



2020 Edition

Foods that Fight Fatigue

Foods that Fight Chemotherapy Related Fatigue

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1 Introduction

Fatigue can be separated into physical fatigue, mental fatigue, and emotional fatigue. Food and nutrition can reduce fatigue in each of these categories.

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Ask yourself four questions:

1) Are you eating enough calories?

BMR x A = daily calories

2) Are you drinking enough water?

Fluid loss of 1.36% after exercise impaired mood and concentration.

64oz daily, although this depends on many factors.

3) Do your drinks contain electrolytes?

4) Are you skipping meals?

Steady blood sugar reduces fatigue, increases concentration and mood.

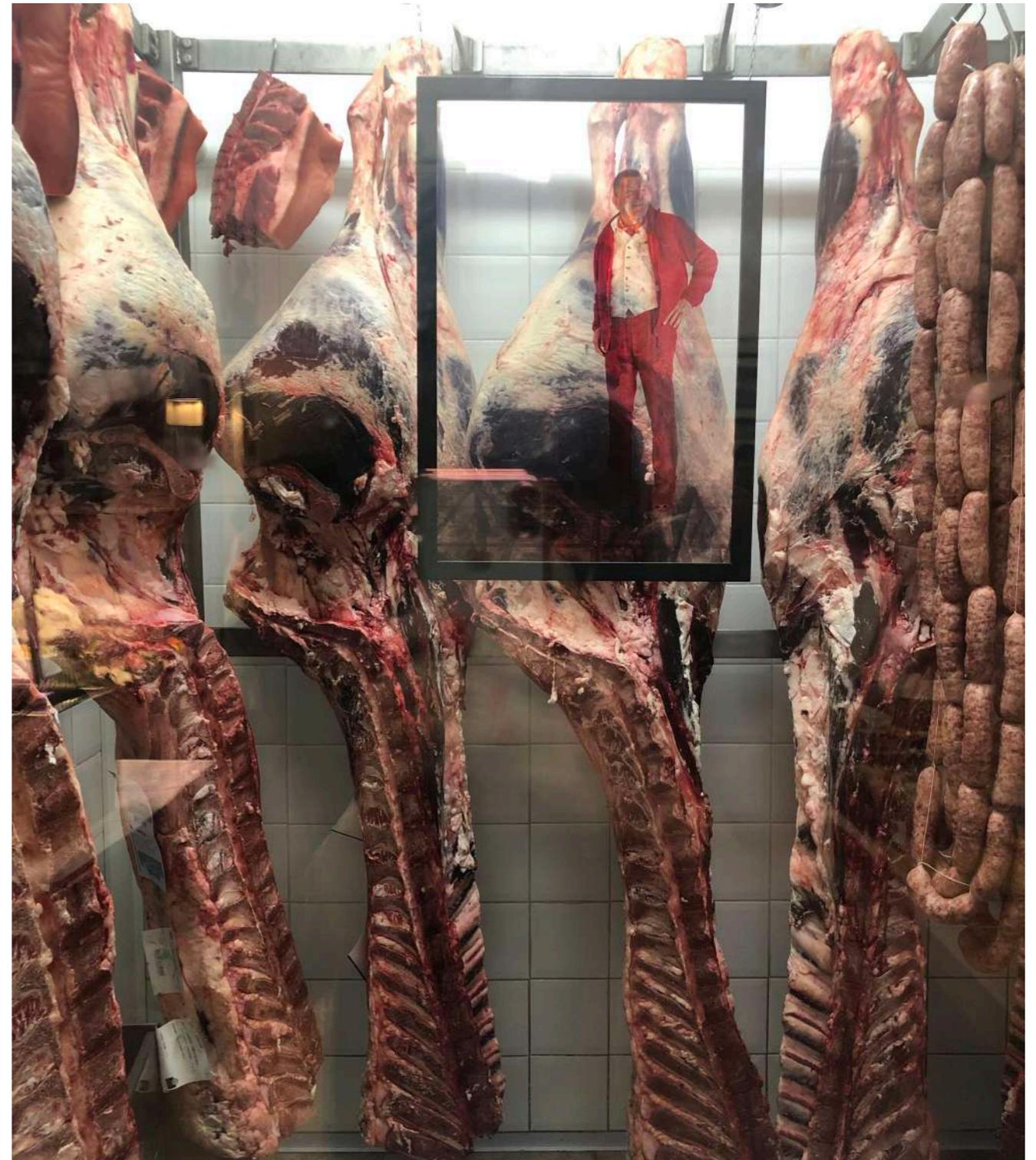
1.1 Chemotherapy damages the mitochondria

Chemotherapy- induced adverse side effects are, in many cases, mediated by mitochondrial damage. The most feared and studied side effect of chemotherapeutic drugs is cardiotoxicity. Also, skeletal muscle physiology impairment has been recorded after many chemotherapeutical treatments.

The heart has more mitochondria than any organ in the body!

Mitochondrial damage includes the impairment of the electron transport chain and the loss of mitochondrial membrane potential with subsequent disruption of cellular energetic.

Girini et al, Oxid Med Cell Longen 2018



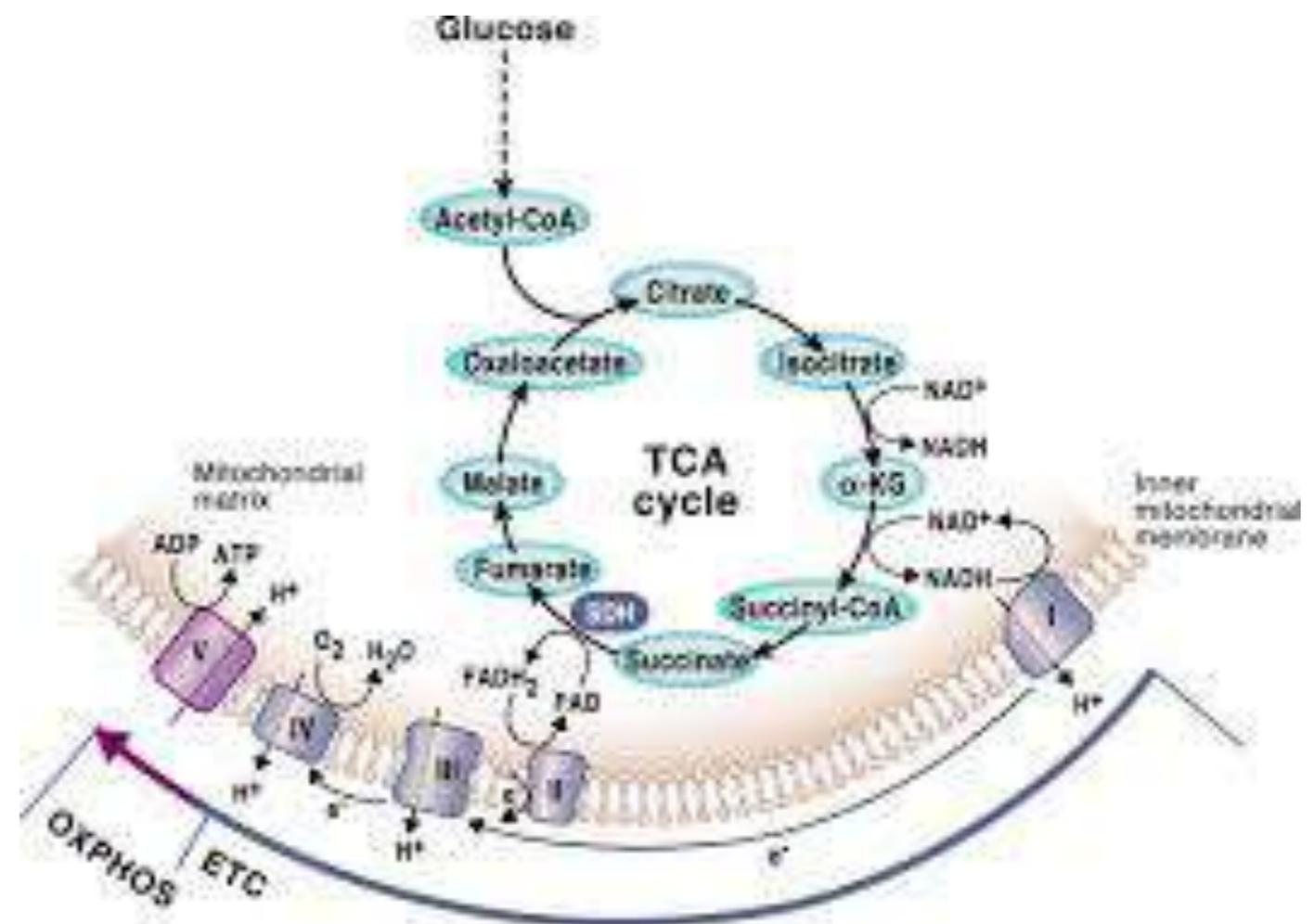
2 How energy is made in the body

Our body runs on an energy unit called ATP, adenosine triphosphate.

Energy, or ATP is made through three pathways in the body: glycolysis, TCA cycle, and beta-oxidation.

Two of these processes take place in the mitochondria, which is an organelle in the cell responsible for generating most of the cell's energy.

The mitochondria houses the electron transport chain, which is made up of complex I, complex II, complex III and complex IV. These complexes rely on the vitamins and minerals as cofactors to produce energy.



3 Foods that nourish the mitochondria

Complex I: Flavin (vitamin B2), CoQ10

Complex II: Iron, CoQ10

Complex III: CoQ10

Complex IV: Copper, iron

Vitamin B2: almonds, asparagus, beef, milk

CoQ10: chicken, beef, pork, fatty fish, spinach, broccoli, soybeans, whole grains

Iron: beef, liver, Nettle leaf tea, beets, spinach

Copper: asparagus, dark chocolate, dark leafy greens, lentils, beef, mushrooms, nuts and seeds

What does this mean?

Diversify your diet to include nuts and seeds, different kinds of meat, and a variety of fresh fruits and vegetables in your daily diet.



3.1 Mitochondria is vulnerable to oxidative stress

Foods rich in anti-oxidants are generally fresh, organic, and colorful.

Examples of anti-oxidant rich foods:

Beets

Strawberries

Raspberries

Tomatoes

Carrots

Yellow bell peppers

Green tea

Blueberries

Blackberries

Eggplant

What does this mean?

1) Aim for 3-5x cups of fruits and vegetables daily

2) Drink 1x cup of green tea daily





The brain uses around 20% of the energy produced in the body.

We know that brain function, including concentration, memory, and mood can be part of the fatigue.

Phosphatidylcholine (PC) is a phospholipid and is the most abundant lipid of brain mitochondria. PC can be found in eggs, beef liver, beef and soybeans.

Omega-3 fatty acids support synaptic plasticity and seem to positively affect the expression of several molecules related to learning and memory that are found on synapses.

What does this mean?

- 1) Eggs daily
- 2) Include 2-3 x servings of fish each week

4.1 Foods that fight inflammation



The Mediterranean diet is a highly anti-inflammatory diet, and is associated with a reduced risk of dementia and depression. There is emerging evidence supporting protective roles for omega-3 fatty acids, polyphenols, vitamin D and B vitamins.

Anti-inflammatory foods: herbs and spices, such as turmeric, low refined carbohydrate, salmon

Vitamin D: mackerel, salmon, egg yolks, beef liver, tuna

Vitamin B12: beef, liver, chicken, salmon, clams, yogurt, eggs

Vitamin B6: pork, chicken, turkey, fish, wholegrain, eggs, soy beans

Folate: asparagus, broccoli, spinach, eggs, avocados, banana, beets

What does this mean?

Diversify your daily diet!

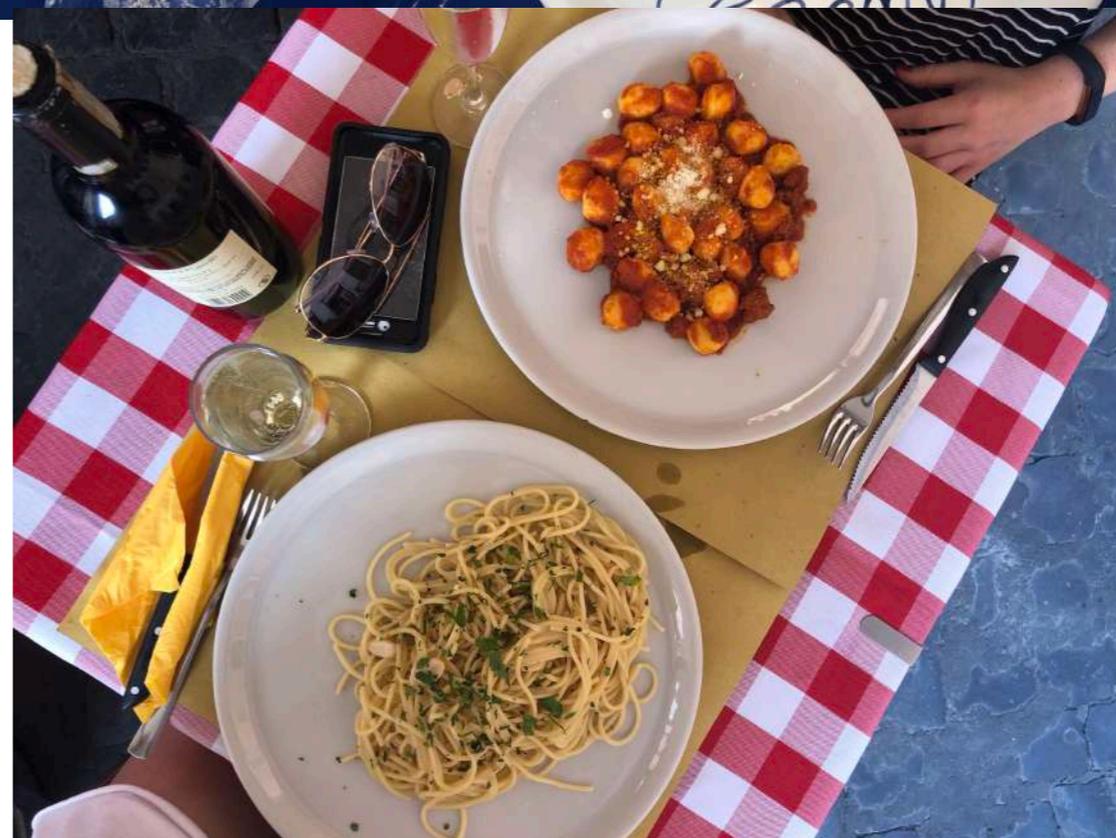
Food coma happens when you eat a full meal and often a big meal with a lot of refined carbohydrates, causing blood sugar to rise rapidly.

A quick rise in blood sugar means the potential of a quick drop in blood sugar. This dip can cause symptoms of hypoglycemia or feelings of sleepiness and fatigue.

To avoid this phenomena, learn to combine foods that are high in carbohydrates with foods high in fat, protein, and fiber.

What does this mean?

- 1) Healthy fat should make up 20-35% of daily calories.
- 2) Aim for 1 gram of protein per kilogram of weight, for someone who is moderately active.
- 3) A general guideline for fiber intake is ~ 14 grams of fiber for every 1000 calories.



6 Quality of the food

1) Organic and non- GMO foods have:

- 1) Less exposure to pesticides
- 2) Increased vitamin C, minerals, antioxidants, and phytonutrients
- 3) More fresh because of no preservatives

2) Buy animal products free of antibiotics and growth hormone

3) Only drink filtered water

What does this mean?

Limit exposure of pesticides (inflammation) + increase excretion (clean water) = more energy



6.1 Dirty dozen- www.ewg.org



1. Strawberries



2. Spinach



3. Kale



4. Nectarines



5. Apples



6. Grapes



7. Peaches



8. Cherries



9. Pears

6.1 Clean 15- www.ewg.org



1. Avocados



2. Sweet Corn*



3. Pineapple



4. Onions



5. Papaya*



6. Sweet Peas Frozen



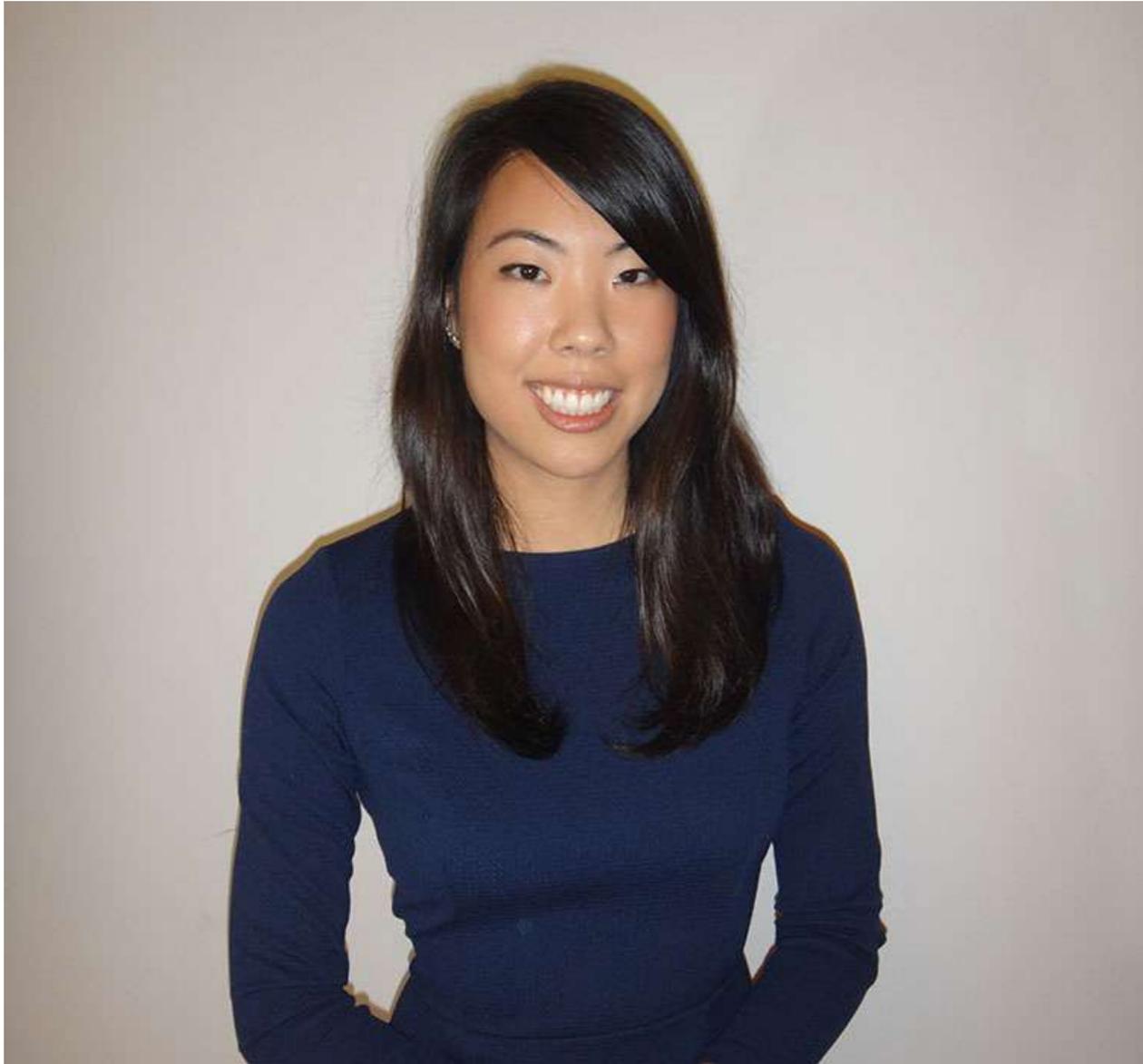
7. Eggplant



8. Asparagus



9. Cauliflower



1. Shiitake mushroom
2. Salmon
3. Eggs
4. Green tea
5. Macadamia nuts

Questions?

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