

FOOD AND DRUG INTERACTIONS

Introduction

Any medication – whether over the counter or prescription – can lead to an interaction with foods you eat.

Common impacts of an interaction include:

- a delay or decrease the absorption of the drug
- an increase in the absorption of a medication and not allowing it to work for the length of time intended
- a side effect or worsening of a side effect

Questions to Ask (When Using a Medication)

Since foods and drugs can interact with each other – and not always positively – it is a good idea to ask questions about your medications with your doctor or pharmacist.

- Is there an optimal time to take medicine? Morning or evening?
- How do I take this drug? (i.e... with or without food, with a meal, etc.)
- If NOT with a meal, how long before I can eat? One hour before or 2 hours after eating?
- Can I take it with other drugs?
- Should I avoid certain foods, beverages or other products?
- What are possible drug interaction signs I should know about?

Steps to Reduce Interactions

There are steps you can take to reduce your risk of food and drug interactions.

- Unless prescribed by a doctor
 - Never open capsules and stir into foods
 - Never mix medicine into hot drinks as heat may change medication potency
 - Never stir your medication into food or drink
 - Never chew a tablet
- Never take medicine with alcoholic drink
- For tablets and pills
 - Take with a full glass of water (8 oz) to help reduce stomach irritation and improve absorption
- Talk to your MD and PharmD about
 - New medications
 - Over-the-counter medications
 - Supplements
 - Drug allergies
- Always carry a list of all your medications and the dosing instructions
- If you have any side effects from a medication, contact your doctor or pharmacist immediately. If you are not sure if symptoms are related to your medication, be sure to ask
- Since certain foods may break down the drug, or limit its absorption, following drug directions can help your medications work correctly

FOOD AND DRUG INTERACTIONS

Food Groups and Interactions

Food Group	Food Part	Mechanism	Related Drugs	Food Examples
Fruit	Furanocoumarin	Furanocoumarins limit the action of the enzyme CYP3A4, which helps drugs be metabolized. The amount of a drug may increase in the blood stream and may lead to toxicity symptoms. Equally, the amount of the drug maybe be lessened and not reach its therapeutic effect.	May include: <ul style="list-style-type: none"> • Statin (high cholesterol lowering) drugs • High blood pressure drugs • Anti-anxiety drugs • Corticosteroids • Drugs for abnormal heart rhythms • Antihistamines 	<ul style="list-style-type: none"> • Grapefruit juice • Grapefruit • Other Citrus Foods
Vegetables	Vitamin K	Vitamin K is involved in the blood clotting process. Eating an increased amount of food containing Vitamin K counteracts blood-thinning drugs and may increase the risk of blood clot formation. It is recommended to keep intake of foods high in Vitamin K consistent.	May include: <ul style="list-style-type: none"> • Anticoagulant/Blood Thinners 	<ul style="list-style-type: none"> • Spinach • Broccoli • Cabbage • Greens • Kale • Brussel Sprouts
Grains	Fiber	Fiber products taken with any medication and vitamin products often slows the transport of the tablet or capsule in the gut. The delay in transport can sometimes reduce the product dissolution and decrease the amount absorbed into the blood. This would reduce the effect of the product.	May include: <ul style="list-style-type: none"> • Digoxin • Metformin • Levothyroxine 	<ul style="list-style-type: none"> • Fiber supplements <p>Most high-fiber foods do not contain enough fiber to interfere with drug activity</p>

FOOD AND DRUG INTERACTIONS

Food Groups and Interactions

Food Group	Food Part	Mechanism	Related Drugs	Food Examples
Protein	Tyramine	Tyramine is an amino acid. Amino acids are building blocks of proteins, including protein foods we eat, such as meat, eggs, seafood, nuts, seeds, and more. Some medications prevent tyramine from being broken down as they normally do. The build-up of tyramine can result in dangerously high blood pressure.	May include: <ul style="list-style-type: none"> MAOIs (monoamine oxidase inhibitors) Drugs to treat symptoms of Parkinson's disease 	<ul style="list-style-type: none"> Chocolate Some cheeses Hot dogs and processed lunch meats Soy sauce
Dairy	Calcium	Antibiotics treat bacterial infections, and do not treat viral infections. Calcium binds to the antibiotics in the stomach and upper small intestine to form a compound that is difficult to absorb. Many antibiotics have instructions to take several hours before a meal with dairy or several hours after a meal with dairy.	May include: <ul style="list-style-type: none"> Antibiotics 	Dairy Foods <ul style="list-style-type: none"> Milk Yogurt Cheese <ul style="list-style-type: none"> Calcium-Fortified Juices
Fats	Fat	Some medications are recommended to be taken with lower-fat diets and foods, such as cholesterol medications. The goal of this is to better assist in the action of the drug to lower blood cholesterol and not inhibit the drug by adding extra fat to the blood.	May include: <ul style="list-style-type: none"> Statins (cholesterol lowering drugs) ACE Inhibitors (dilate blood vessels) Bronchodilators Antifungal 	<ul style="list-style-type: none"> Butter Lard High-fat meat products Fried foods High fat meals Pastries and desserts

FOOD AND DRUG INTERACTIONS

Fortified Nutrients and Interactions

Food Part	Related Drugs	Foods
Folate	<p>May ↓ absorption of folate:</p> <ul style="list-style-type: none"> • Antacids • Bile acid sequestrants • Nonsteroidal anti-inflammatory drugs (NSAIDs) • Birth Control Medications • Anticonvulsants 	<p>Fortified Foods:</p> <ul style="list-style-type: none"> • Enriched Breads, Cereal, Flour and Grain Products <p>Supplements:</p> <ul style="list-style-type: none"> • Multivitamins • Folate supplements
Vitamin D	<p>May ↑ vitamin D in the blood:</p> <ul style="list-style-type: none"> • Hormone replacement therapy with estrogen <p>May ↓ vitamin D levels:</p> <ul style="list-style-type: none"> • Antacids • Calcium channel blockers • Cholestyramine • Anticonvulsant medications 	<p>Fortified Foods:</p> <ul style="list-style-type: none"> • Dairy • Enriched Breads, Cereal, Flour and Grain Products <p>Supplements:</p> <ul style="list-style-type: none"> • Multivitamins • Vitamin D supplements
Iron	<p>↓ absorption of iron</p> <ul style="list-style-type: none"> • Bile acid sequestrants • Ulcers medications <p>Iron ↓ with:</p> <ul style="list-style-type: none"> • Antibiotics • ACE inhibitors <p>Iron ↑ by:</p> <ul style="list-style-type: none"> • Birth control medications 	<p>Fortified Foods:</p> <ul style="list-style-type: none"> • Enriched Breads, Cereal, Flour and Grain Products <p>Supplements:</p> <ul style="list-style-type: none"> • Multivitamins • Iron supplements

FOOD AND DRUG INTERACTIONS

Fortified Nutrients and Interactions

Food Part	Related Drugs	Foods
Vitamin B-12	↓ B12 in the body: <ul style="list-style-type: none"> • Anticonvulsants • Chemotherapy medications • Bile acid sequestrants • H2 blockers • Metformin • Proton pump inhibitors B-12 supplements may interfere with antibiotic drug absorption	Fortified Foods: <ul style="list-style-type: none"> • Enriched Breads, Cereal, Flour and Grain Products • Vegan and vegetarian foods Supplements: <ul style="list-style-type: none"> • Multivitamins • B-12 supplements

Other Nutrients and Interactions

Other	Food Part	Related Drugs	Food Examples
Salt Substitutes	Potassium	May include: <ul style="list-style-type: none"> • Digoxin • ACE inhibitors 	Salt substitutes that contain potassium (i.e.. NoSalt)
Alcohol	Alcohol	May include: <ul style="list-style-type: none"> • Pain relievers/Fever reducers/NSAIDs • Bronchodilators • Statins • Nitrates • Metformin 	Any alcohol-containing drink

FOOD AND DRUG INTERACTIONS

Activity: Menu Planning

When medications and your regular diet collide, it is important to think of what you can do limit an interaction.

In this activity, discuss what the person in each situation could do to limit and prevent food-drug interactions.

Situation	Ideas
<p>I usually make a yogurt smoothie with my breakfast. But I am taking an antibiotic in the morning with food. What can I eat for breakfast instead?</p>	
<p>Salads are one of my favorite lunch foods. My doctor put me on a blood thinner. I guess I cannot eat vegetables anymore. Is that right?</p>	
<p>I have high blood pressure and was told to not eat so much salt. I like my salt substitute, but now I'm on a drug where I cannot use it. Something about potassium. My foods taste so bland. Help!</p>	

FOOD AND DRUG INTERACTIONS

Activity: Eating the Nail

Iron is one of the nutrients that is impacted by drug and medication use. Like most vitamins and minerals, we do not see them, but they are in our foods. To show that iron is added in supplements and fortified foods, try this activity called “Eating the Nail.”

Background: Iron is a mineral that is important for humans. Iron helps carry oxygen around the body. It also is involved in the growth of red blood cells. To get iron, we need to eat foods with iron, such as meats, beans, and leafy green vegetables. Some foods – including dry cereals – have iron added.

Activity Materials:

- 1 cup fortified breakfast cereal with high iron (Total Cereal recommended)
- 1-quart sized zip-top bag
- 1-cup liquid measuring cup
- *water*
- 1 paper plate
- 1 strong magnet
- 3-4 food boxes with labels

Magnet Activity Directions:

1. Measure dry cereal into zip-top bag. Seal out air. With fingers, crunch cereal in bag into small pieces until it appears powdery. The finer the cereal, the more easily iron will be seen.
2. Open bag carefully and add enough *water* so half the bag is full of water and cereal. Seal closed.
3. Swoosh cereal and water around to help combine water and cereal.
4. Lay bag on its side on the paper plate. Let bag sit for 15-30 minutes. Move the magnet under the bag slowly. Start to look for little black or gray lines or flecks moving with the magnet in the cereal. These lines are iron.

Conclusion: Greatest Benefit from Medications

To get the greatest benefit from your medications, it is recommended to:

- Let your physician know about every drug, including over-the-counter drugs or herbal supplements you are taking
- Make sure you understand how and when the drug should be taken
- Ask if there are any foods that should be avoided
- Consult with your physician before consuming alcohol if you are on medication

FOOD AND DRUG INTERACTIONS

References

- 5 Common Food-Drug Interactions, Academy of Nutrition and Dietetics, 2014
- Avoid Food and Drug Interactions, Food and Drug Administration
- Bailey, et al. CMAJ, 2013; 185 (4), doi: 10.1503/cmaj.120951
- Drug Interactions: What You Should Know, Food and Drug Administration (FDA), 2013
- Dugrand-Judek et al. PLoS ONE, 2015; 10(11), doi.org/10.1371/journal.pone.0142757
- Food and Drug Interactions by Norman Tomaka, C.R.Ph.
- Food–Drug Interactions: Which Ones Really Matter?, Darrell Hulisz & Justin Jakob, US Pharm. 2007;32(3)93-98
- Mahoney A, Evans J. AMIA Annu Symp Proc. 2008 Nov 6:1039, Comparing drug classification systems
- National Institute of Health, 2013 & 2015
- National Institute of Health, Important Drug and Food Information From the National Institutes of Health Clinical Center Drug-Nutrient Interaction Task Force Important information to know when you are taking: Warfarin (Coumadin) and Vitamin K, 2012, https://www.cc.nih.gov/ccc/patient_education/drug_nutrient/coumadin1.pdf
- National Institute of Health, Vitamin K Fact Sheet for Consumers, 2016, <https://ods.od.nih.gov/factsheets/VitaminK-Consumer/>
- National Institutes of Health, Office of Dietary Supplements
- Possible Interactions with: Iron, University of Maryland Medical Center, 2007
- Possible Interactions with: Vitamin B12 (Cobalamin), University of Maryland Medical Center, 2007
- Possible Interactions with: Vitamin B9 (Folic Acid), University of Maryland Medical Center, 2007
- Possible Interactions with: Vitamin D, University of Maryland Medical Center, 2007

Developed by: Laura Barr, Caitlin Huth, and Susan Glassman, Nutrition & Wellness Team, 2017
Reviewed by: Jenna Smith and Marilyn Csernus, Nutrition & Wellness Team 2017