Importance of Nutrition & Inflammation in MPN

MPN Horizons Conference

Paris 16-18 Oct 2026

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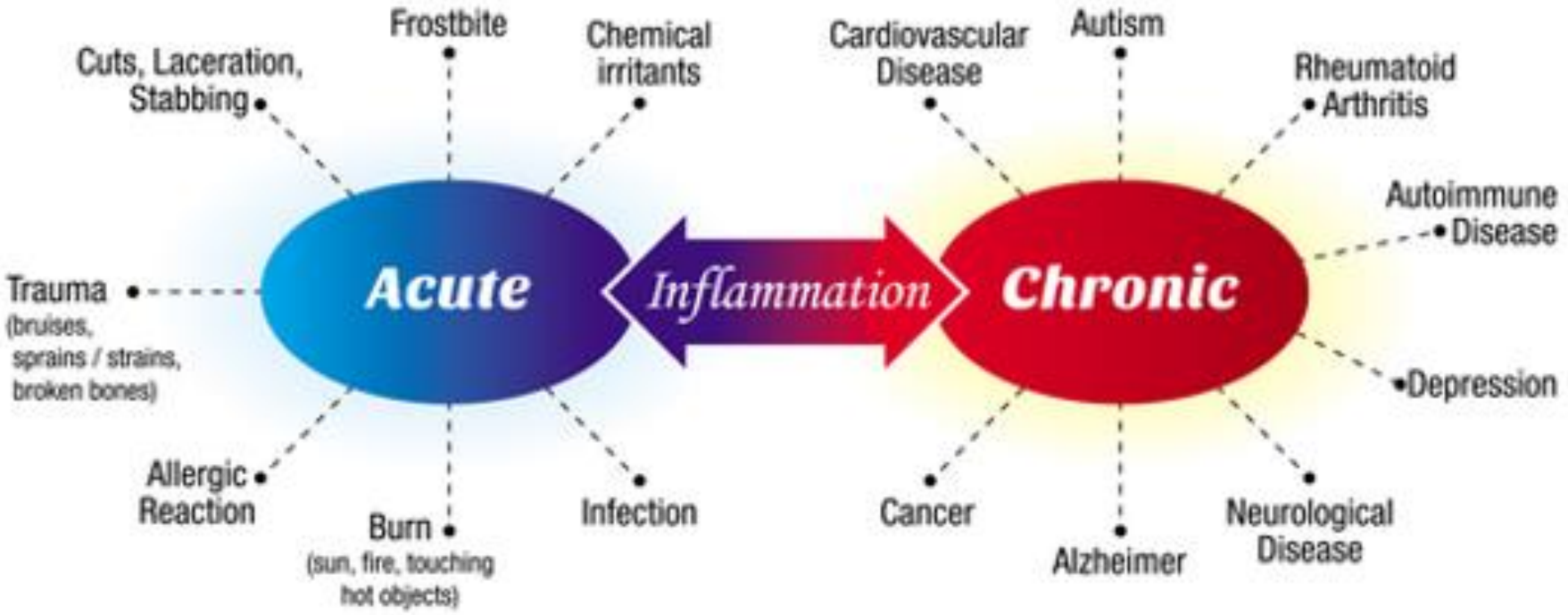


Nutrition & MPN Inflammation

- What is inflammation – acute vs chronic
- MPN Inflammation
- How food choices impact inflammation
- Gut microbiome, fibre & health
- Anti-inflammatory eating tips
- Eating priorities before a SCT
- Nutrition links



Inflammation - Acute VS chronic



Short term immune response
-fights infection, assists healing
-important immune function

Prolonged immune response.
-Chronic low-grade inflammation
-Last months or years.
-Leads to tissue damage rather than healing
-Measure by biomarkers: CRP, IL-6, TFNa

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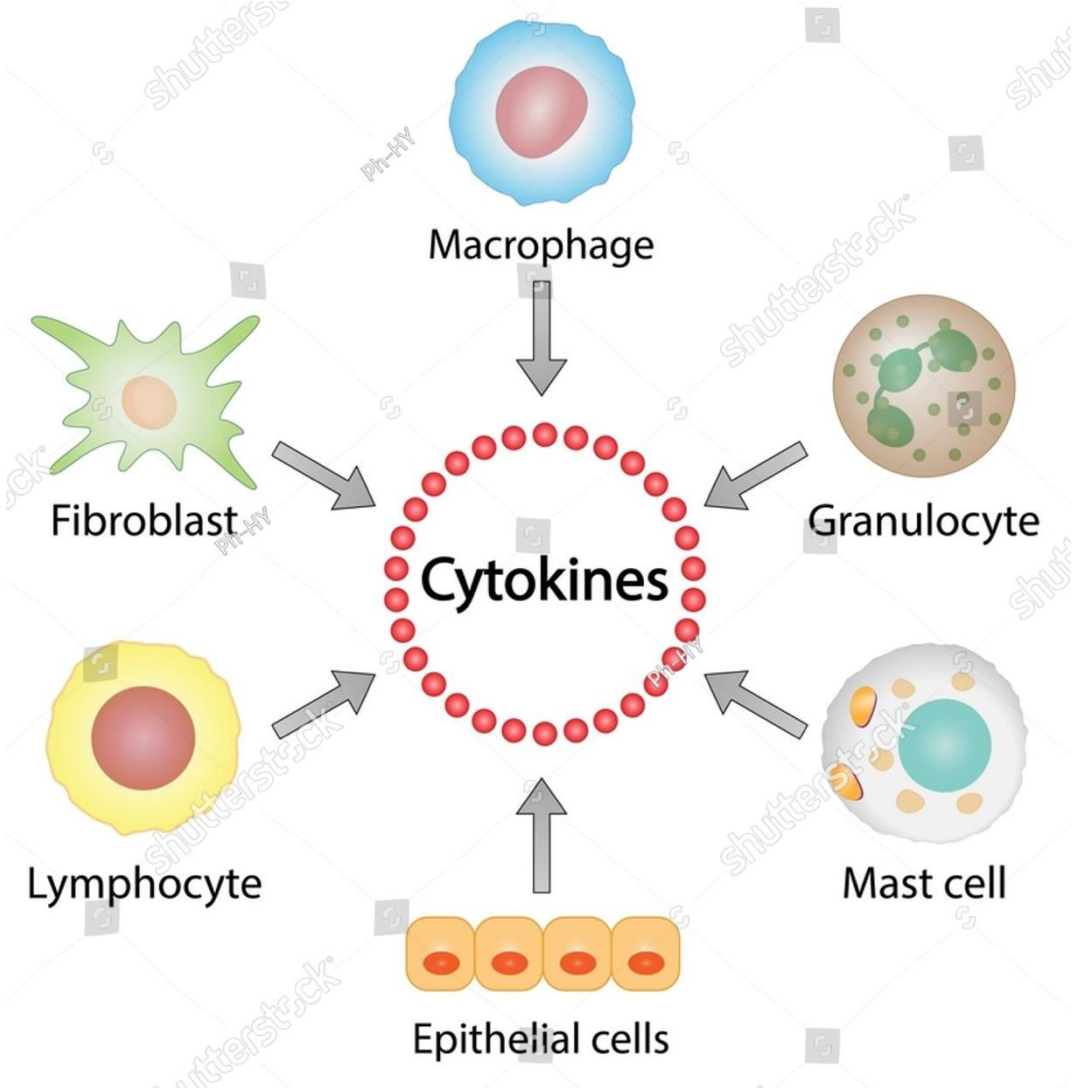
Inflammatory response produces CYTOKINES

- Small molecules released by immune cells to fight infection & assist healing.

  CRP, IL-6, TNF-alpha

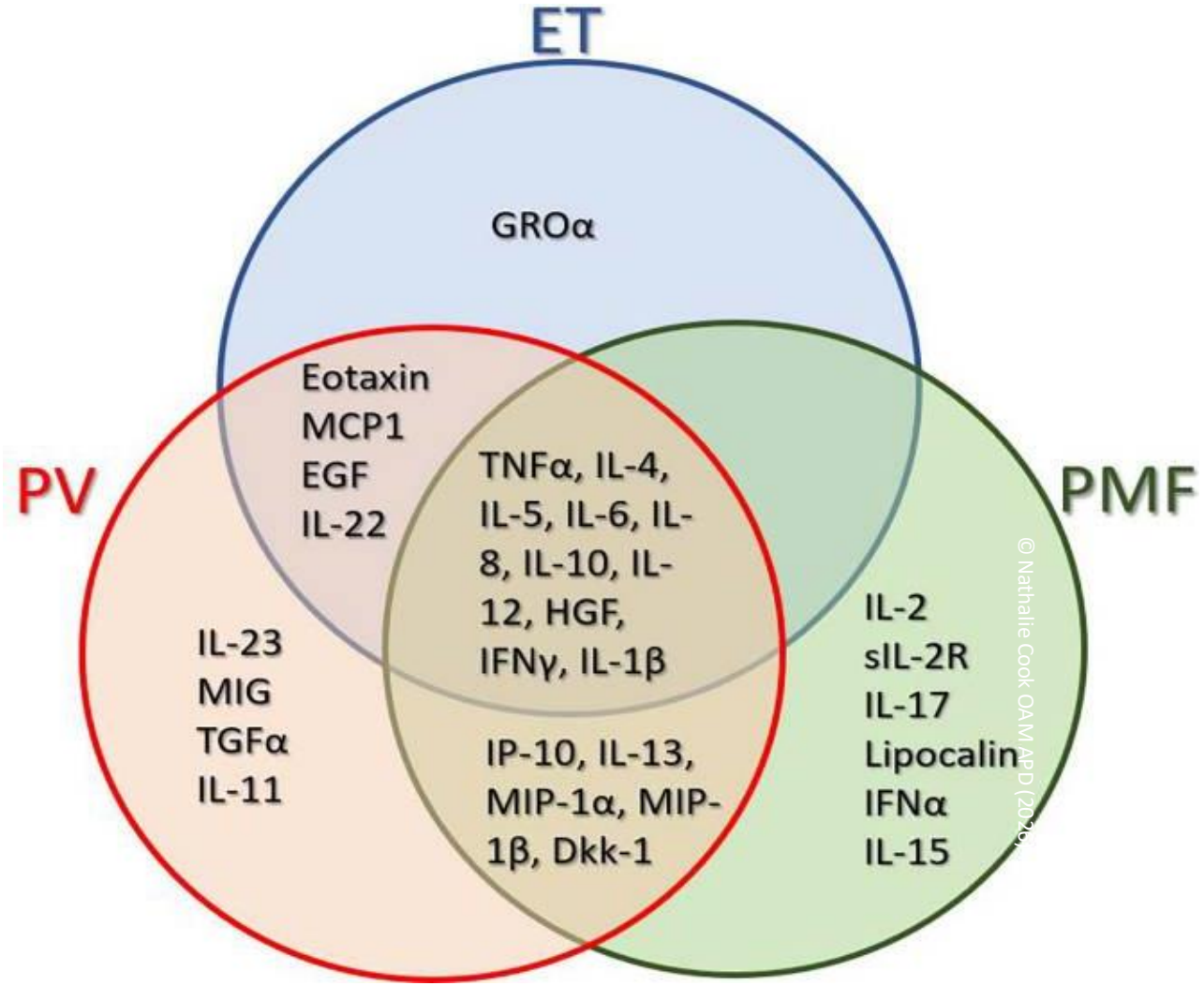
- Signal danger & call for help from the immune system.
- Chronic low-grade inflammation & cytokines drive:

  MPN & other chronic inflammatory diseases - CVD, T2DM, RA etc



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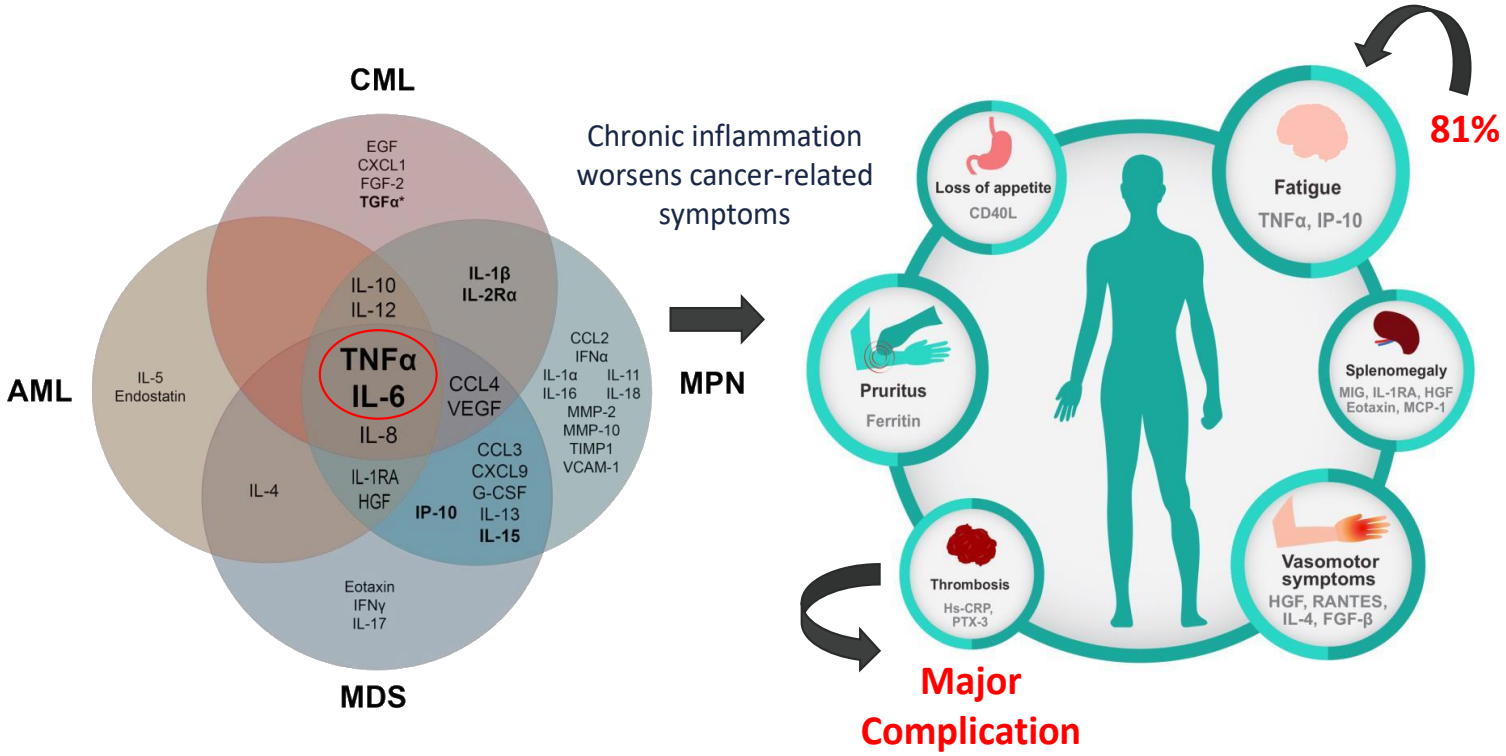
MPNs (ET, PV, MF) are assoc. with chronic inflammation & elevated inflammatory cytokines



Ramanathan G, **Fleischman AG**. The Microenvironment in Myeloproliferative Neoplasms. *Hematol Oncol Clin North Am*. 2021;35(2):205-216.

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Inflammatory cytokines correlate with symptom burden and a worse prognosis



Adapted from Craver et al, 2018

Ramanathan G, **Fleischman AG**. The Microenvironment in Myeloproliferative Neoplasms. *Hematol Oncol Clin North Am*. 2021;35(2):205-216. doi:10.1016/j.hoc.2020.11.003

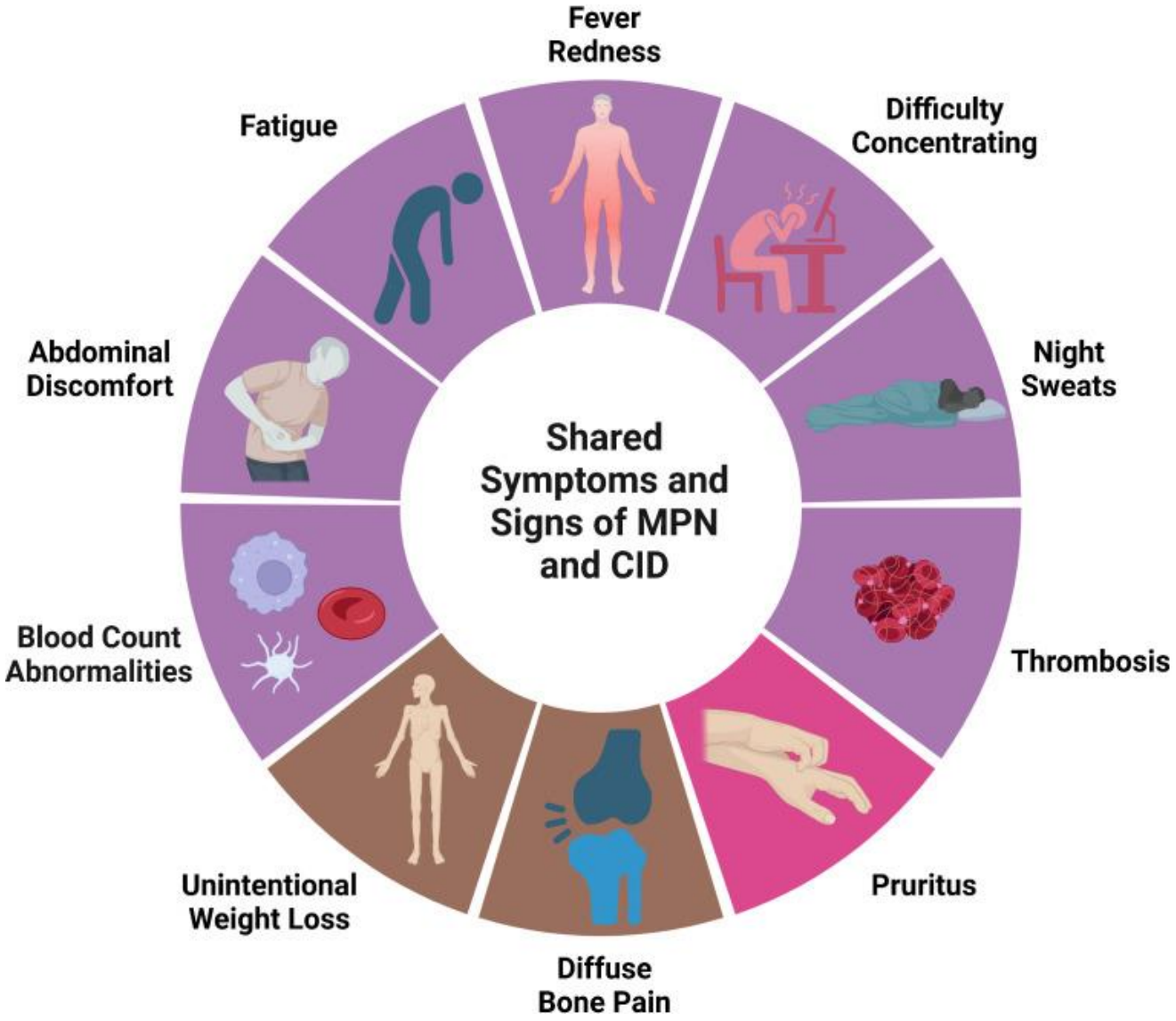
SOURCE: Fleischman, AG, University of California, Irvine- Nutrition and MPN

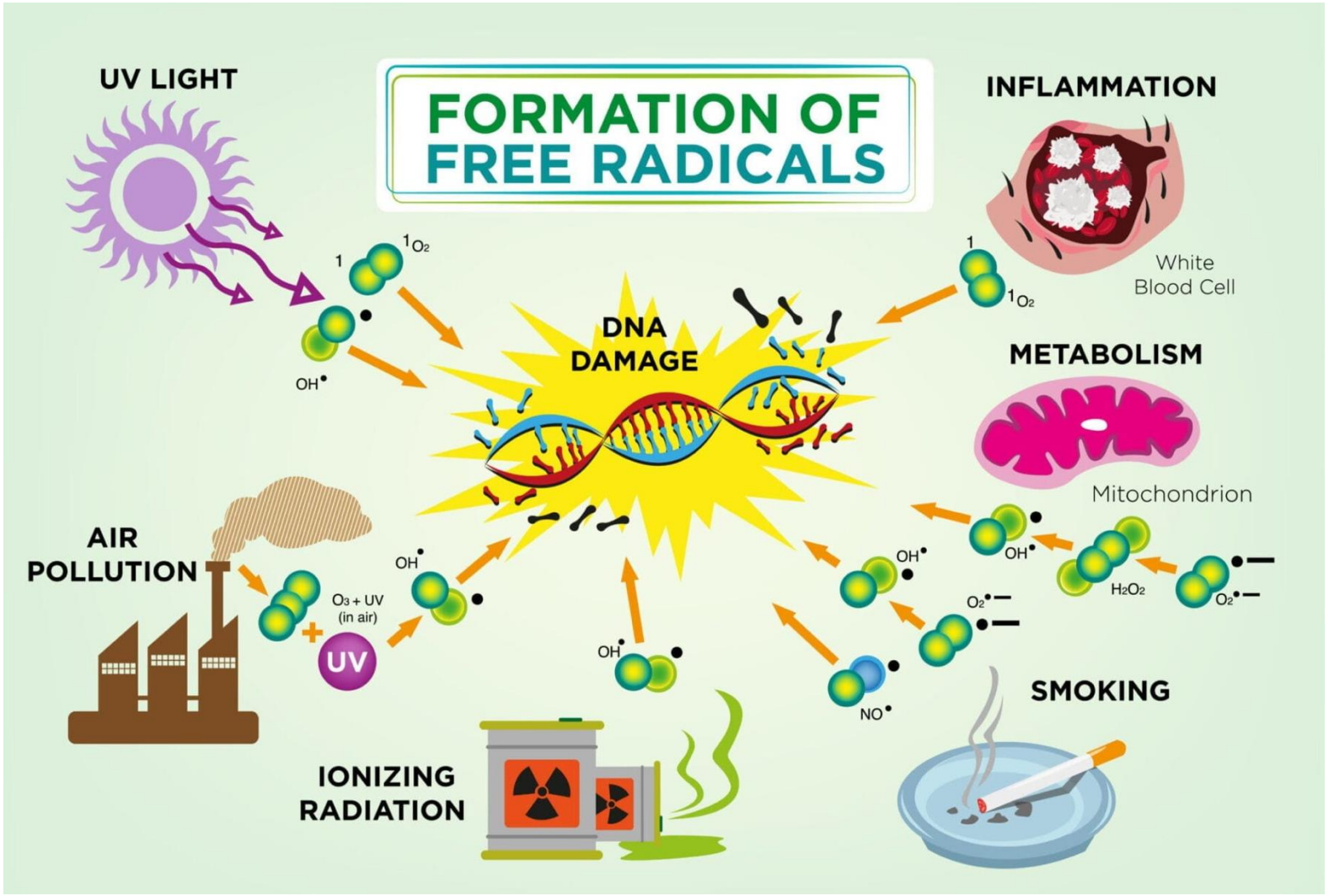
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Myeloproliferative neoplasms – blurring the lines between cancer and chronic inflammatory disorders

Eli M Soyfer [1], Angela G Fleischman

Front Oncol. 2023





- Inflammatory cytokines & environmental factors produce ***FREE RADICALS***

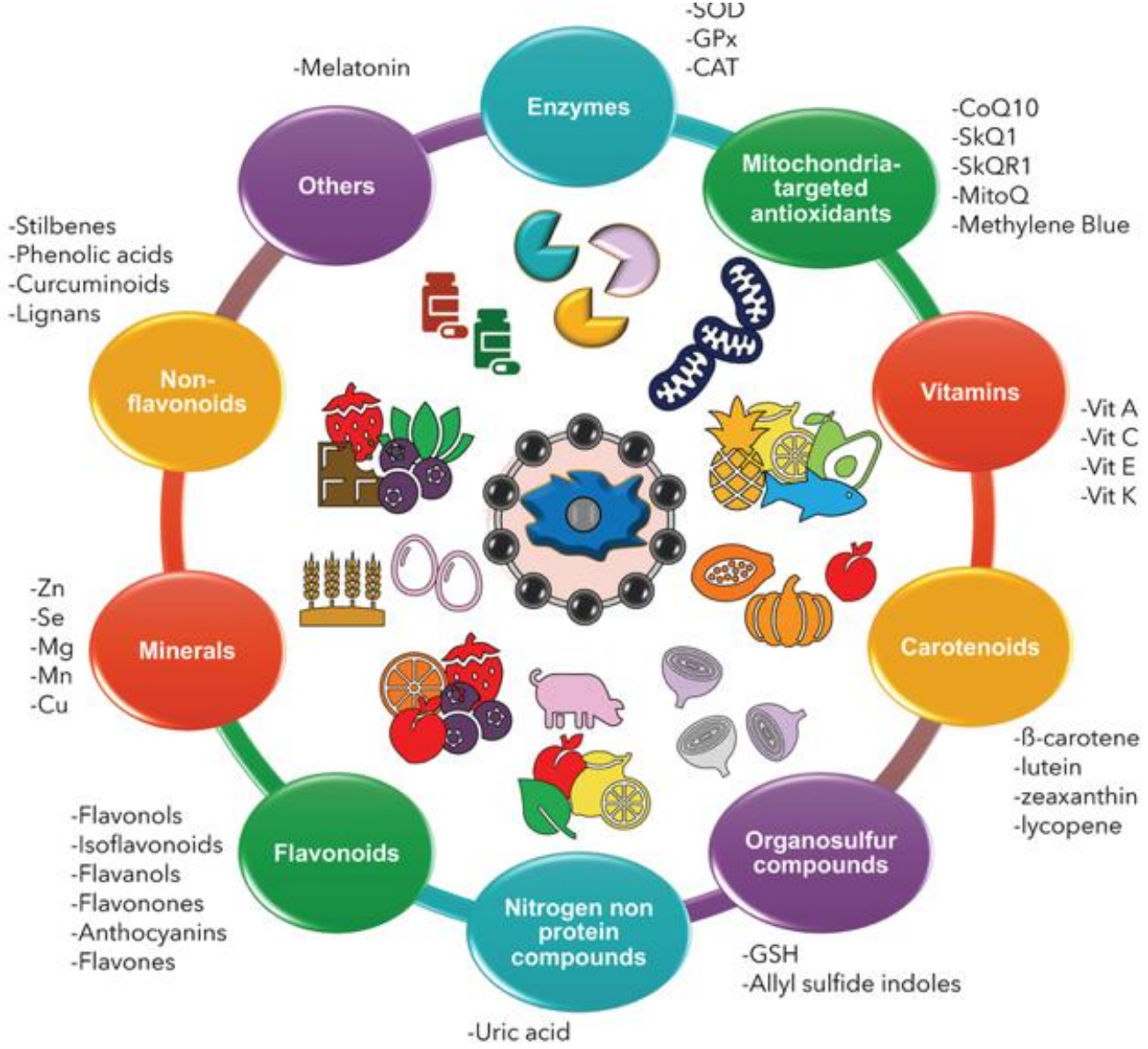
(unstable molecules missing an electron)

- Free radicals cause oxidative cell damage

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- **Antioxidants** stop free radical chain reactions, without becoming unstable themselves

- Both internal & external antioxidants - help balance cytokines & oxidation:
  - Enzymes
  - Flavonoids/polyphenols
  - Vitamins (A,C,E,K)
  - Minerals - selenium, zinc etc



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- Good news –**ANTIOXIDANTS** in colourful plant foods help reduce inflammation & limit free radical/oxidative cell damage!

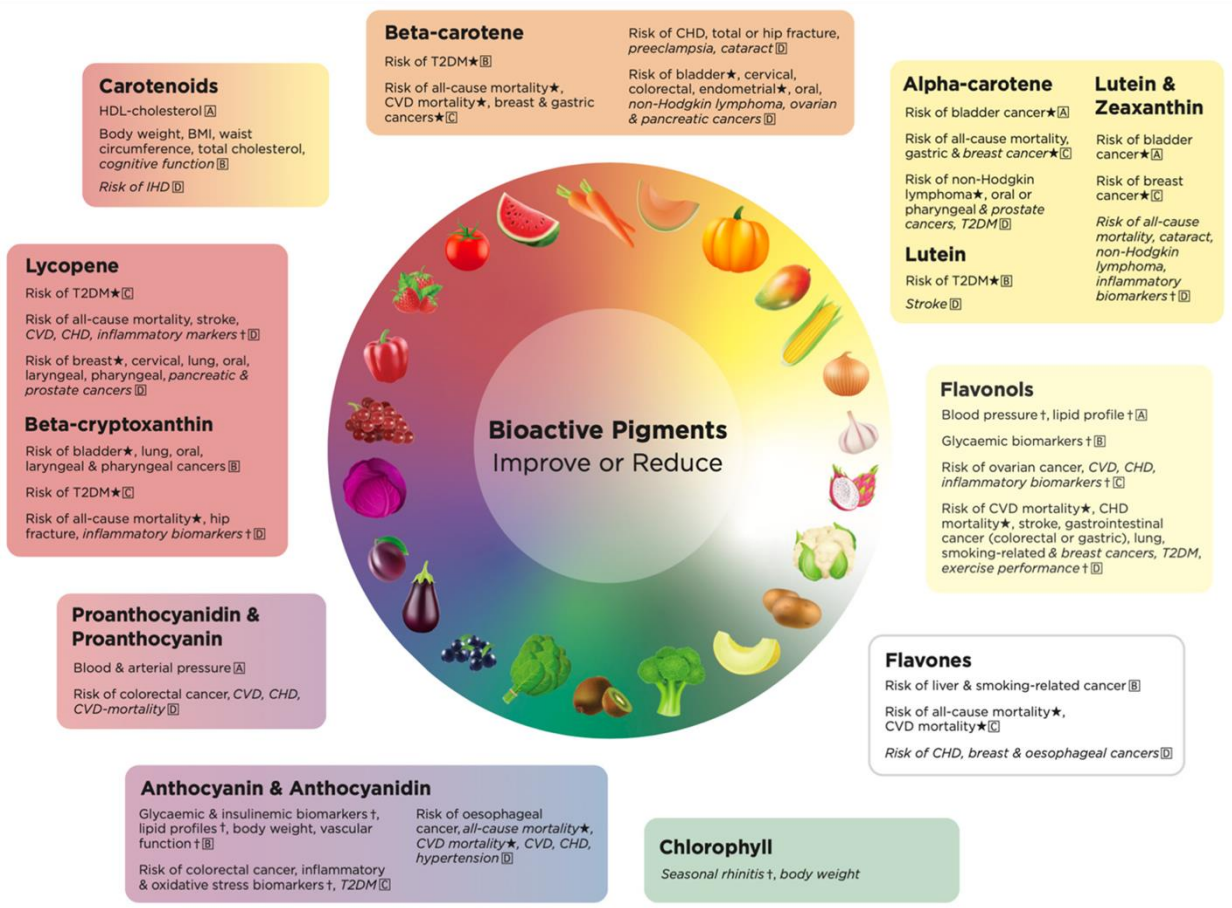
- No specific ‘MPN diet’, however, experts agree…

  We benefit from a diet of **mostly minimally processed, colourful, high fibre plant foods, including olive oil & by limiting ultra-processed foods.**

- Healthy eating **also protects general, gut & cardiovascular health.**

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Flavonoids and other bioactive pigments in plant foods give their bright colours and are assoc. with better health outcomes: type 2 diabetes, blood lipids, inflammation, cardiovascular disease, cancer & overall mortality



Blumfield, M., Mayr, H., Vlieger, N. D., Abbott, K., Starck, C., Fayet-Moore, F., & Marshall, S. **(2022). Should We 'Eat a Rainbow'? An Umbrella Review of the Health Effects of Colorful Bioactive Pigments in Fruits and Vegetables**. *Molecules*, *27*(13), [4061]. https://doi.org/10.3390/molecules27134061

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Review

Flavonoids—Chemistry, metabolism, cardioprotective effects, and dietary sources

N.C. Cook and S. Samman

Human Nutrition Unit, Department of Biochemistry, University of Sydney, Sydney, Australia

N.C. **Cook**, S. Samman. Flavonoids – Chemistry, metabolism, cardioprotective effects, and dietary sources, ***The Journal of Nutritional Biochemistry*****,** Volume 7, Issue 2, (1996), Pages 66-76
(Cited by 4164)

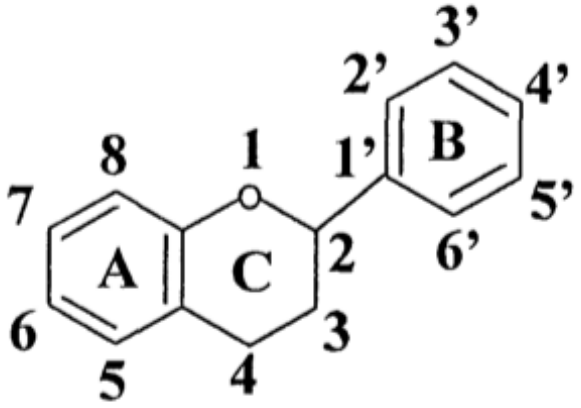


Figure 1 The generic structure of flavonoids.

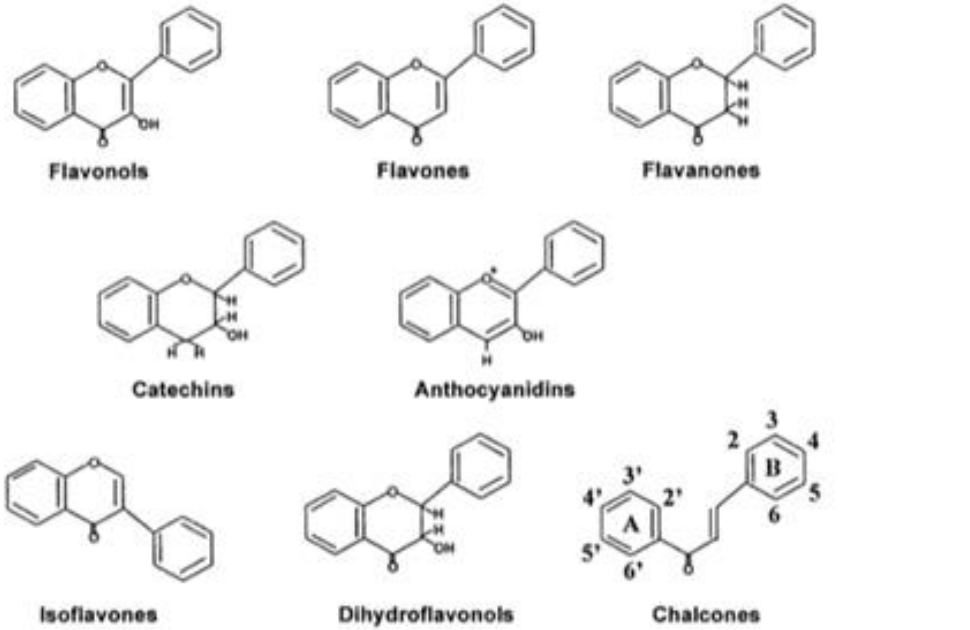


Figure 2 The structures of the major classes of flavonoids.

Functional groups on flavonoids **donate electrons** to stabilize **FREE RADICALS**:

- Carbonyl group (C=O):
- Carboxylic acid group (-CO_2H or -COOH)
- Methoxy group (-OCH_3

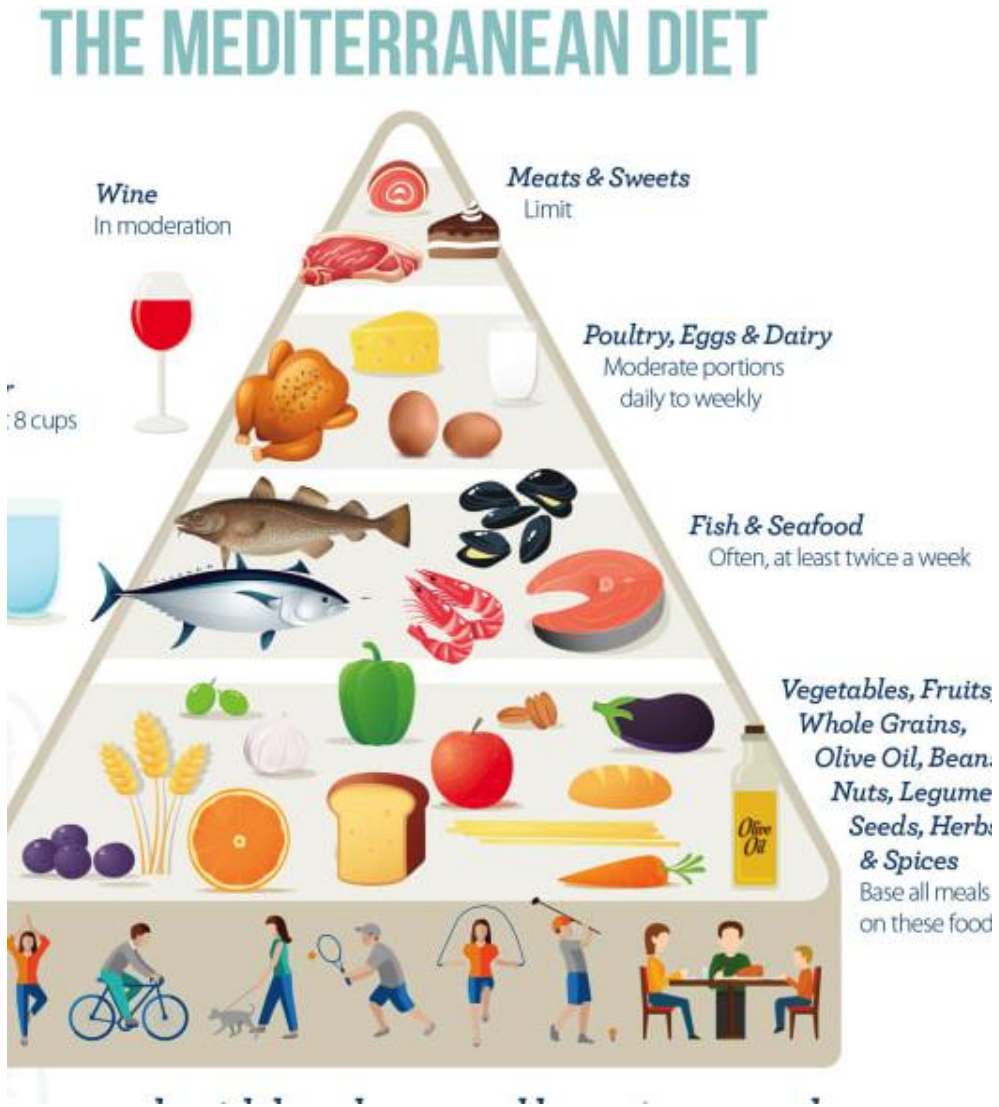
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Antioxidants in Foods

	Antioxidant	Sources
	Vitamin E	Sunflower seeds, almonds, peanut butter, wheat germ oil, avocados
	Vitamin A	Carrots, sweet potatoes, liver, pumpkin, turnip greens
	Vitamin C	Kiwis, sweet peppers, peaches, broccoli, citrus fruit
	Cryptoxanthin	Butternut squash, tangerines, papaya, plums, corn
	Selenium	Mixed nuts, turkey, wheat, tuna, wheat germ
	Astaxanthin	Lobster, crab, shrimp, seaweed, salmon
	Anthocyanin	Eggplant, blueberries, raspberries, blackberries, red cabbage
	Lycopene	Tomatoes, guavas, watermelon, pink grapefruit, asparagus
	Lutein	Spinach, kale, mustard green, swiss chard, green peas
	Catechins	Dark chocolate, green tea, black tea, red wine, black grapes,
	Quercetin	Onions, apples, parsley, olive oil, dark cherries

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Evidence diet impacts cytokines & inflammatory biomarkers



Adherence to a Mediterranean style diet: (N=3,042):

Lower inflammatory markers (cytokines):

20% lower CRP

17% lower IL-6 levels

Lower coagulation markers

15% lower homocysteine levels

14% lower white blood cell counts

6% lower fibrinogen levels

Inverse assoc. between healthy eating and all cause mortality

*** <u>Physical activity</u> – as normal part of life**

Mitrou et. al. Arch Intern Med. 2007;167(22):2461-2468.
Chrysohoou et. al. *J Am Coll Cardiol.* Jul 7 2004;44(1):152-158.

(Adapted from: R. Scherber, MD Mays Cancer Center)

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1st trial investigating impact of a Mediterranean style diet on MPN symptoms & inflammation:

28 MPN pts - able to adhere to a Mediterranean diet pattern (15 weeks).

Adherence to a Mediterranean diet resulted in 42% reduction in MPN symptoms

The NUTRIENT Trial (NUTRitional Intervention among myEloproliferative Neoplasms): Results from a Randomized Phase I Pilot Study for Feasibility and Adherence

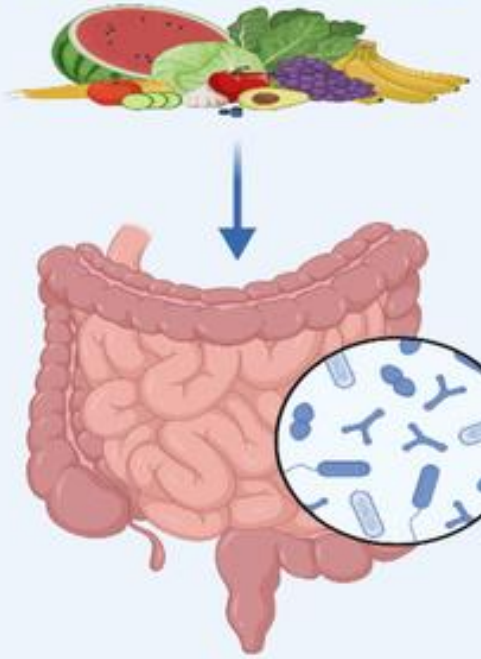
L. F. Mendez Luque, J. Avelar-Barragan, H. Nguyen, J. Nguyen, E. Soyfer, J. Liu, J.H.Chen, N. Mehrotra, X. Huang, H. Kosiorek, A. Dueck, A. Himstead, E. Heide,, M. Lem, K. El Alaoui, E. Mas,. R. Scherber, R. Mesa, K. Whiteson, A. Odegaard, and A.G. Fleischman ***(Cancer Res Commun 2024)***

Research is ongoing….

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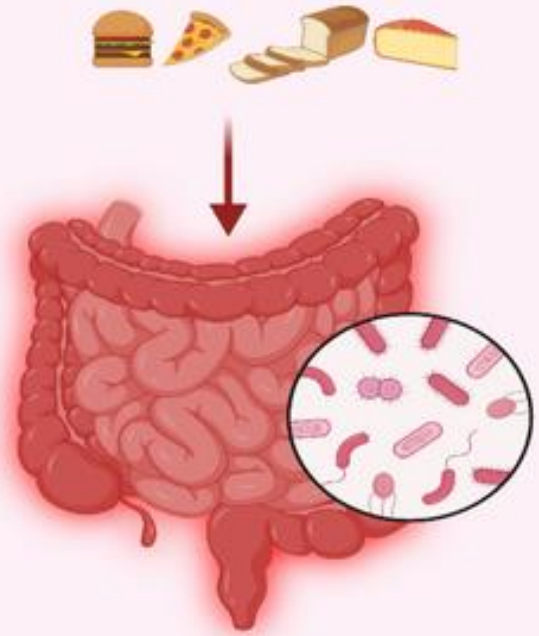
Western Diet vs. Mediterranean Diet effects on Gut Health

Mediterranean Diet



- ↓ Gut inflammation
- ↑ Rich in fiber, fruits, and vegetables
- ↑ High in healthy fats
- ↑ Supports gut microbiota balance
- ↑ Boosts beneficial bacteria

Western Diet



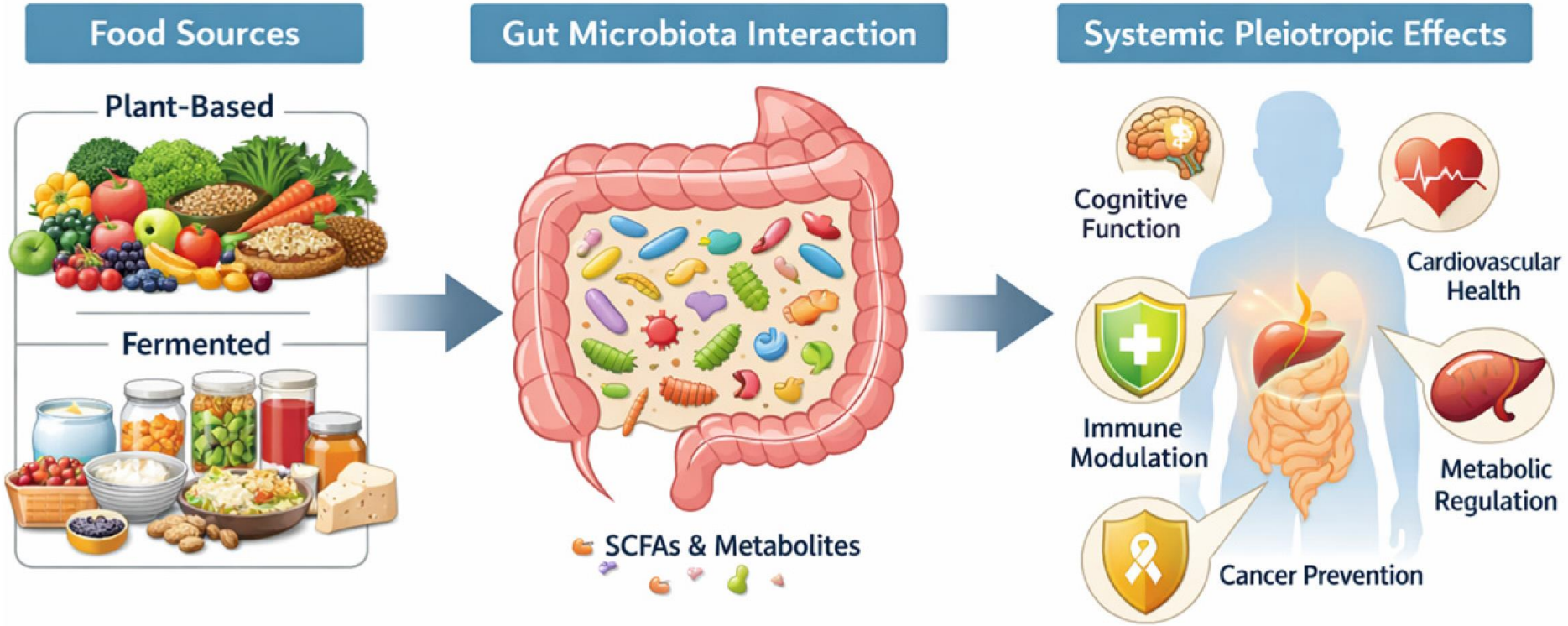
- ↑ High in saturated fats and sugars
- ↑ Increases harmful bacteria
- ↑ Triggers inflammation
- ↓ Low in fiber
- ↑ Linked to leaky gut

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We have >38 trillion gut microbes. They use fibre & flavonoids from plant foods to make short-chain fatty acids (SCFAs) & other metabolites that fight inflammation throughout the body

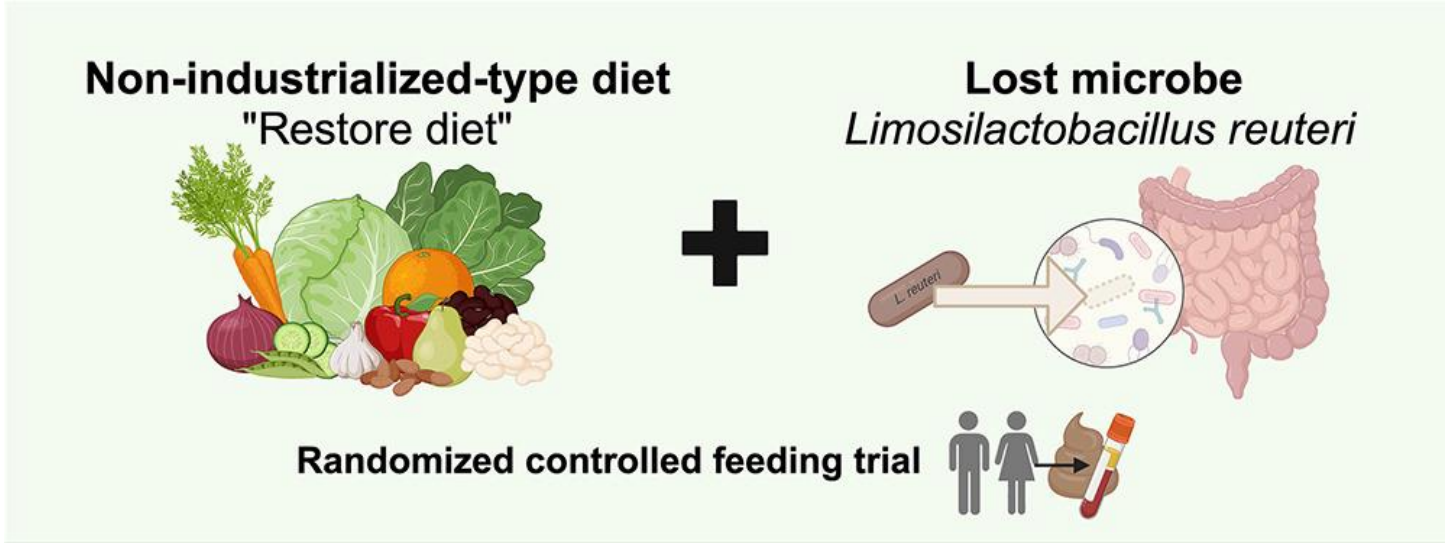
(* SCFA: Butyrate, proprionate, acetate)

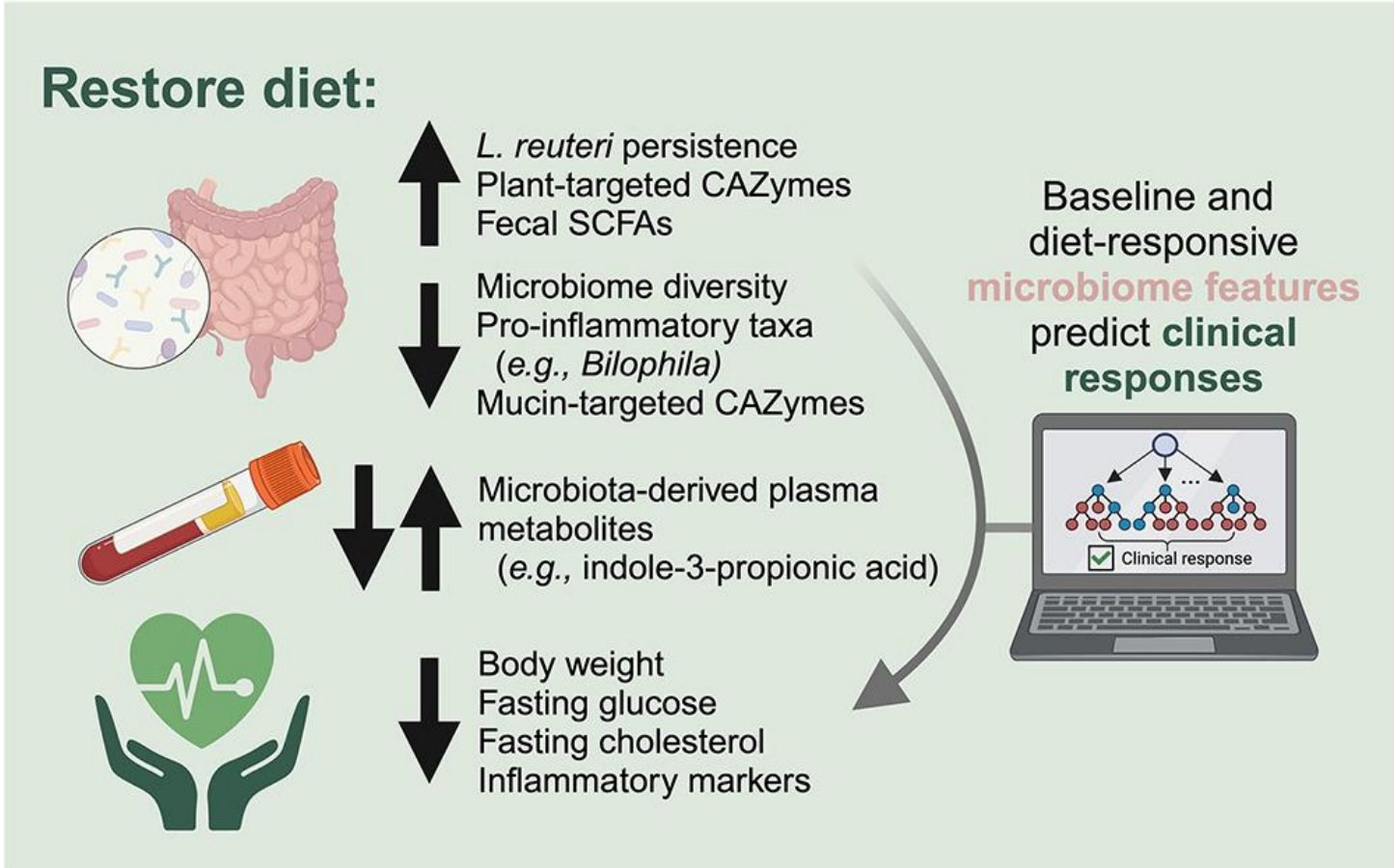
(Pleiotropic = multiple effects)



Review: Probiotic and Bioactive Compounds in Foods: From Antioxident Properties to Gut Microbiome Modulation. B. Goncalves et al, *Molecules* **2026**, *31*(2), 345;

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Cardiometabolic benefits of a non-industrialized type diet are linked to gut microbiome modulation

Li et al., 2025, *Cell* 188, 1226–1247 March 6, 2025

https://doi.org/10.1016/j.cell.2024.12.034

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Limit these

Pro-inflammatory foods

Processed foods





Fried snacks

Sugary foods & beverages





Refined carbs



Alcohol

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Eat more of these

Anti-inflammatory foods

Leafy greens & vegetables





Healthy fats

Fruits





Spices & herbs

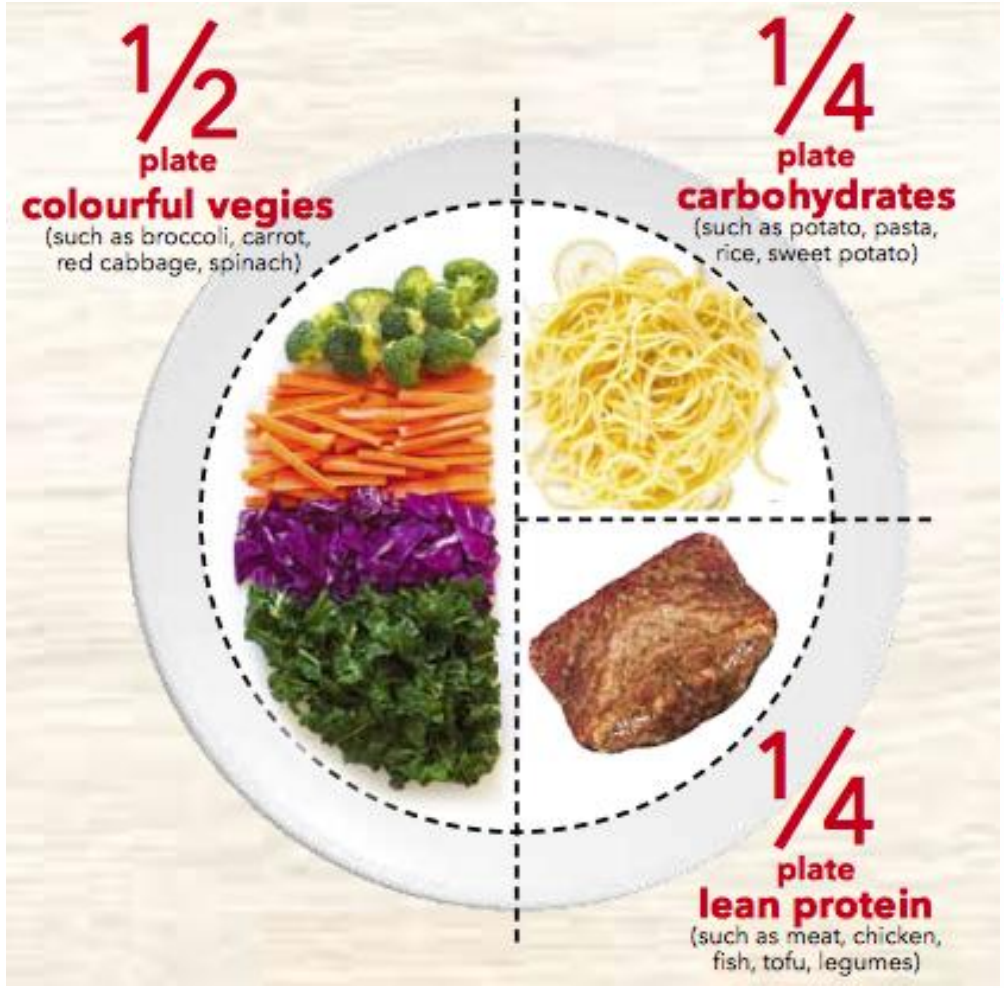
Whole grains

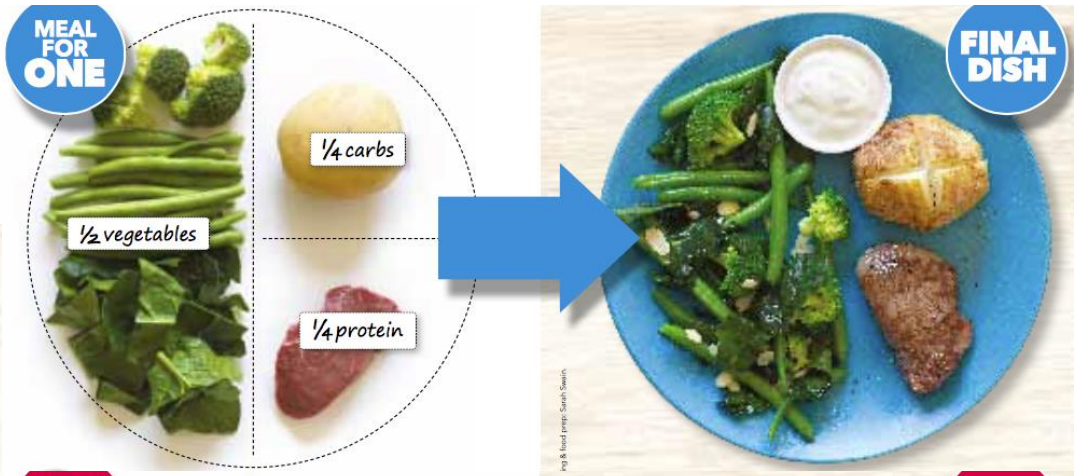


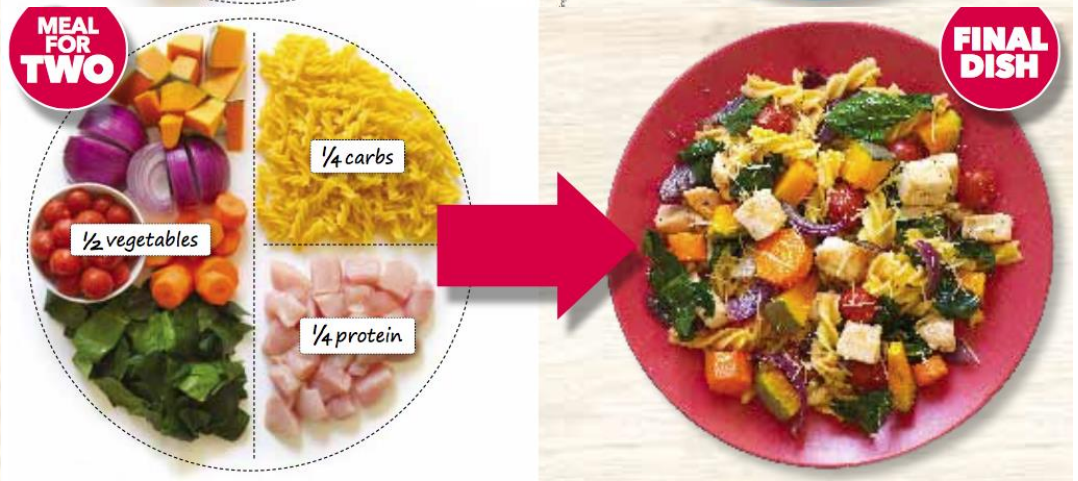


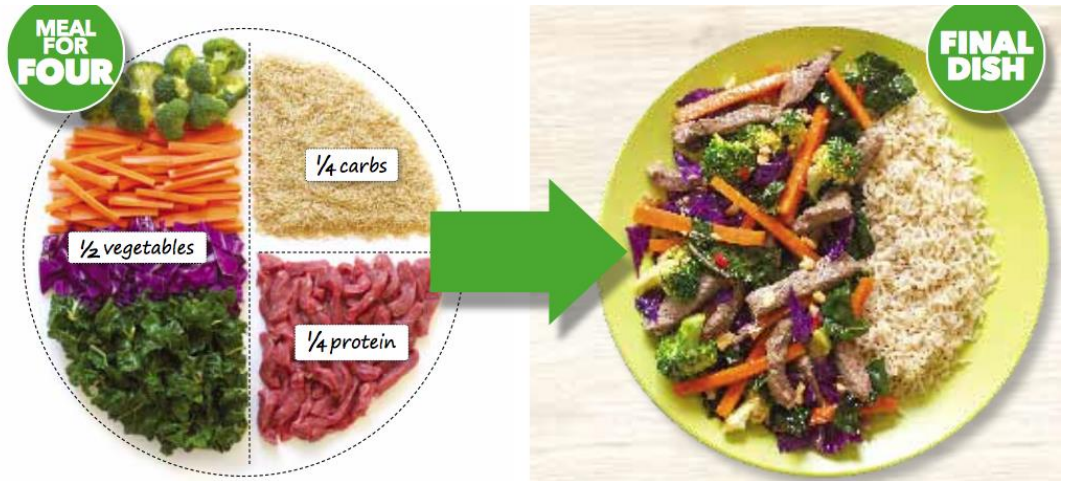
Green tea

Healthy plate portions









Source: www.healthyfoodguide.com.au

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- Increase fibre gradually for better GI tolerance
- Include a variety of different fibre sources to feed the diverse gut microbes
- Aim for 25-35g fibre/day
- Ensure adequate fluid intake

https://dietitianconnection.com/category/patient-resources/gut-health-resources/



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[Aim for 30+ plants each week | Dietitian Connection]

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Easy anti-inflammatory breakfast ideas









Oats, colourful fruit, seeds, nuts, yoghurt, lemon juice & zest etc

Eggs & veggies on grainy toast.

Chia, yoghurt & fruit puddings

Toasties with colourful veg & cheese

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Easy anti-inflammatory lunch ideas

Egg, chicken, tuna or legume wraps with colourful salad, cheese & houmous.

Shredded chicken with beans, cabbages, grated carrot, lettuce, nuts & lime dressing

Legumes with cucumber, parsley, tomato, onion, rocket, feta & olives

Tinned salmon or tuna with colourful veg, quinoa or brown rice, legumes, lemon juice & olive oil





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Easy anti-inflammatory dinner ideas

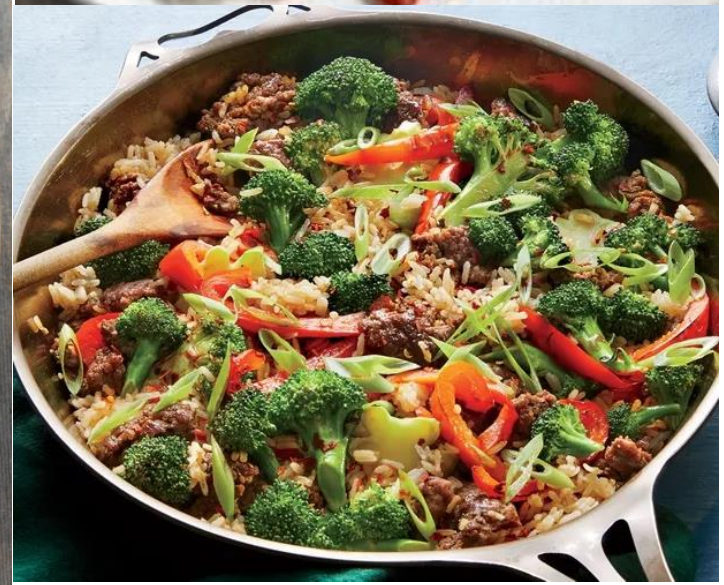
- Baked salmon & veg with olive oil
- Pesto, bean & veg pasta
- Skinless chicken stir fry & veg
- Legume & veg bowl
- Lean beef & veg stir fry
- Cook with olive oil, herbs & spices for flavour & extra anti-oxidants











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Healthy Snack Ideas:



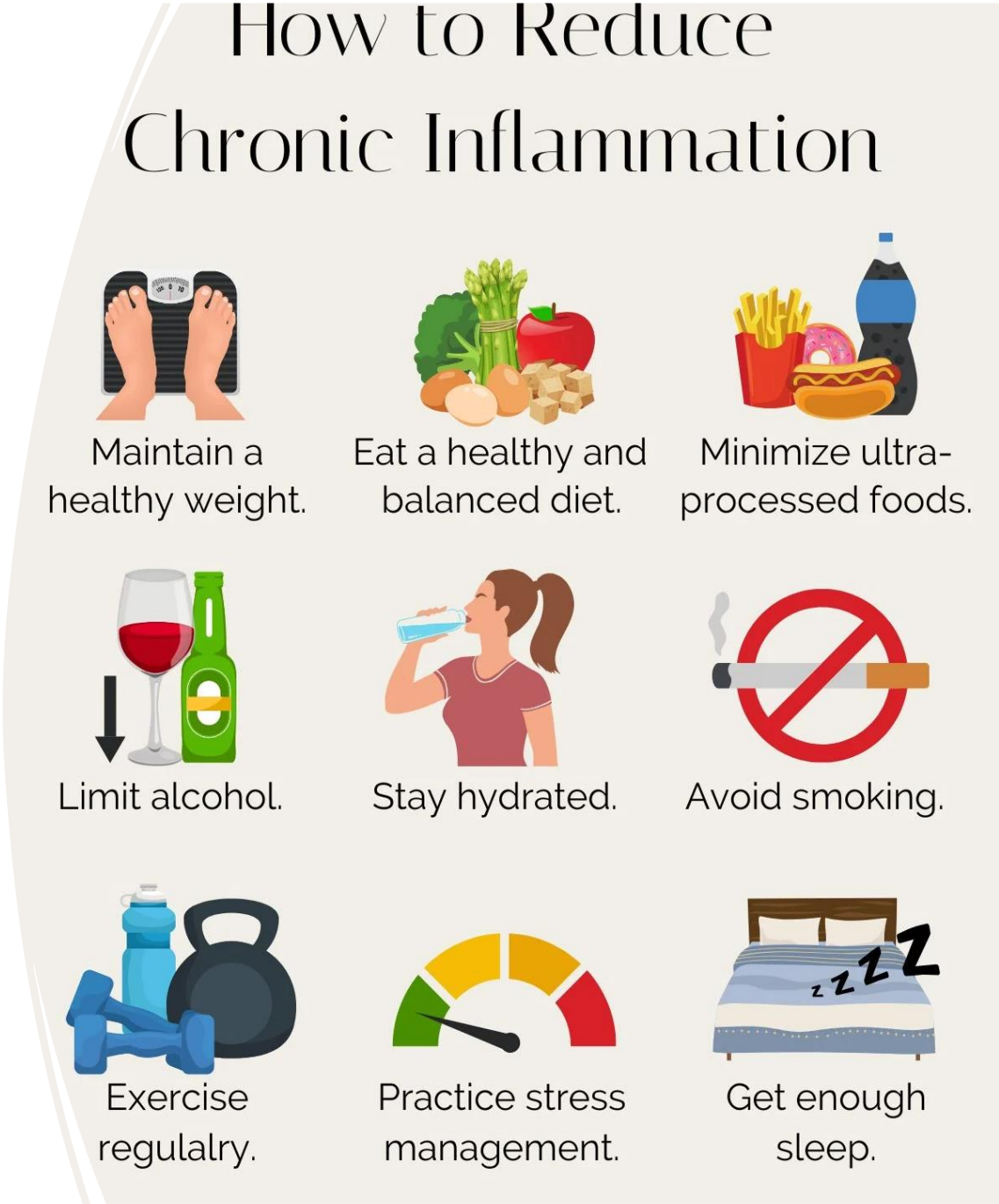






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Other lifestyle factors that can help reduce inflammation



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Nutrition priorities before a stem cell transplant (SCT)

- **Build weight reserves: high energy/high protein food** to offset upcoming weight loss.

- **Boost protein intake: to build/ protect muscles.**
- AIM: 1.2-1.5g/kg bw (70kg = 84-105g/day)

- **Fix vitamin deficiencies:** Dr-approved supplements

- **Hydration:** Fluids help kidneys flush out chemotherapy waste

- **Learn about food safety:** to prevent food born infection when WCC/immunity is low post Tx



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Healthy eating is good medicine!

It's empowering & something we can do everyday to stay well with MPN

- Include **colourful** plant foods daily- Vits, minerals, **flavonoids & fibre**
  - Increase slowly. Try 1 change/day
  - Think '***everyday***' & '***sometimes***' foods –**NOT** 'good' or 'bad' foods!
- **Enjoy olive oil** in cooking & salads
- **Include lean protein at each meal** for strong muscles & bones (dairy, chicken, meat, eggs, legumes, nuts, seeds)
- Use the **Portion Plate Model** (1/2 veg, ¼ lean protein & ¼ high fibre/low GI carbs, + healthy fats).
- **Move more & sit less** - reduces fatigue, assists weight mgt, mental & physical health.





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Nutrition & Inflammation Links

Portion plate guide | Baker Institute

What is the Gut Microbiome? | Deakin Food and Mood Centre

Dietary fibre Baker Heart & Diabetes Institute www.baker.edu.au

Diet and nutrition health advice | Dietitians Australia

Healthy Recipes: Thousands of perfect meals from Healthy Food Guide

Gut health resources | Dietitian Connection

Aim for 30+ plants each week | Dietitian Connection

Flavonoids—Chemistry, metabolism, cardioprotective effects, and dietary sources – ScienceDirect
Cook, N.C & Samman, S. (1996) *J. Nutr. Biochem*.

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Questions ???



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