



Lecture 53:

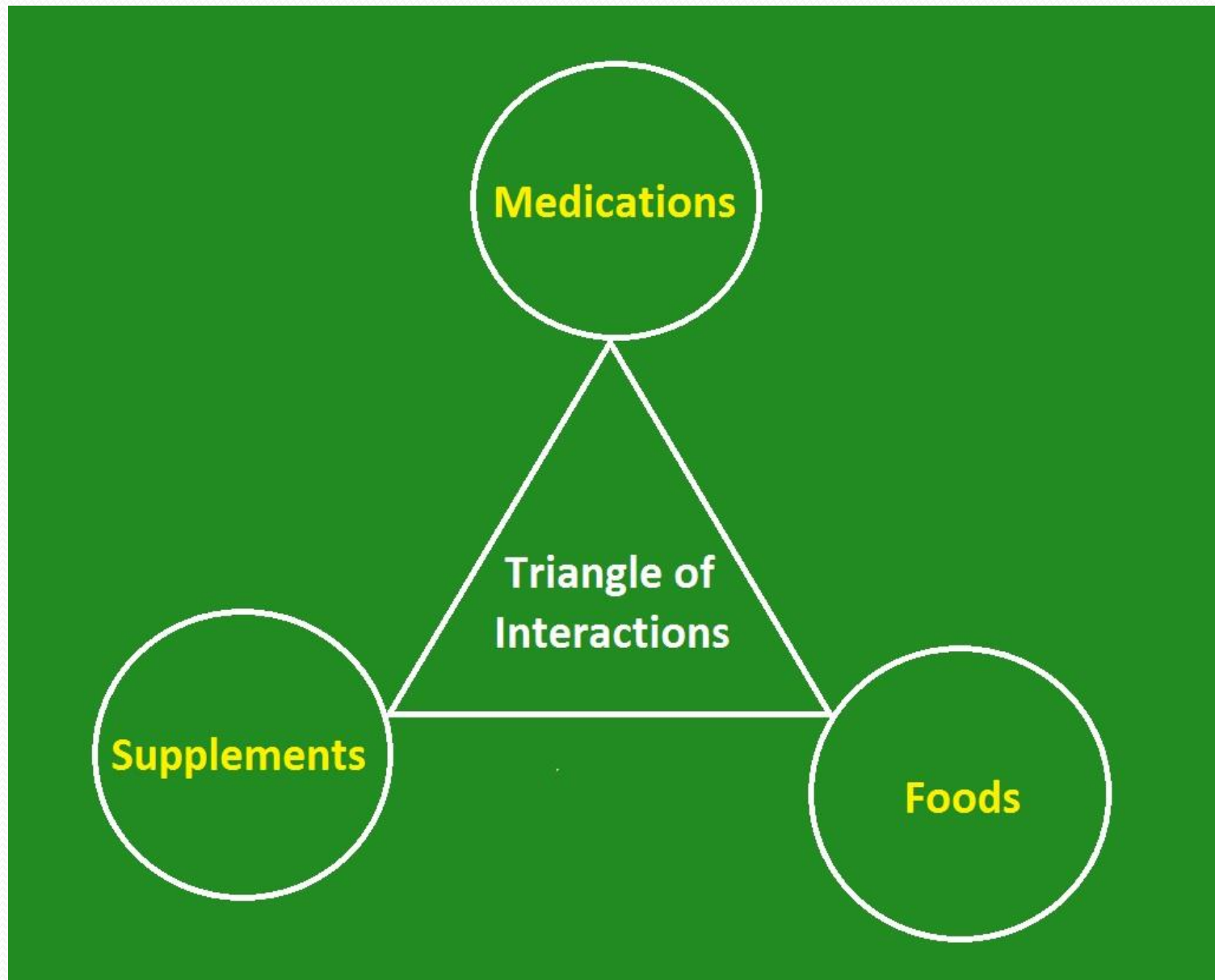
Drugs - Foods Interactions

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Interactions:

- **1)** Interactions between some medications and foods.
- **2)** Drug – induced nutrient depletions.



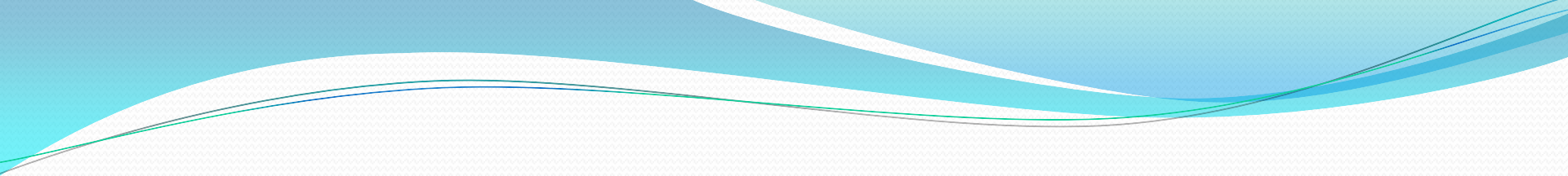
Interaction between Medications and Furanocoumarins:

- **Furanocoumarins** are a group of organic compounds produced by certain plants as a defence mechanism to protect themselves from external organisms.



Grapefruit is very high in furanocoumarins.

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- The importance of **furanocoumarins** is their interactions with metabolism of some medications.
 - They cause “**enzyme inhibition**”, which means they block the liver enzyme **cytochrome P450**, interfering with metabolism of some medications.

Subtypes and Food Sources:

Subtypes are:

- 1) **Bergamottin:** grapefruit, pomelo, and Seville orange
- 2) **Dihydroxybergamottin:** grapefruit , pomelo, and Seville orange
- 3) **Bergapten:** celery
- 4) **Isobergapten:** parsnips
- 5) **Angelicin**
- 6) **Psoralen:** fig, celery, parsnips, wild carrot, and parsley.

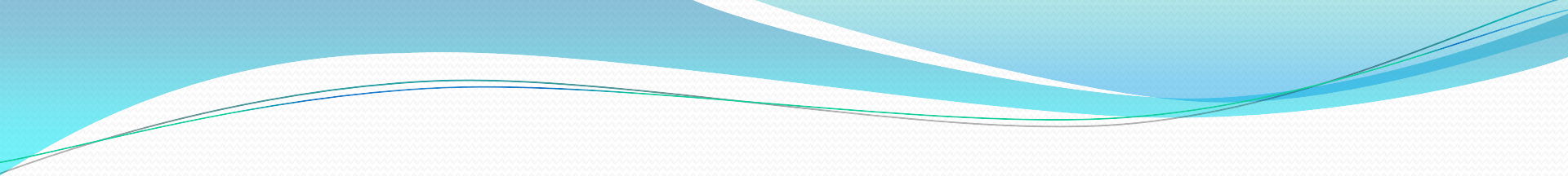
- **Bergamottin** and **dihydroxybergamottin** are the two furanocoumarins found in grapefruit and they also block cytochrome P450 in the intestinal wall.
- Grapefruit also contains “**naringenin**” that inhibits cytochrome P450 both in the intestine and liver.

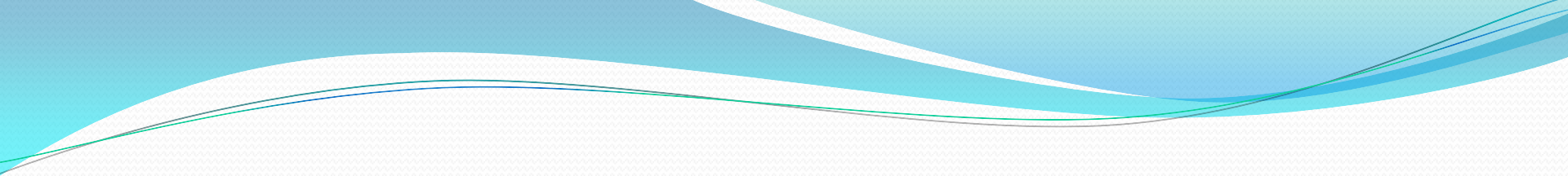


Drug interactions with grapefruit:

The following medications have interactions with grapefruit:

- **Amiodarone (Cordarone)**
- **Astemizole (Hismanal)**
- **Atorvastatin (Lipitor)**
- **Budesonide (Entocort)**
- **Buspirone (BuSpar)**
- **Cerivastatin (Baycol)**
- **Cilostazol (Pletal)**
- **Cisapride (Propulsid, Prepulsid)**

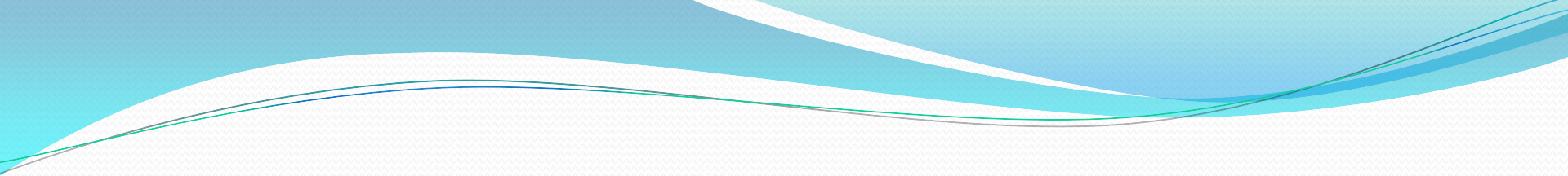
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- **Colchicine**
 - **Eletriptan (Relpax)**
 - **Etoposide (Vepesid)**
 - **Halofantrine (Halfan)**
 - **Lovastatin (Mevacor)**
 - **Mifepristone (Mifeprex)**
 - **Pimozide (Orap)**
 - **Quinidine (Quinaglute, Quinidex)**
 - **Sildenafil (Viagra)**

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- **Simvastatin (Zocor)**
 - **Sirolimus (Rapamune)**
 - **Terfenadine (Seldane)**
 - **Ziprasidone (Geodon)**

Drug – Induced Nutrient Depletions:

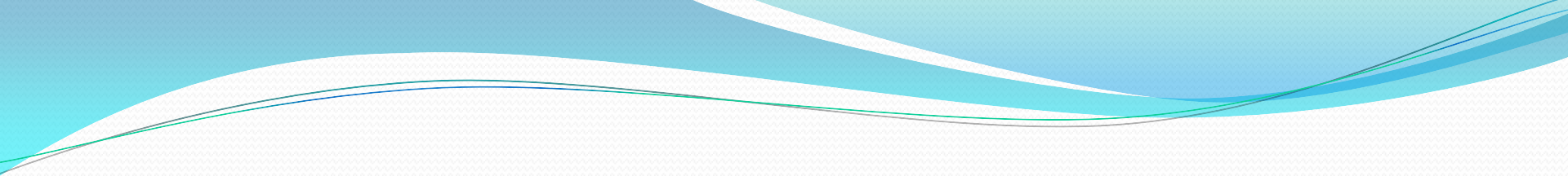
1) **Acetaminophen**: depletes the following nutrients from the body:

- Glutathione
- N – acetyl cysteine (precursor for glutathione)



2) Aluminum-containing antacids (Maalox, Mylanta): deplete the following nutrients from the body:

- Calcium
- Magnesium.
- Phosphorous.
- Iron.
- Zinc.



3) Antacids (sodium bicarbonate, baking soda):
deplete the following nutrients from the body:

- Folic acid.
- Magnesium.
- Potassium.
- Proteins.

4) Histamine H₂ Blockers (Zantac, Tagamet):
deplete the following nutrients from the body:

- Vitamin B₁₂
- Folic acid.
- Vitamin D.
- Zinc.
- Calcium.
- Chromium.
- Iron.

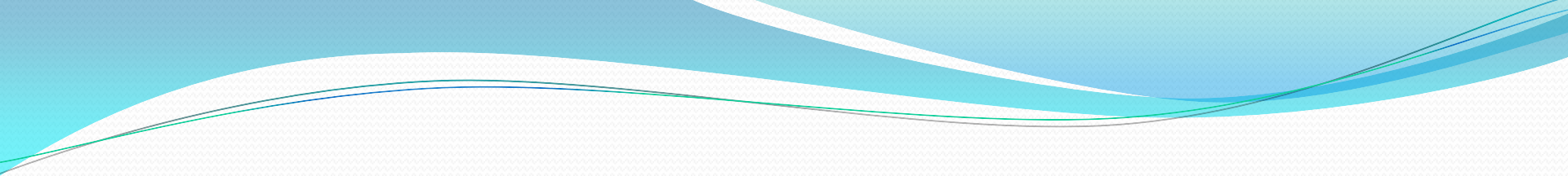
5) Digestive Enzymes: depletes the following nutrients from the body:

- Folic acid.
- Iron.



6) Proton Pump Inhibitors (Omeprazole, Pantoprazole): deplete the following nutrients from the body:

- Vitamins B₁₂, B₉, and C.
- Beta – carotene.
- Calcium.
- Chromium.
- Protein.
- Minerals (all).



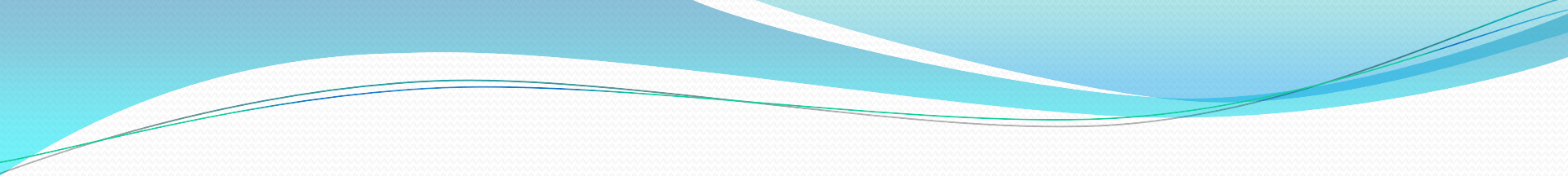
7) Antibiotics (all): deplete the following nutrients from the body:

- Probiotics.
- Vitamin K.
- Vitamin C.
- Vitamin B (all).

8) Neomycin: depletes the following nutrients from the body:

- Calcium.
- Magnesium.
- Beta-carotene.
- Vitamin B₁₂
- Iron.
- Vitamin A.





9) Tetracyclines: deplete the following nutrients from the body:

- Calcium.
- Magnesium.
- Iron.
- Zinc.
- Vitamin B₁₂.
- Vitamin B₉.
- Vitamin 6.
- Probiotics.

10) Aminoglycosides:

- Magnesium.
- Potassium.

11) Penicillins:

- Potassium.

12) Fluoroquinolones:

- Magnesium.
- Calcium.
- Iron.
- Zinc.

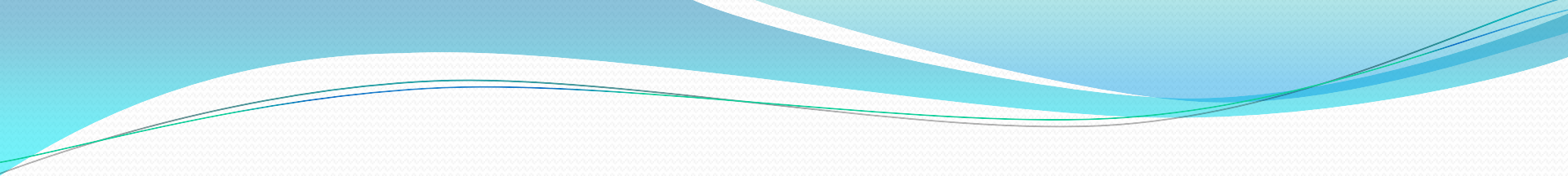
13) Antifungal antibiotics:

- Magnesium.
- Potassium.



14) Anti –Cancer medications:

- **Cisplatin:** carnitine, magnesium, potassium, vitamin E, and zinc.
- **Cyclophosphamide:** vitamin E.
- **Doxorubicin:** vitamin B₂.
- **5-FU:** vitamin B₁, B₃ and E.

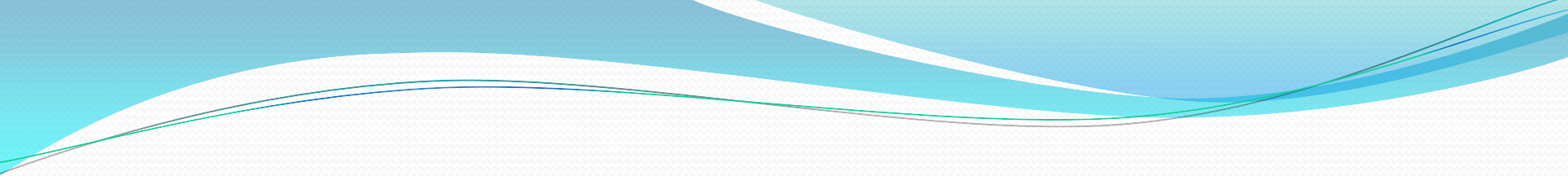


15) Sufa Medications (Co – Trimoxazole):
depletes the following nutrients from the body:

- Folic acid.
- Carnitine.
- Probiotics.

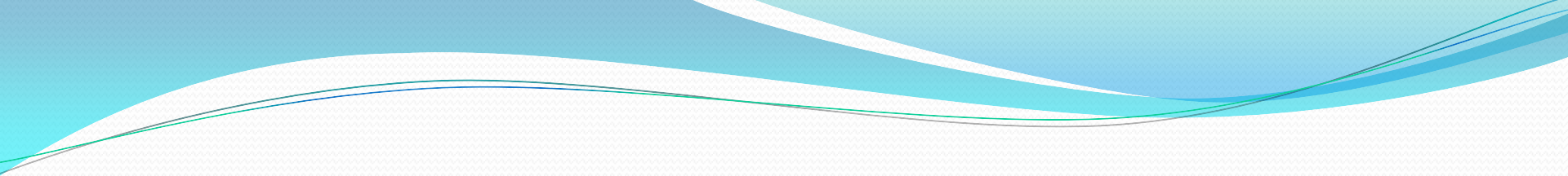
16) Diuretics:

- Potassium.**
- Magnesium.**
- Calcium.**
- Vitamins B₁, B₆, B₉ and C.**



17) Anti – Tuberculosis : depletes the following nutrients from the body:

- Vitamins B6 and B3 (Isoniazid).
- Vitamins D and K (Rifampin).
- Copper and Zinc (Ethambutol).



18) Anticonvulsants (Barbiturates): deplete the following nutrients from the body:

- Vitamins K, E and D.
- Carnitine.
- Calcium.
- Vitamins B₁₂, B₉, B₇ and B₆.

19) Anticonvulsants (Phenytoin): deplete the following nutrients from the body:

- Vitamin D.
- Carnitine.
- Glutathione.
- Calcium.
- Vitamins B₁₂, B₉, B₆, B₇, and B₁.
- Vitamin E.
- Zinc.

20) Anticonvulsants (Carbamazepine): depletes the following nutrients from the body:

- Vitamin D.
- Calcium.
- Carnitine.
- Glutathione.
- NAC.
- Vitamins K, E, B12, B9, B7, and B6.

21) Anticonvulsants (Primidone): deplete the following nutrients from the body:

- Vitamin B9.
- Vitamin B7.

22) Anticonvulsants (Valproic acid): deplete the following nutrients from the body:

- Carnitine.
- Vitamins B₃ and B₉.
- Zinc.

23) Anticonvulsants (Zonisamide): deplete the following nutrients from the body:

- Calcium.
- Vitamins B₁, B₇, B₈ and B₉.

24) Antidepressants (Tricyclics such as Amitriptyline):

deplete the following nutrients from the body:

- Co – Enzyme Q10.**
- Vitamin B2.**

25) Antidepressants (SSRIs such as Zolaft, Prozac, Celexa): deplete the following nutrients from the body:

- Melatonin.**

26) Antipsychotics (Phenothiazines such as Chlorpromazine, Haloperidol, Perphenazine, and Thioridazine): deplete the following nutrients from the body:

- Co – Enzyme Q10.
- Vitamin B2.

27) Anti – Diabetics:

a) Sulfonylureas (Chlorpropamide, Tolazamide, Tolbutamide, Glipizide, Glyburide, Glimepiride):

deplete the following nutrients from the body:

- Co - Enzyme Q₁₀

b) Biguanides (Metformin): deplete the following nutrients from the body:

- Vitamin B₁₂
- Folic acid
- Vitamin B₁

c) Insulin:

- Magnesium.

28) Anti - Inflammatory (Corticosteroids): deplete the following nutrients from the body:

- Vitamin D.
- Minerals: calcium, chromium, selenium, zinc, potassium and magnesium.

29) Anti - Inflammatory (Sulfasalazine): depletes the following nutrients from the body:

- Vitamin B9 (Folic acid).

30) Anti - Inflammatory (Colchicine): depletes the following nutrients from the body:

- Beta – Carotene.
- Vitamin B₁₂.
- Potassium.

31) Anti - Inflammatory (NSAIDs, such Ibuprofen, Indomethacin): deplete the following nutrients from the body:

- Folic acid.
- Vitamin C.
- Iron.

32) Aspirin: deplete the following nutrients from the body:

- Folic acid.
- Vitamin C.
- Iron.

33) Anti – HIV medications (Ribavirin, Zidovudine): deplete the following nutrients from the body:

- Copper.
- Zinc.
- Vitamin B₁₂.
- Carnitine.

34) Cardiovascular Medications:

Digoxin: depletes the following nutrients from the body:

- B1 (thiamine)
- Magnesium

b) Potassium Supplements: deplete the following nutrients from the body:

- Vitamin B12

35) Cholesterol – Lowering Meds (Cholestyramine):

deplete the following nutrients from the body:

- Beta-Carotene**
- Calcium**
- Vitamins B9 and B12**
- Iron**
- Magnesium**
- Phosphorus**
- Vitamins A, D, E, K**
- Zinc**

36) Cholesterol – Lowering Meds (Colestipol): deplete the following nutrients from the body:

- Beta-Carotene
- Folic Acid
- Iron
- Vitamin A
- Vitamin B₁₂
- Vitamin D
- Vitamin E
- Vitamin K



37) Cholesterol – Lowering Meds (Statins):

deplete the following nutrients from the body:

- Co – Enzyme Q₁₀.**
- Selenium.**
- Zinc.**
- Essential fatty acids.**

38) Cholesterol – Lowering Meds (Gemfibrozil):

deplete the following nutrients from the body:

- Co – Enzyme Q₁₀.**
- Vitamin E.**

39) Cholesterol – Lowering Meds (Clofibrate, Fenofibrate): deplete the following nutrients from the body:

- Co – Enzyme Q₁₀.
- Vitamin E.
- Homocysteine (increased).

40) Anti – Hypertensives

Drug-Induced Nutrient Depletions

Medications for High Blood Pressure

Medications	Nutrients Depleted
Hydralazine	Co-Enzyme Q10 Magnesium, Vitamin B6
Beta - Blockers	Co-Enzyme Q10
Clonidine	Co-Enzyme Q10
Loop Diuretics (Bumetanide, Furosemide)	Vitamin B6, Vitamin C, Potassium, Magnesium
Thiazide Diuretics	Potassium, Magnesium Zinc
Potassium-Sparing Diuretics (Triamterene, Spironolactone)	Co-Enzyme Q10 Folic Acid, Calcium

41) Female Hormones:

a) Estrogen Replacement: deplete the following nutrients from the body:

- Vitamins A, E, and B6
- Magnesium
- Co – Enzyme Q10

b) Oral contraceptives: deplete the following nutrients from the body:

- Vitamins C, B1, B2, B6, B9 and B12
- Magnesium
- Zinc

42) Laxatives:

a) Mineral oils deplete:

- Beta - Carotene
- Vitamins A, D, E, K.
- Calcium.
- Phosphorus.

b) Bisacodyl and Senna products depletes:

- Potassium.
- Calcium.
- Vitamin D.

Drugs that Deplete Vitamin B12:

**Cephalosporins
Cholestyramine
Cimetadine
Doxycycline
Esomeprazole
Famotidine
Fluoroquinolones
Kanamycin
Lanoprazole**

**Lansoprazole
Macrolides
Metformin
Minocycline
Neomycin
Nizatidine
Omperazole
Oral Contraceptives
Oxytetracycline**

**Pantoprazole
Penicillins
Phenytoin
Rabeprazole
Ranitidine
Sulfonamides
Tetracycline
Trimethoprim**

Drugs that Deplete Folic Acid:

Aspirin	Corticosteroids	Phenytoin
Barbiturates	Famotidine	Primidone
Carbamazepine	Hydrochlorothiazide	Ranitidine
Celecoxib	Indomethacin	Salsalate
Cholestyramine	Methotrexate	Triamterene
Cimetidine	NSAIDs	Trimethoprim
Colestipol	Oral Contraceptives	Valproic Acid

Drugs that Deplete Co - Enzyme Q10:

Amiloride	Gemifobrozil	Moexipril/HCTZ
Amoxapine	Glimepiride	Nortriptyline
Beta Blockers	Glipizide	Prochlorperazine
Candesartan/HCTZ	Glyburide	Protriptyline
Chlorpromazine	Haloperidol	Repaglinide
Chlorpropamide	Hydralazine	Statins
Clonidine	Imipramine	Thiazides
Desipramine	Indapamide	Thioridazine
Doxepin	Irbesartan/HCTZ	Tolazamide
Enalapril/HCTZ	Losartan/HCTZ	Tolbutamide
Fenofibrate	Methyldopa	Valsartan/HCTZ

Homework:

- 1) Describe how grapefruit interacts with some medications.
- 2) Describe the nutrients that are depleted from the body by *birth control pills*.

