

## Functional Herbal Therapy and Cancer: Module 3

# The Role of Herbs in Supporting the Cancer Patient During Conventional Treatments



## Module 3.1: The Best Diet for the Cancer Patient

### An optimized ketogenic diet

This diet is especially helpful when the patient is undergoing conventional treatments to kill cancer cells, as it is aimed to make them more vulnerable by depriving them of key nutrients.

A vegan ketogenic diet is preferable because animal protein is rich in amino acids that stimulate growth factors such as IGF-1. In addition, cancer cells have an insatiable appetite for certain amino acids, and their survival often depends on a ready supply. Key ones identified include glutamine, asparagine, serine, methionine and branched-chain amino acids (BCAAs). These are all found in higher levels in protein-rich animal foods like beef, chicken, fish, dairy products and eggs.

### Key elements of the diet are:

1. Coconut as milk, cream, oil, yoghurt
2. Vegan protein powders: hemp, pea, brown rice, chick pea
3. Medium chain triglycerides (MCTs): 30-40 g/day
4. Flaxseed (linseed) oil; virgin olive oil
5. Nuts with less than 10% net carbohydrates: macadamias, pecans, walnuts etc; nut milk and cheese made from these
6. Hummus with a low carbohydrate level
7. No grains, sugar or legumes other than for 2, 6 and 10
8. No starchy vegetables: potato, sweet potato, pumpkin etc
9. Only berries as fruit: raspberries, blackberries and strawberries
10. Tempeh and/or tofu but **not** seitan

### With emphasis on these important phytonutrients:

1. Foods rich in carotenoids: dark green leafy vegetables, tomatoes, avocados
2. All the elements of the microcirculation diet (low sugar version: no blueberries or sugar from chocolate)
3. Foods rich in flavonoids: onions, chamomile tea

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4. Mushrooms of all kinds, especially as soup
5. Foods rich in anthocyanins: berries, purple vegetable varieties
6. Foods rich in phytochemicals: coffee, tomatoes, peppermint tea
7. Cruciferous vegetables: broccoli, kale, cabbage
8. Plenty of fiber from multiple sources, which will follow from the above

### The basic energy breakdown of the diet should be as follows:

For 2000 Calories per day:

- Fat (70-75%) 1400-1500 Calories = 126-135 g
- Protein (15-20%) 300-400 Calories = 75-100 g
- Carbohydrates (10%) 200 Calories = 50 g

### In addition, supplement with:

#### Mandatory:

1. EPA (can be from fish oil, because the recommended diet is vegan to specifically avoid animal protein, and this is not present in fish oil), evening primrose oil
2. **NO** amino acids from supplements!

#### As needed:

1. Vitamins B12, B6 and D3
2. Iron and zinc
3. Bitter herbs (gentian, wormwood and feverfew), cholagogue herbs (peppermint, globe artichoke) and cholaretic herbs (globe artichoke, dandelion root): to help cope with the extra dietary fat

#### Fall-back position:

Not every patient will be able to achieve this diet, so there will still be benefit from observing the following:

1. Low-carbohydrate diet
2. Reduced animal protein (flexitarian diet)
3. Diet high in the key phytonutrients above
4. Fasting before chemotherapy (see Module 3)

## Module 3.2 – Avoiding the Potential for Harmful Interactions

Adverse herb-drug interactions (HDIs) can be classified according to the type of interaction:

Number of hallmarks targeted by phytochemical:

1. **Pharmacokinetic interactions (PKI):** the herb changes the absorption, metabolism or excretion of the drug, leading to altered activity (increased or diminished)
2. **Pharmacodynamic interactions (PDI):** the pharmacodynamic effects of the herb add to or subtract from the pharmacodynamic effects of the drug, leading either to altered activity (up or down) and/or increased side effects

Potential adverse HDIs can be classified according to the degree of evidence:

1. **Confirmed** from clinical observation and studies, for example St John's wort and digoxin
2. Attributed from **clinical reports**
  - a) probable
  - b) possible
  - c) unlikely
3. **Speculated** from the pharmacology of the herb and the drug:
  - a) probable – based on confirmed pharmacological properties of the herb in humans, for example licorice and potassium loss
  - b) possible – based on possible pharmacological effects of the herb in humans
  - c) speculative – based on pharmacological effects from animal research involving oral doses that reflect human doses
  - d) highly speculative – based on pharmacological properties of the herb or its constituents identified by:
    - in vitro* research
    - animal research given by injection
    - animal research involving unrealistically large oral doses
4. **Inaccurate** or misleading: based on mistaken assumptions about the herb, its phytochemistry, the plant part used, or its pharmacological effects

### Which HDI risks are real?

HDI risk can be confirmed either from repeated clinical observations or controlled clinical studies. They might also be attributed from one or two clinical reports, especially if they have been carefully analyzed and have a biological plausibility.

Hence, based on the above classification, 1 and 2a have the highest relevance, but then only if the interaction might cause harm. So, this is a RED classification for 1 and 2a. Next in line are 2b and 3a, which are an AMBER classification. All others are GREEN until further information, including your observation of the specific patient. In other words, a watchful GREEN.

### From an expert opinion review of HDI risk during chemotherapy:

- Ginkgo and garlic can be co-administered safely (although caution with both as they are Nrf2 primers, see below)
- Therapies with CYP2C9 substrates (warfarin) should be closely monitored with ginseng
- Echinacea may be a problem for CYP3A substrates with narrow therapeutic index
- Co-administration of St John's wort with substrates of CYP3A, CYP2C9 or P-gp: **strictly avoided**
- Might be advisable to pause herbal therapies during chemotherapy

### The most important consideration

Important cytoprotective pathways are upregulated in cancer cells, making them more resistant to cytotoxic therapies. Pathways or mechanisms include Nrf2, sirtuins and autophagy/mitophagy.

It is **very important** to avoid herbs that might upregulate these pathways during conventional killing therapies, or herbs that might protect key cell structures such as mitochondria. Upregulation of these protective pathways might impair the effects of conventional therapies and encourage the formation of resistant cells, thereby adversely influencing clinical outcomes.

Given a) that there is a huge diversity in cancer cells, even within an individual person, b) the majority of potential HDIs have not been well studied for chemotherapy, and c) tumor cells use upregulated cellular protection to survive chemotherapy, most herbs are best avoided in the 24 to 48 hours either side of pulsed chemotherapy. However, there are a few key exceptions.

### Module 3.3 and 3.4 – Key Herbs During Conventional Cancer Treatment

1. Ginseng (survival, QoL, fatigue)
2. Gynostemma (survival, QoL, immunity, lowers metastasis risk)
3. *Coriolus (Trametes) versicolor* (PSK) (survival, QoL, immunity, fatigue)
4. Reishi, shiitake and maitake (survival, QoL, immunity)
5. Astragalus and associated traditional formulations (survival, QoL, immunity)
6. Ginger (CINV, QoL, fatigue)
7. Bioavailable curcumin (CINV, QoL, fatigue, survival, lowers inflammation)
8. PHY906 with Baical skullcap, licorice, *Paeonia lactiflora* and the Chinese date (CINV, QoL)

9. Milk thistle (reduces liver damage from drugs)
10. Echinacea root (cannabinoid effects, immunity)
11. Ginkgo (lowers PAF-driven inflammation, protects against doxorubicin cardiotoxicity)
12. Injected mistletoe (QoL, survival?)

## Module 3.5 – Herbs and Chemotherapy

### Fasting Before Chemotherapy

1. Only advise if the patient is robust and not malnourished, emaciated or underweight
2. Suggest fasting for 36 hours before and 24 h after chemotherapy treatments
3. Another alternative to complete fasting would be to suggest a fasting-mimicking diet for three days around chemotherapy, as per above
4. If that is too difficult, then recommend a tolerable level of calorie restriction in this time frame.

#### 1. Improve the tumor microenvironment (TME):

##### a) lower TME pH

- Sodium bicarbonate 5 g in water twice a day
- An optimized ketogenic diet

##### b) reduce TME tissue stiffness

- Horsechestnut, butcher's broom, possibly grape seed extract

##### c) reduce TME hypoxia

- Microcirculation diet (low sugar version)
- Ginkgo, ginger, garlic, curcumin, Dan Shen, Coleus

#### 2. Render cancer stem cells more vulnerable:

##### a) reduce nutrient supply

- Short-term fasting...and at other times...
- The optimized ketogenic diet

##### b) impact key signalling pathways

- Curcumin, resveratrol, green tea, pomegranate extract, artemisinin, broccoli sprouts, Korean ginseng, licorice

##### c) enhance immune surveillance

- Three-way mushroom immune therapy
- Echinacea root and Astragalus

### 3. Reduce the risk of metastasis:

#### a) reduce metastasis-promoting inflammation

- Curcumin, Boswellia and Ginkgo (role of PAF)

#### b) improve vascular integrity and blood quality

- Grape seed, bilberry, green tea, curcumin
- Ginger, curcumin, garlic, Dan Shen, Coleus

#### c) enhance immune function

- Three-way mushroom immune therapy
- Echinacea root and Astragalus

### Summary approach for outcome-influencing strategies using herbs during conventional chemotherapy (removing overlaps)

#### Lower TME pH

- Sodium bicarbonate
- An optimized ketogenic diet and short-term fasting or fasting-mimicking diet

#### Reduce TME tissue stiffness

- Horsechestnut, butcher's broom

#### Improve circulation and oxygenation

- Microcirculation diet (low sugar version)
- Ginger, garlic, Dan Shen, Coleus, celery seed
- Grape seed, bilberry

#### Impact key signalling pathways

- Resveratrol, green tea, pomegranate extract, artemisinin, broccoli sprouts, Korean ginseng, licorice,

#### Enhance immune surveillance

- Three-way mushroom immune therapy
- Echinacea root and Astragalus

#### Lower inflammation

- Bioavailable curcumin, Boswellia, Ginkgo (anti-PAF)

## Useful combinations for above outcome-influencing strategies using herbs during conventional chemotherapy

- Horsechestnut, butcher's broom, grape seed
- Echinacea angustifolia root and Echinacea purpurea root
- Reishi, shiitake and possibly maitake
- Boswellia, turmeric, ginger and celery seed
- Korean ginseng, Ginkgo, Fallopia (resveratrol), silymarin, grape seed

## Before, during and after chemotherapy

Note, while the following is optimal, it may not be always be practical in its full form due to cost and compliance. If this is the case, then prioritize according to the patient's needs and history.

### Before chemotherapy commences (ideally one month prior):

- Commence diet, preferably an optimized ketogenic diet
- Start liquid herbal blood cell, mitochondrial support formula (see below for example)
- Start 3-way mushroom therapy
- Start sodium bicarbonate
- Consider Horsechestnut, butcher's broom, possibly grape seed extract
- Just prior to chemotherapy, commence short-term fasting as outlined above
- Example blood cell, mitochondrial support formula (can instead use tablets to approximate this approach):

Codonopsis	1:2	30 mL
Withania	1:1	20 mL
Astragalus	1:2	40 mL
Korean Ginseng	1:2	<u>20 mL</u>
		110 mL

Dose 8 mL with water 2 to 3 times a day

## During ongoing chemotherapy

### 24 to 48 hours either side of intravenous doses

- Continue optimized ketogenic diet, except for the fasting period
- Herbal liquid blood cell, mitochondrial support formula or equivalent in tablet form
- 3-way mushroom therapy
- Sodium bicarbonate
- Milk thistle as an option to protect the liver
- Ginger for nausea, and can continue as needed
- IN GENERAL NO OTHER HERBAL TREATMENTS

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## Between chemotherapy doses

- Continue diet, preferably optimized ketogenic
- Continue herbal liquid formula or equivalent in tablet form
- 3-way mushroom therapy, plus Echinacea root
- Sodium bicarbonate
- Milk thistle as an option to protect the liver
- Bioavailable curcumin
- **Other aspects of outcome-influencing strategies already flagged and not covered in the above, especially:**
- Ginkgo to protect against metastasis
- Resveratrol, green tea, pomegranate extract, artemisinin, broccoli sprouts and licorice for key signalling pathways
- Boswellia for inflammation
- Reduce TME tissue stiffness with Horsechestnut, butcher's broom
- Improve circulation and oxygenation with the microcirculation diet (low sugar version) and by selecting from Ginger, garlic, Dan Shen, Coleus, celery seed, Grape seed and bilberry

## After chemotherapy has stopped, continue the following for 4 to 6 weeks:

- Continue diet, preferably optimized ketogenic
- Herbal liquid formula or tablet equivalent
- 3-way mushroom therapy, plus Echinacea
- Sodium bicarbonate
- Milk thistle as an option to protect the liver
- Bioavailable curcumin
- **Other aspects of outcome-influencing strategies already flagged and not covered in the above, especially:**
- Ginkgo to protect against metastasis
- Resveratrol, green tea, pomegranate extract, artemisinin, broccoli sprouts and licorice for key signalling pathways
- Boswellia for inflammation
- Reduce TME tissue stiffness with Horsechestnut, butcher's broom
- Improve circulation and oxygenation with the microcirculation diet (low sugar version) and by selecting from Ginger, garlic, Dan Shen, Coleus, celery seed, Grape

## Then after this 4 to 6-week period has finished, continue with:

- Diet, preferably optimized ketogenic
- Stop PSK, but continue other two aspects of mushroom therapy, plus Echinacea root
- Sodium bicarbonate
- Ginkgo to protect against metastasis and lower inflammation
- Consider other anti-inflammatory herbs, especially Boswellia and willow bark
- Pulsed anti-stem-cell therapy (see below), OR otherwise continuous bioavailable curcumin

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## Pulsed anti-stem-cell therapy

- Cycle of 5 to 7 days **ON** and 5 to 7 days OFF
- For the “on” days: bioavailable curcumin 600 to 800 mg/day
- AND Artemisia annua delivering artemisinin 240 to 320 mg/day
- AND Polygonum (resveratrol), Korean ginseng and others like extra Ginkgo, green tea, pomegranate extract

## Module 3.6 – Herbs and Other Cancer Therapies

### Herbs and surgery

#### **Surgery for cancer represents an underestimated clinical opportunity:**

Surgery likely encourages cancer metastasis, probably due to a range of factors including increased inflammation, a prothrombotic state and a stimulated healing response (providing a growth stimulant to tumor cells). While herbs should be used in the obvious way to support the patient through the stresses of anesthesia and going under the knife, they also represent an opportunity to help reduce the risk of future recurrence and metastasis.

#### **Objectives for surgery support:**

1. Reduce the potential negative impact of anesthesia and analgesics with milk thistle/silymarin (see below for protocol) and anti-inflammatory herbs (see 2 immediately below)
2. Reduce the inflammatory aftermath of surgery: bioavailable curcumin, Ginkgo (PAF) and willow bark (all taken for 4 to 6 weeks after surgery)
3. Reduce the procoagulant, prothrombotic effect of surgery with ginger, curcumin, garlic, dan shen or Coleus (all taken for 4 to 6 weeks after surgery)
4. Support immunity with 3-way mushroom therapy (throughout), Echinacea root, Astragalus (both after)
5. Assist with side effects such as nausea: ginger, Korean ginseng (both after)
6. Promote healing, but without stimulating the cancer: Ginkgo (after) and the microcirculation diet protocol (throughout); probably best to avoid gotu kola, but this is a theoretical concern
7. Also, aspects of the TME, CSC and metastasis reduction protocols (as per previous) as appropriate

### **Milk thistle protocol for general anesthesia**

Start the herb (in concentrated silymarin extract tablet form) about three weeks prior to surgery. Advise to continue taking it right up to the day before surgery and then to pick up right where they left off as soon as possible afterwards.

Dosage depends on the anticipated length of the procedure (and the time under general anesthesia). For surgery up to two hours, recommend 600 mg a day, and to continue taking it for four weeks after surgery. If the surgery takes between two and four hours, suggest taking 800 mg a day, and then continuing that dose for six weeks after surgery. And for surgery more than four hours long, still recommend taking 800 mg a day, but continue that dose each day for two to three months post-surgery.

### Key herbal support during radiotherapy:

1. Reduce the potential negative impact and side effects of radiation by judicious use of adaptogens and radioprotectants, including Ginkgo (before and after, but not during), berberine e.g. from Phellodendron (during), Eleuthero and Astragalus (both throughout)
2. Reduce the inflammatory aftermath of radiotherapy with bioavailable curcumin (high dose, after), and Ginkgo and Boswellia (both after)
3. Employ a safe radiosensitizer, for example bioavailable curcumin (low dose, during)
4. Support immunity with 3-way mushroom therapy, Echinacea root and Astragalus (all throughout),
5. Finally, aspects of the TME and metastasis reduction protocols, as per above, with herbs not already covered in 1 to 4

### Key herbal support during immunotherapy drugs:

1. Encourage a healthy gut microbiome with abundant dietary fiber and the bowel flora protocol (see Module 2.4)
2. Support immunity with Echinacea root, 3-way mushroom therapy and Astragalus
3. Aspects of the TME, CSC and metastasis reduction protocols (see previously), but especially bicarbonate, microcirculation support (Ginkgo and gotu kola), bioavailable curcumin