV vit C** & liposomal C with red ginseng, **vit D**, vit E, zinc, magnesium, selenium

GC-MAF (subcutaneous injections)

Cimetidine, melatonin

Chinese herbs eg danshen (?) *PMID 29284481*

eg in practice, mixed mushroom soup, with ginger, curcumin & all spices, shallots, onions

cancer.gov > NIH > cancer institute > medicinal mushrooms – health professionals version; & PMID 22582152, 34786892, 30671486, 25845339

NK cell reducers

Age, more so in men than women

Surgery *Angka (2017) - NK cell dysfunction after cancer surgery PMID 28817109*

Chronic renal failure

Some patients with CFS/FM/ME, especially chronic infections

May be low in autoimmune disease eg SLE, T1D - *protective or pathogenic PMID 337770006*

Stress – high cortisol/low DHEAS pattern on blood tests *before 9 am*

Growth hormone, especially those injecting it (some gym junkies)

Excessive oestradiol, injected testosterone

Lectins (?)

Folic acid

Lipoic acid (?)

Interesting chart summary of NK cell biology

stemcell.com NK cell: receptors and functions

Cancer support nutrition

The major **initiating** nutritional factors in cancer propagation are:

1 Glutamine – the most abundant amino acid → nucleotides, non-essential amino acids, fatty acids → proteins & fats; controls energy production, gene transcription, repair, immunity

‘the rediscovery of the role of **glutamine** in tumour cell growth in addition to the pivotal role of **glucose**’

Cancer cells show increased consumption and dependence on glutamine

Glutamine metabolism ie its metabolites fuel the TCA cycle via alpha-ketoglutarate

Glutamine activates mTOR

B Altman et al – From Krebs to Clinic: Glutamine Metab in Cancer Therapy, 2016, PMID 27492215

J Jiang et al – Starve cancer cells of glutamine: break the spell or make a hungry monster, 2019, PMID 31212591

PMID 33320840

Cancer support nutrition

In some situations, eg post surgery (with markedly increased catabolism & inflammation), oral mucositis, oesophagitis, post radioRx, **short-term use of glutamine may be useful - caution**

The two reviews looked at oral oral glutamine used for 3-4 weeks, 1 week before chemoRx and for 2 weeks after, with minor variations on this regime, and found it useful

C Sayles – Oral glutamine in preventing treatment-related mucositis in adult patients with cancer: a review, Nutr in clinical practice, 2015, resarchgate.com doi.10.1177/0884533615611857

E Topkan et al – Influence of oral glutamine supplementation on survival outcomes of patients treated with concurrent chemoradiotherapy for locally advanced non-small cell lung cancer, BMC Cancer, 2012, doi.org/10.1186/1471-2407-12-502

Glutamine

often in large quantities in supplemental gut healants so **do not use in cancer**,

is often in high-protein foods

most of us consume ~3-5 grams/day

www.tools.myfooddata.com > high glutamine foods > 100g > Common

You can search by vegetables, vegan, fruits, nuts and seeds, fish, meats etc

I prefer to look at per 100 grams as this is a more practical measure for comparison for most foods

Highest glutamine foods – from highest to falling glutamine content:

Soy protein powder isolate (17 grams per 100 grams), eggs especially egg powders, various cheeses, dried spirulina (**but most will not eat 100 grams of this**), hemp seed, almonds, pumpkin seeds, beef, goat cheese, sunflower seeds, peanuts, lamb shoulder, walnuts, turkey, wheat germ (in cereals), chicken breast, cashew, pistachio, anchovies, other **lamb cuts (4 grams per 100 grams)**, some vegetable burgers due to their soy content, octopus

Raw red cabbage has high glutamine, unusual for a vegetable (cooked cabbage has less)

Lowest glutamine foods – from lowest to increasing glutamine content:

cooking oils and ghee (one reason for keto diet in cancer?), black tea, spirit drinks, apple cider vinegar, coffee, most vegetables and fruits, beer, brown rice, most spices, oysters, cream cheese, lentils, beans, buckwheat, beef and chicken sausages (due to their cereal content?), herring, squid, leg of lamb, sole fish, crab, lamb liver, various fish, lamb shank

Fattier cuts of meat tend to have lower glutamine because of the fat/oil content

Food are consumed as a group ie carbohydrates, protein and fat together,
so *tables like this can be misleading* as they are reporting individual foods, not the whole meal,
so appreciate the limitation of tables

Catherine O'Sullivan, dietitian, Ireland (3 oz ~ 85 grams)

Red Meat	<3000mg per 85g	3000-4500mg per 85g	>4500mg per 85g	Ranges
Lamb	Lamb mince Roast Leg of lamb Lamb Liver Lamb Rib	Lamb (Sirloin Cut)	----	Lamb Range (mg) per 3oz 2402mg- 3497mg
Beef	Ground Mince (25% fat) Ground Mince (5% fat) lean steak (rib cut)	beef (broiled) round beef (sirloin cut) beef chuck (shoulder cut)	beef skirt	beef range: (mg) per 3oz 2008-4258mg
Chicken	<3000mg per 85g	3000-4500 per 85mg	>4500mg per 85g	Ranges:
	Chicken Mince Chicken leg (No Skin)	Chicken drum-stick Chicken breast	----	Chicken ranges: (mg) per 3oz 2219-3948mg
Turkey	<3000mg per 85g	3000-4500 per 85mg	>4500mg per 85g	Range:
	---	Turkey Breast Turkey thigh Turkey Leg	---	Turkey Range: (mg) per 3oz 3108-3473mg
Duck	<3000mg per 85g	3000-4500 per 85mg	>4500mg per 85g	Range:
	-----	Duck	---	N/A
Fish	<3000mg	3000-4000mg	>4000mg	Ranges:
Seafood	per100g	per100g	per100g	
	Scallops Lobster Salmon Crayfish	Cod Whiting Bass Sardines Mackeral	Shrimp Octopus* Anchovies*	Fish Range (mg) per100g 2032-3665mg

Balancing optimal versus inadequate or excessive protein intake

mTOR responds to protein and excess calories to make more ATP, increases cell division, increases efficiency eg of mitochondria - so good for cell repair & cognition but not cancer

Excess protein stimulates mTOR, which normally modulates apoptosis, autophagy & metastasis in cancer (breast, ovary, pancreas).

mTOR controls t-cells, natural killer cells, M-2 macrophages

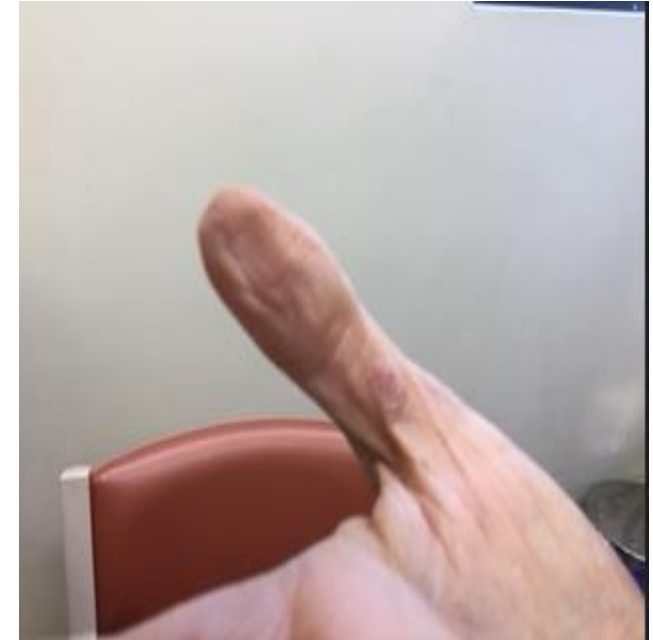
Abnormal/excessive mTOR *always* stimulates cancer growth

Fasting controls mTOR but must monitor physical signs of low lean weight & blood tests - urea, creatinine & albumin

When mTOR is low, autophagy & repair start, hence the benefit of *monitored fasting* in cancer

.

Early protein loss sign – deviation great toe, moderate – wasting interossei & severe – collapsed finger pulps or finger pulp atrophy (must be hydrated)



Balancing optimal versus inadequate or excessive protein intake continued

World War-2, 'rabbit starvation' was malnutrition due to excess consumption of wild, extremely lean rabbit, so excessive protein → within weeks → diarrhoea and death

Nutraceuticals that inhibit mTOR directly or indirectly (eg downstream metabolites) – apigenin (broccoli, capsicum etc), astragalus, andrographis, berberine, caffeine, curcumin, EGCG, fisetin (strawberry, onions etc), gamma tocotrienol, genistein, gynostemma pentaphyllum (>28 separate compounds against cancer), indoles (i3c, DIM), NAC, quercetin & resveratrol

PMID 20812900, 23272914, lifeextension.com > cancer-fighting properties of gynostemma

Metformin inhibits mTOR

Y Wang et al – Metformin induces autophagy and G0/G1 phase cycle arrest in myeloma, J Experimental & Clinical Cancer Res 37, 63 (2018)

Fasting & ketogenic diet inhibit mTOR (but my experience of keto in cancer has not been good)

Thomas Seyfried – Cancer as a metabolic disease, 2014

Blocking glutamine

1 **Berberine** – multiple actions in cancer & blocks glutamine uptake, it is also in many Chinese herbal medicines; *Petrea King (Bundanoon) recommends this*

doi.org/10.2147/OTT.S235667

2 **metformin** – inhibits mTOR & glutaminase & ‘tumour cells are addicted to glutamine & overexpress glutaminase...’ *PMID 30646605 & PMID 29554948*

& metformin ‘directly inhibits glutamate-induced excitotoxicity’ *PMID 26876766*

& metformin inhibits cancer stem cells

3 Green tea/**EGCG** – L-theanine, EGCG inhibit glutamate dehydrogenase, animal study

PMID 21813650

Blocking glutamine continued

Glutaminase **converts glutamine to glutamate**

other Glutaminase blockers:

4 **Curcumin** - **even better with some chemoRx eg cis-platinum** *PMID 20937593*

5 Capsicum, lycopene, holy basil, **resveratrol**, Honokiol, graviola, sulphoraphane, ashwagandha (L-asparaginase which inhibits glutamine metabolism), and valerian **have anecdotal reports but no pubmed studies**

6 Phenylbutyrate - **perhaps by reducing leucine?** *doi.org/10.1152/ajpendo.1998.274.5*

may work by differentiating tumours, histone modification, ammonia scavenging, potentiate chemoRx in a range of cancers, side effects minor – fatigue, indigestion

MS Al-keilani et al – The effects of combined treatment with sodium phenylbutyrate and cisplatin, erlotinib, or gefitinib on resistant NSCLC cells, 2018, PMID 30349406

S Phuphanich et al – Oral sodium phenylbutyrate in patients with recurrent malignant gliomas, Neuro-oncol, 2005, PMID 15831235

Continuing other dietary factors from slide 10! (sorry folks)

2 No sugar or refined carbs

Oxidative stress, protein kinase C, AGEs, gene expr → cancer *PMID 30098549*

Hyperinsulinaemia spreads cancer faster *PMID 32061306*

Inflammation and its relationship with cancer *PMID 31315034. B Bikman - Why we get sick, pages 52-55*

3 No gluten - Professor A Fasano has many references in pubmed on how 'all disease begins in the leaky gut' and how gluten sensitivity is common *PMID 32051759*

4 Limit dairy – perhaps A2 milk (goat, sheep, buffalo) only if the patient is desperate, as there is molecular mimicry with gliadin

Nicholas Gonzalez, NY cancer physician – several fascinating books

*The Nicholas Gonzalez Foundation has **diets** for specific cancers*

*Costs ~ US\$ 100 online, these are just **some** examples of the categories*

1 Sympathetic type 1 – extreme vegetarian

2 Parasympathetic type 5 – moderate carnivore (Type 2 extreme carnivore)

3 Balanced types 8 – balanced vegetarian

and there are several subtypes

Almost all advanced cancer patients have reduced nutrient absorption – Dr Taufiq Binjemain

Hair test Drs Data – Bell curve

ESSENTIAL AND OTHER ELEMENTS								
		RESULT	REFERENCE	PERCENTILE				
		µg/g	INTERVAL	2.5 th	16 th	50 th	84 th	97.5 th
Calcium	(Ca)	134	300– 1200					
Magnesium	(Mg)	17	35– 120					
Sodium	(Na)	5	20– 250					
Potassium	(K)	11	8– 75					
Copper	(Cu)	42	11– 37					
Zinc	(Zn)	220	140– 220					
Manganese	(Mn)	0.02	0.08– 0.60					
Chromium	(Cr)	0.36	0.40– 0.65					
Vanadium	(V)	0.014	0.018– 0.065					
Molybdenum	(Mo)	< 0.01	0.020– 0.050					
Boron	(B)	0.13	0.25– 1.5					
Iodine	(I)	1.5	0.25– 1.8					
Lithium	(Li)	0.005	0.007– 0.020					
Phosphorus	(P)	176	150– 220					
Selenium	(Se)	2.3	0.55– 1.1					
Strontium	(Sr)	0.10	0.50– 7.6					
Sulfur	(S)	49200	44000– 50000					
Cobalt	(Co)	< 0.002	0.005– 0.040					
Iron	(Fe)	5.1	7.0– 16					
Germanium	(Ge)	0.047	0.030– 0.040					
Rubidium	(Rb)	< 0.003	0.007– 0.096					
Zirconium	(Zr)	0.012	0.020– 0.42					22

Breast cancer patient, had lumpectomy, hair test before any nutritional Rx
Drs data hair test

ESSENTIAL AND OTHER ELEMENTS								
		RESULT	REFERENCE	PERCENTILE				
		µg/g	INTERVAL	2.5 th	16 th	50 th	84 th	97.5 th
Calcium	(Ca)	433	300– 1200					
Magnesium	(Mg)	27	35– 120					
Sodium	(Na)	10	20– 250					
Potassium	(K)	5	8– 75					
Copper	(Cu)	12	11– 37					
Zinc	(Zn)	280	140– 220					
Manganese	(Mn)	0.09	0.08– 0.60					
Chromium	(Cr)	0.35	0.40– 0.65					
Vanadium	(V)	0.020	0.018– 0.065					
Molybdenum	(Mo)	0.023	0.020– 0.050					
Boron	(B)	0.26	0.25– 1.5					
Iodine	(I)	0.22	0.25– 1.8					
Lithium	(Li)	0.005	0.007– 0.020					
Phosphorus	(P)	166	150– 220					
Selenium	(Se)	0.89	0.55– 1.1					
Strontium	(Sr)	0.49	0.50– 7.6					
Sulfur	(S)	47400	44000– 50000					
Cobalt	(Co)	0.008	0.005– 0.040					
Iron	(Fe)	5.6	7.0– 16					
Germanium	(Ge)	0.036	0.030– 0.040					
Rubidium	(Rb)	0.005	0.007– 0.096					
Zirconium	(Zr)	0.015	0.020– 0.42					

A Dr Taufiq Binjemain recommendation - Mimosa pudica

Mimosa pudica (shame plant) **seed is being used in cancer as a bowel scrubber**

but like many herbal (Indian) products has multiple actions (animal studies) – antibacterial, antiviral, antifungal, antioxidant, antivenom, wound healing (topical 2%), antidepressant, diuretic (can be combined with thiazides for increased activity), perhaps biofilm disruptor, contains many plant sterols and alkaloids – mimosine **might have some anti-cancer activity**

low toxicity

Worth putting all? (cancer) patients on mimosa pudica 2 bd, as this kills worms, parasites etc & increases nutrient absorption

Codeage 1000 mg or Microbe are common brands

H Ahmad et al – Mimosa pudica: an overview, Pharmacogn Rev. 2012, PMID 23054537

G Muhammad et al – Mimosa pudica, a high-value medicinal plant as a source of bioactives for pharmaceuticals, 2015, ift.onlinelibrary.wiley.com

J Jose et al – Structural characterization of a novel derivative of myricetin from mimosa pudica as an anti-proliferative agent for the treatment of cancer, 2016, Biomed Pharmacother, PMID 27780135

Some cancer signalling marker **inhibitors** – this is not a complete list

MMPs matrix metalloproteinases: doxycycline, bromelain, **curcumin**, **EGCG**, fucoidan, marine red algae/cavalina pilufera, passiflora flavonoids, **Pectasol** (modified citrus pectin, this brand has been used in studies)

Angiogenesis - mainly VEGF vascular endothelial growth factor: apigenin, artemisinin, angelica sinensis, bindweed, broccolini, burdock root (Essiac), **iv vit C**, **curcumin**, **D**, **EGCG**, genistein, ginger, ginkgo biloba, glycyrrhiza glabra, grapeseed extract, Honokiol, lactoferrin, magnolia officinalis, mistletoe, **melatonin**, omega-3, panax ginseng, pomegranate extract, quercetin, resveratrol, **reishi**, rosemary, selenium, salvestrol, scutellaria, soy, shark cartilage (Comitris 30 ml amp sublingual in USA, Douglas labs), **Tetrathiomolybdate** eg 40 mg qid or higher monitor LFTs, with chemoRx (doi.org/10.1038/s41523-021-00313-w, doi.org/10.3892/or.2019.7367)

Some more cancer markers

MDR1 is a resistance marker, reduced by **artemisinin**, **curcumin**, **EGCG**, i3c/dim, flavonoids, genistein, **paw paw extract**, **quercetin**, silymarin

P Wang et al – Overcoming cancer cell drug resistance using natural products, 2015, PMID26421052

p53 is a tumour suppressor gene, the **wild p53 gene needs zinc**; p53 is increased by exercise, **apigenin**, chamomile, artemisinin, ashwagandha, **berberine**, beta-carotene, broccolini/sulphoraphane/cruciferous veg, black seed oil, cordyceps, CBD/THC, **curcumin**, 2-deoxyglucose (inhibits glycolysis *PMID 31533338*) or used with metformin, **EGCG**, vit E, feverfew, ginger, golden seal, genistein, **IP6 gold**, **metformin**, omega-3 (or SPMs specialised proresolving mediators), vitex, resveratrol

Synergy with foods and/or supplements & what to avoid with chemoRx

Piperine (often combined with curcumin) *increases* bioavailability of oral curcumin but may increase *leaky gut*; it inhibits C3A4 (so *not with chemoRx*) & increases CBD/THC

Quercetin dihydrate (Life Extension) *increases* absorption of EGCG & curcumin; but don't use with chemoRx; is a *radiosensitiser* (along with melatonin and curcumin); better IV

Curcumin multiple actions, *synergy* with boswellia (acetyl keto beta boswellic acid) & Honokiol (magnolia lignan/bark); *radiosensitiser*; caution if renal stones; may lower iron (along with low stomach acid, zinc, ALA & EGCG); poor absorption, so IV (special protocol)

Silymarin *synergy* with berberine & curcumin; *reduces cancer stem cells*; caution if ER positive breast cancer (the seeds have less oestrogen) or prostate cancer

Synergy with foods and/or supplements & what to avoid with chemoRx

Berberine multiple actions, **synergy** with curcumin, piperine, silymarin & melatonin; **not with chemoRx**, macrolide a/b or brain injuries

ALA (Dr Burt Berkson) & LDN for pancreatic cancer, he uses high dose ALA (sometimes 400-600 mg iv in am & 100-200 mg again pm same day)

Voltaren 25 mg 2-3 per week with ALA; **increased** bioavailability with piperine but both increase leaky gut risk

Dipyridamole **synergy** with atorvastatin

EGCG (Dr James Morre) 6 times per day, with quercetin, piperine, capsaicin (or chilli guajillo, very hot) & luteolin; EGCG interferes with many drugs even weeks later so **not with chemoRx**; monitor uec, lfts

Synergy with foods and/or supplements & what to avoid with chemoRx

Holy basil (tulsi plant) – oral, stomach, liver, pancreatic, colon, breast, lung, prostate cancer (in vivo, vitro & human studies); radioRx protective or contraindicated with radioRx?

Pterostilbene better absorbed than resveratrol; synergy with tocotrienols, quercetin & melatonin

Apigenin (chamomile, celery) synergy with curcumin & EGCG 300 mg daily as extract

Luteolin multiple actions (like curcumin) – anti-inflam, antiox, antimicrobial, apoptotic, chemosensitiser, cancer prevention, CNS, CVS, diabetes, anti-allergic; 50 mg tds to 6/day

Parsley is high in apigenin & luteolin (but probably not high enough for cancer Rx)

Synergy with foods and/or supplements & what to avoid with chemoRx

Fisetin (strawberry, apple, onion); caution with chemoRx

Tocotrienols – try to take on their own, or with v little tocopherols; synergy with chemoRx

Ashwagandha improves chemoRx fatigue

Lycopene & doxycycline synergy with IV vitamin C

Melatonin – reduces chemoRx fatigue & toxicity *PMID 25503168*

Santhekadur - The dark face of fructose as a tumour promoter, 2019 PMID 32215285

Summary of *some* of the more useful supplements

Berberine

Curcumin – better absorbed & efficacy as IV but a specific protocol

EGCG

Melatonin 20-40 mg tds (does not usually cause sleepiness in the day)

Quercetin – poor absorption, therefore liposomal or IV

Silymarin

Tocotrienols - not just tocopheryl succinate

Paw paw extract alternating with IP6 Gold eg 4-6 months of each?

Compounding pharmacy can be invaluable – better quality supplements, combining products, information especially for injectables

Improving nutrition in inflammatory conditions

Inflammation = element of **catabolism** *Mose (2020) doi.org/10.1371/journal.pone.0241274*

‘chronic critical illness is increasing’ and these patients have ‘persistent inflammation, immunosuppression & catabolism’ *PMID 28284293*

‘inflammation drives allergy, cancer, Alzheimer’s’ & ‘Nrf2...ultimately exerts anti-inflammatory functions’ *PMID 33238435* (excellent description of NF-kB vs Nrf2, involving curcumin, resveratrol, lycopene, luteolin, EGCG, quercetin, naringenin & hesperidin, for the *really* obsessive physicians, ie you lot)

‘Inflammatory disease is catabolic & associated with IR,...lipolysis & protein loss’, in a human experimental model *PMID 33151986*

A major cause of inflammation is **insulin resistance** – up to 85% of Americans? Aussies are expert in imitating American culture *B Bikman – Why we get sick, Intro page xv; Mel Sydney-Smith 30 yrs ago!*

Improving nutrition in inflammation

Avoid or limit the cause eg allergens, toxins etc – GF, DF, egg free (egg is the commonest allergen in my patients); either elimination and rechallenge or IgG test (\$200 - doing the test encourages compliance in my patients).

Control hyperpermeability – zinc carnosine, herbs (*Janet Kim* says don't use slippery elm), *saccharomyces boulardii*, vitamins A, D, melatonin (*J Lieurance – Melatonin, miracle molecule book*)

Improve digestion with pancreatic enzymes, betaine hydrochloride & ox-bile

Improve the microbiota, mainly with a range of prebiotic foods *rather than just probiotics* (*Dr Suzanne Perera*), konjac, lactulose & root vegetables are good sources of fibre; aim for at least 40 grams per day. Pectasol (modified citrus pectin) has multiple actions in cancer – mentioned earlier.

Mediterranean, DASH, Wahl's diet are all anti-inflammatory

Mediterranean diet – much research, most are familiar with this

DASH dietary approaches to stop HT – excessive grains and meal frequency is perhaps excessive?

Mediterranean-DASH combo = MIND Medit-DASH intervention for delaying neuro-degenerative disease has even more green salad and more vegetables

Wahl's diet cheat sheet on Google is worth considering – GF, DF, egg free, organic organ meats; her diet starts with a salad of mixed leafy greens – perhaps those with extremely sensitive constitutions might start with all cooked foods for a few weeks, and after gut healing, begin her diet.

Terry Wahl's cheat sheet > images; also excellent book



Dietary tips must be tailored to the condition eg histamine sensitivity

Omega-3 but **any** seafood is likely to **raise mercury** levels, even the SMASH seafoods (sardines, mackerel, anchovies, salmon and herring); so consider a 3rd-party tested omega-3 supplement, refrigerate after opening as fish oils are easily oxidised

Prawns & scallops are lower in mercury, almost none

fda.gov > mercury levels in commercial fish (1990-2012)

Protein 3 times per day – perhaps controversial (?), but those who restrict meals to 1-2 per day, invariably lose muscle; this might help initially in cancer but **as we age, maintaining lean weight is crucial**. It's one major reason we lose balance, # & die

Complicated, because as we drastically reduce carbs (eg keto), protein may be used up for energy production via the Krebs cycle, **ie muscle catabolism**

0.8-0.9 mg/kg body weight but need to increase this if severely catabolic or exercising regularly eg 4-5 times per week in a gym or running long distances > 10 km daily

Dietary tips

Protein must be balanced by a large **variety** of not commonly eaten vegetables eg squash, egg plant, bok choy, radish, okra, brussels sprouts, artichoke, purple sweet potato

Cooking with a pressure cooker and/or soaking & sprouting reduces lectins

Mustard seeds or powdered mustard **contain the myrosinase enzyme** to enable better digestion of brassicas or eat a small portion of raw brassica with your daily steamed brassicas

Minerals:

Zinc – stress lowers this

Magnesium – stress lowers this

Selenium – low in Aussie soils and Aussie Brazil nuts (Dr Hugh Durham)

Iodine – most of us are low on iodine-loading testing (Dr David Brownstein)

Insulin resistance is one of the *commonest* causes of inflammation & visceral fat

Fructose **is a much bigger danger than glucose for inflammation**

Glucose is stored as glycogen in liver and then muscle **versus** fructose, which is immediately stored as fat

Jessie Inchauspe – Glucose revolution 2022

Lower insulin by reducing see-sawing sugar and insulin levels
ie flattening the curve a la Covid!

Nutrition and inflammation

Ameliorating inflammation by lowering visceral obesity & reducing inflammatory markers

Zoe Harcombe, Ph D in public health nutrition – reduce inflammation by

1 spacing meals eg 4-5 hours between meals, allows insulin to fall and glucagon to rise → this is her proposed mechanism for visceral fat loss

2 no snacking between meals

3 three meals per day

4 reducing carbohydrates by 10% and increasing fats by 10%

Nutrition and inflammation

Most diets result in weight loss & reduction in inflammatory markers *Ge (2020) PMID 32238384*

Following the Harcombe system allows fat loss without lean weight loss

Zoe Harcombe – book, diet & youtube videos

Several of my middle-aged female patients, usually a challenging group, have lost weight & waist by using her suggestions (anecdotal of course)

zoeharcombe.com

The diet fix – Zoe Harcombe

Visceral fat loss and thus inflammation

A recommended protocol:

- 1 Consume fibre first eg vegies or salad (Wahl's green salad) or tabbouleh with olive oil & apple cider vinegar (fibre reduces the glucose & insulin response)
- 2 Protein & fats next eg scrambled egg with oil and parsley, onion, squash, broccoli, asparagus (also an excellent prebiotic) – fats slow gastric emptying, so have them before carbs
- 3 Carbohydrates, sweets or fructose at the end of the meal
- 4 Fibre controls blood sugar swings. Aim for 40 grams or more of fibre per day, mainly from veg (avocado if not histamine sensitive, artichoke, capsicum, green peas, taro) but also from psyllium
- 5 Apple cider vinegar before meals lowers blood sugar & insulin

A Shukla et al PMID 26106234

D Trico et al PMID 27548711

J R Perry et al doi:10.4172/2155-9600.1000476

J Yuan et al PMID 25066659

Jessie Inchauspe – Glucose revolution 2022

Misc tips around inflammation & hyperinsulinaemia & hyperglycaemia

Australians have ever expanding girths and blood sugars; 1 in 5 have bsl over 6.1 (perhaps the new definition of diabetes?) aihw.gov.au > *Aust Nat Diab strategy 2016-20*, diabetesqld.org.au

Excess insulin is a major driver *B Bikman – Why we get sick, BenBella 2020*

> 4.7 mmol/litre & < 3.9 increases health problems *C Park et al PMID 23404299*

Varying blood sugar more damaging to endothelium & oxidative stress than sugar *PMID 27137793*

Fructose increases oxidative stress *R Lustig – Fructose: its alcohol without the buzz PMID 23493539*

Fructose glycates 10 times more than glucose, AGE advanced glycation end products → RAGE receptor for AGE *PMID 28096127*

Miscellaneous tips around inflammation & hyperinsulinaemia & hyperglycaemia

Dietary **fructose** is stored as **fat** *PMID 26856717*

Fructose has more deleterious effects than glucose – increases blood sugar, fatty liver and IR, oxidative damage, possibly addictive? *R Lustig Fructose: its alcohol without the buzz, PMID 23493539*

Hyperglycaemia reduces neutrophil migration, phagocytosis, SOD, microbial killing *PMID 26897277*

Somewhat reluctantly ('due to media reports'), Diabetes Aust now endorses low-carb diets for T2D, little mention of effectiveness *diabetesaustralia.com.au > position statement 2018*

Exercise (or movement), either aerobic or resistance **after** eating, prevents excessive increase in blood sugar & insulin

Summary

1 There is no perfect diet – **individualise** for the patient in front of you and their level of *discipline*

2 In humans, excessive protein restriction leads to **sarcopaenia**, more severe in women than men; undoubtedly, excess protein (especially as red meat) worsens cancer & MetS *PMID 30975545*

Let's not confuse humans with mice! Most studies are non-human

Balance protein (1/4 of the plate) with vegetables and plant foods (3/4 of the plate)

3 Calorie restriction is not protein restriction – different animals *PMID 31431306*,
[https://doi.org/10.1016/0921-8734\(93\)90018-X](https://doi.org/10.1016/0921-8734(93)90018-X)

non-Japanese genes might not respond to restricted diets; Okinawans have high purchasing power, high safety, excellent health care, good climate, little traffic, no pollution and amazing genes. On one quality of life index, Sydney-siders were just 10% below them! *numbeo.com > quality of life comparisons*

no doubt human studies will give us more accurate information

4 I have not mentioned toxicity & inflammation *Dr J Pizzorno - The toxin solution, 2018*

