Nutraceuticals in the Management of Cancer and Chronic Illness

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Nutraceuticals

- Nutraceuticals: Any product derived from food source with extra health benefits in addition to the basic nutritional values found in all foods
- May activate disease-fighting genes and suppress genes that promote disease
- Since each individual has a unique genome, a food benefiting one might *not* create the same effect for another - could even prove harmful

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Anti-inflammatories

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Musculoskeletal INFLAMMATION

- Green Lipped Mussel (Perna canaliculus)
- Glucosamine/Chondroitin
- Methylsulfonylmethane MSM
- Boswellia (Boswellia serrata)
- Deer/Elk Velvet

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Green Lipped Mussel (perna canaliculus)

- Active anti-inflammatory principles:
- Omega 3 fatty acids - eicosatetraenoic acid (ETA) – COX-2 (and COX1) pathway blocker, eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA)
- Glycosaminoglycans – Chondroitin sulphates – stimulate cartilage matrix production, inhibit degradative enzyme in cartilage, prevent thrombus, plaque and fibrin formation in synovial and subchondral vessels
- Amino acids – glutamine, methionine
- Vitamins – E & C
- Minerals – Zn, Mn, Cu
- Dose rates:
  - Loading dose 20 – 40mg/Kg/day x 10 days
  - Maintenance 10 – 20mg/Kg/day
- Note: Active anti-inflammatory properties are destroyed by heat therefore care of added to food products
- Contraindications: Seafood allergy

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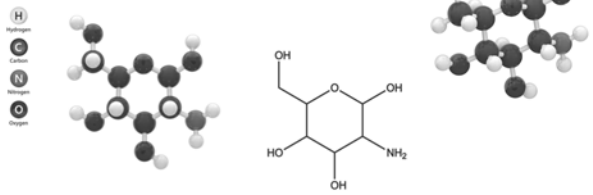
Glucosamine

$C_{16}H_{13}NO_5$



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Glucosamine

- Glycosaminoglycans (GAG's)
  - Long chained protein, sugar complexes
    - Blood plasma
    - Joints
    - Mucous membranes
- Hydrochloride and sulphate
  - HCL used often in animal product – cheaper
  - Sulphate
    - Stabilised with NaCl or KCl therefore care in renal patients
    - Better bioavailability
- Action:
  - Regulates the synthesis of collagen in cartilage
  - Mild anti-inflammatory effects
- Dose rates:
  - 475mg b.i.d. 10-20Kg
  - 712.5mg b.i.d. 20-40Kg
  - 950mg b.i.d. >40Kg
- Adjunctive Chondroitin sulfate dose: 10-30mg/Kg/day
  - Either use as GLM or CS
  - Inhibits destructive enzymes in joint fluid and cartilage
- Contraindications:
  - Dose dependent inhibition of blood clotting
  - Care in diabetics - monitor

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Methylsufonylmethane MSM

- Organic sulphur compound
  - Phytoplankton decay
  - Oxidation of dimethyl sulphide gas
  - High levels in rainwater
    - Plants
- Supplements – often made as a by-product of the paper industry
- Dose Rate: 100 - 250mg b.i.d
- Contraindications:
  - Clotting disorders
  - Diabetes
- Actions:
  - Enhances the anti-inflammatory activity of cortisol
  - Improves cellular uptake of key nutrients Vits B, A, C, D, E, amino acids, selenium, calcium, magnesium, Co Enzyme Q10
  - Strong antioxidant
  - Antiparasitic
  - Improves cellular glucose uptake
  - Component of Insulin

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Boswellia (Boswellia serrata)

- Burseraceae: balsamiferous trees and shrubs
- Boswellic acids:
  - anti-inflammatory, antiarthritic, immune-modulating, anticancer
  - Improves cell mediated immunity
  - Blocks synthesis of 5-lipoxygenase production (inflammatory mediators)
  - Reduce degradation of glycosaminoglycans
- Dose rate: 150 – 200mg b.i.d.

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Deer/Elk Velvet

- Cartilage growth phase of the stag antler
  - Harvested under nerve block
  - Ethical issues
- Active agents:
  - Collagen
  - GAG's
  - Glycoproteins
  - Growth factors
  - Morphogenic factors
  - Minerals
- Recorded effects:
  - Relief from the pain and swelling associated with arthritis,
  - Increased energy levels and vitality,
  - Improved stamina, muscle strength and endurance,
  - Reduced recovery and healing times,
  - Restore bone mass and support joint function,
  - Stimulation of the immune system,
  - Improved blood circulation and mental alertness.
- Dose rate: 250mg/20Kg bw s.i.d.

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Others to consider

Turmeric (curcumin)

Antioxidant, anti –inflammatory

King of Bitters (*Andrographis paniculata*)

Roots – diterpenoid lactones: Anti-inflammatory, antioxidant, immune modulatory, cytotoxicity, anti-angiogenic

Nettle Leaf

Pain, arthritis, allergy - hox alpha suppresses various inflammatory cytokines

Lipophilic dichloromethane (DCM) extracts

Nuclear factor kappa beta pathway inhibition

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Turmeric (Curcuma longa)

- Actions:
  - Anti-oxidant (anti-aging)
  - Anti-Inflammatory
  - Anti-Angiogenic
  - Anti-Carcinogenic
  - Anti-Apoptotic (preventing cell death i.e. from radiation)
  - Anti-Metastatic (inhibits the over-growth of cells)
  - Anti-Diabetic
  - Cardiovascular Protection; Lower LDL (bad) Cholesterol
  - Immuno-modulatory (immune system enhancing)
  - Neuro-Protective (protects the Central Nervous System – CNS)
- Contraindications:
  - Increased risk of bleeding for animals on blood thinners
  - Caution around surgery due to increased bleeding risk
  - Care if used with NSAID's – may need to reduce the dose
  - May interfere with antacids
  - May increase the effect of blood pressure lowering drugs
  - May stimulate the uterus therefore not recommended during pregnancy
- Dose rate:
  - 95% Liposomal curcumin 500mg s.i.d. 20 – 40 Kg. (b.i.d for giant breeds)
  - Reduce the amount given for smaller dogs

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Fatty Acids (ALA, EPA, DHA)

Anti-inflammatory

Avocado/Soybean Unsaponifiable (ASU)

Blocks pro-inflammatory chemicals, helps regenerate connective tissue, prevents deterioration of synovial cells

Sprouted Seeds

Reduces starch in grains, improves diet- readily available nutrients – sulforaphane – anticancer activity

Licorice

helps leaky gut and adrenal fatigue

General foods to consider within a treatment plan

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Green (or Black) Tea Leaf Extract

Anti-inflammatory , anti-microbial - NF kappa beta pathway inhibition

DLPA (D L phenylalanine)

Essential amino acid for bone and muscle pain; endorphin stimulant

Milk Thistle/ SAMe (s-adenosyl L methionine)

Liver cleansing – methylation pathway – cell membrane and hormone

Maintenance – anti-inflammatory in osteoarthritis/fibromyalgia (NOT with antidepressants)

Dietary Vegetables

Green leafy/yellow orange, reduce cancer risk

Transfer Factor (Bovine Colostrum; Egg)

Immune modulation

Yucca root

Gluten-free starch

Others to consider

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Nutraceuticals to consider for Cancer Cases

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L-Arginine

- Critical role in collagen and urea synthesis
- Stimulates the release of certain hormones e.g. insulin like growth factor
- Modulates immune function e.g. lymphocytes have a requirement for arginine
- Promotes wound healing therefore particularly useful in post surgical excision cases

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Glutamine

Glutamine and cancer: cell biology, physiology, and clinical opportunities

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Glutamine is an abundant and versatile nutrient that participates in energy formation, redox homeostasis, macromolecular synthesis, and signaling in cancer cells. These characteristics make glutamine metabolism an appealing target for new clinical strategies to detect, monitor, and treat cancer. Here we review the metabolic functions of glutamine as a super nutrient and the surprising roles of glutamine in supporting the biological hallmarks of malignancy. We also ... and therapeutics to exploit tumor cell glutamine dependence, ... in this arena, and suggest a disease-focused paradigm to deploy

Glutamine metabolism acts as a central player in the regulation of uncontrolled tumour growth by modulating bioenergetic and redox homeostasis and serving as a precursor for biomass synthesis.

Cancer cells are addicted to glutamine

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When to give GLUTAMINE

Summary of Applications of Glutamine

The potential applications for orally administered glutamine include:

- all wasting syndromes;
- cancer patients undergoing chemotherapy;
- inflammatory bowel diseases, especially of the small intestine (e.g., Crohn's disease);
- persons with wounds that are still healing (e.g., burns, injuries, surgeries); and
- persons with low muscle mass and chronic immune weakness revealed by frequent infections (note: glutamine administration is not intended to replace the recommendation for muscle-building exercise).

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Antioxidants including vitamins A, C and E, betacarotene and lutein

- Chronic oxidative stress with formation of reactive oxygen species, especially when antioxidant capacity is inadequate, has been hypothesised to contribute to DNA damage, malignant transformation, and eventual tumour development in numerous species
- Little is known about the potential anti-neoplastic effect of antioxidant supplementation in pet cats and dogs
- Support mitochondrial function

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Medicinal Mushrooms

Anti-Cancer

- Trametes versicolor
- Ganoderma lucidum
- Cordyceps militaris
- Lentinula edodes
- Grifola frondosa
- Chaga

Other properties

- Immune modulation
- anti-microbial
- anti-diabetic

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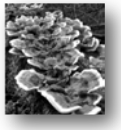
Trametes versicolor

(Yun Zhi) also knowns as Corioulus versicolor



- Certain mushrooms contain different classes of biologically active compounds with strong immune-modulating and anticancer properties
- Polysaccharopeptides (PSP) and protein-bound polysaccharides (PSK, also known as Krestin) were found to have the strongest biological activity
- PSP and PSK can inhibit the proliferation of leukaemia, lymphoma, hepatoma, breast, lung and prostate tumour cell lines

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T.versicolor cont...

- Stimulate both humoral and cell-mediated immune responses
- Increase the synthesis of interferon (IFN)-c and interleukin (IL)-2
- Enhance T-cell proliferation
- Stimulate macrophage-derived nitric oxide production
- Counteract the immuno-suppression induced by cytotoxic drugs
- Consider mixed mushroom products e.g. reishi, mitake, Shitake +/- Transfer Factor

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Other Supplements to Consider

- Noni Juice
  - Morinda citrifolia
  - Antiproliferative activity
- Essiac Tea/Flor Essence
  - Burdock Root, Sheep Sorrel, Rhubarb Root, Slippery Elm Bark, Red Clover Firs
  - Contentious reports
  - Anticancer effect/antiinflammatory
- Turmeric (Curcumin)
  - Anti-inflammatory, anti-proliferative effects in cancer cell lines - p53 pathway activity
  - 80mg/Kg/day
- IP6
  - Inositol hexaphosphate (phytic acid, or phytate)
  - Poly-phosphorylated carbohydrate found in all cells
  - Reduces cell proliferation/increases differentiation of malignant cells
  - Breast, colon, liver
- Shark Cartilage
  - Apoptosis
  - Ethical issues

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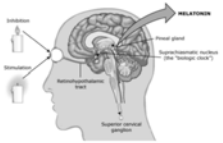
Cont..

- Fractionated Pectin
  - Modified citrus extract
  - Prevents metastasis
- CV247
  - John Carter - Licensed product
  - Sodium salicylate, manganese gluconate, ascorbic acid
- Melatonin
  - When on chemo/radiotherapy
  - 20mg at night



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Cont...

- Quercitin
  - Down regulates mutant p53
  - Suppresses RAS gene expression
  - Potentiates Chemotherapy
- Pau D'Arco
  - Tabehuia impetiginosa
  - Lapachol derivatives (napthoquinones)
  - Anti-inflammatory, anticancer effects
  - NB: Blood thinner – not in surgical cases

Pao D'Arco

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And yet more.....

- Apricot Kernel Oil - Laetrile
- Amagdylin
- B17
  - Contains glucose, benzaldehyde and cyanide
  - Cancer cells - betaglucosidase - enzyme - releases the chemicals – cell destruction

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Hunnan Baiyao

- Chinese herbal formula
- Possibly: Tienchi ginseng root, ajuga forrestii, chinese yam root, Dioscorea nipponica makino root, Geranium wilfordii, Erodium stephanianum, Innula cappa etc.
- Used to stop bleeding, promote wound healing and relieve pain
- Primary effect believed to be on platelet function
- Dog: 250mg/10Kg once to twice daily
- Can be used locally on bleeding wounds
- NOT IN PREGNANCY

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Apocaps

- ➨Apoptogen Formula - helps to support normal apoptosis levels + partially inhibits COX, LOX, angiogenesis and mitosis
- ➨Supports the liver and immune system
- Mixed Product:
  - Vitamin C
  - Luteolin
  - L-Glutamine
  - Apigenin
  - Taurine
  - Ginger Root extract
  - Milk thistle
  - Turmeric
  - Beta Glycans
- AVOID WITH STEROIDS OR NSAID's

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Warning!!!!

- ➨The temptation for clients and some practitioners is to throw every supplement with a possible cancer action at every cancer case
- ➨STOP
- ➨The supplements need to be selected carefully depending upon the cancer that you have in front of you
- ➨The supplements must not compete with each other
- ➨EXTRA CAUTION in chemo and radiotherapy cases as many will alter the way these agents work either in a positive or negative way

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