

Thieves for biofactors – an overview

Drugs that may influence the balance of biofactors

drug group	drug (active substance)	minerals	vitamins
analgesics (NSAID)	acetylsalicylic acid	calcium ↓ iron ↓ (R)	vitamin B ₁₂ ↓ (R) folic acid ↓ (R, A) vitamin C ↓ (R, A)
anti-obesity drugs	orlistat		vitamin A ↓ (R, A) vitamin D ↓ (R, A) vitamin E ↓ (R, A) vitamin K ↓ (R, A) carotenoids (such as lycopene, lutein) ↓ (R, A)
anti-asthmatics	corticoids	calcium ↓ (R, A)	vitamin D ↓ (R, C)
	theophylline		vitamin B ₆ ↓ (C)
antibiotics	aminoglycoside antibiotics (such as amikacin, gentamycin, tobramycin)	magnesium ↓ (R, A) calcium ↓ (A) potassium ↓ (A)	
	aminoglycoside antibiotic neomycin	magnesium ↓ (R) calcium ↓ (R) potassium ↓ (R)	vitamin B ₁₂ ↓ (R) vitamin A ↓ (R) vitamin K ↓ (R)
	chloramphenicol (reserve antibiotic)		vitamin B ₁₂ ↓ (R) vitamin C ↓ (A)

	tetracycline (broad spectrum antibiotics such as doxycycline, tetracycline)	magnesium ↓ (R) calcium ↓ (R) potassium ↓ (R) iron ↓ (R) zinc ↓ (R)	vitamin C ↓ (A)
	isoniacid		vitamin B ₆ ↓ (C)
	penicillin	potassium ↓	
	rifampicin	calcium ↓	
	clotrimazole (trimethoprim and sulfamethoxalole)		folic acid ↓ (C)
antidepressants and neuroleptics	lithium	iodine ↓ (R)	
	selective serotonin reuptake inhibitors (SSRI): citalopram, fluoxetine, sertraline	calcium ↓	vitamin D ↓
antidiabetics	insulin sensitizer	calcium ↓	vitamin D ↓
	metformin		vitamin B ₁₂ ↓ (R) folic acid ↓ (R)
anti-epileptic drugs	carbamazepine/valproic acid/primidone	calcium ↓ (R) magnesium ↓ (R)	folic acid ↓ (R) vitamin B ₆ ↓ (R) vitamin B ₁₂ ↓ (R) vitamin D ↓ (A, C)
	phenytoin	calcium ↓ (R) magnesium ↓ (R)	vitamin B ₁ ↓ (R) folic acid ↓ (R) vitamin B ₆ ↓ (R) vitamin B ₁₂ ↓ (R) biotin ↓ (R)

			vitamin D ↓ (A, C)
	phenobarbital (slow acting barbiturate)	calcium ↓ (R) magnesium ↓ (R)	vitamin B ₁ ↓ (R) folic acid ↓ (R) vitamin B ₆ ↓ (R) vitamin B ₁₂ ↓ (R) biotin ↓ (R) vitamin D ↓ (A, C)
antihypertensive agents	ACE inhibitors (such as captopril)	magnesium ↓ (A) zinc ↓ (R, A) potassium ↑ lithium ↑	
	dihydralazine (vasodilator, especially in pregnancy hypertension)		vitamin B ₆ ↓ (C)
	methyldopa		vitamin B ₁₂ ↓ (R)
	angiotensin II antagonists	potassium ↑	
anticoagulants	heparin	calcium ↓ (R)	vitamin D ↓ (R)
antimycotics	amphotericin B	magnesium ↓ calcium ↓ zinc ↓	
anti-parkinson drugs	L-dopa/carbidopa gel (intestinal application)		vitamin B ₆ ↓ (R) vitamin B ₁₂ ↓ (R) folic acid ↓ (R)
antiphlogistics	ibuprofen, indometacin	potassium ↑	
antirheumatic drugs	methotrexate	magnesium ↓ zinc ↓	vitamin B ₁₂ ↓ (R) folic acid ↓ (C)
	sulfasalazine		folic acid ↓ (R)

	penicillamine (also in heavy metal intoxication)	magnesium ↓ zinc ↓	vitamin B ₆ ↓ (R, C)
antituberculosis drugs	isoniacid		vitamin B ₆ ↓ (C) secondary: niacin ↓ vitamin D ↓ (R)
	rifampicin		vitamin D ↓ (R)
	ethambutol	zinc ↓ (R, A)	
anxiolytic drugs, sedatives	benzodiazepines (such as diazepam, lorazepam)		vitamin D ↓
	anaesthetics (such as propofol, ketamine)		vitamin C ↓
	barbiturates (such as phenobarbital)	calcium ↓ (R) magnesium ↓	vitamin B ₁ ↓ (R) folic acid ↓ (R) vitamin B ₆ ↓ (R) vitamin B ₁₂ ↓ (R) biotin ↓ (R) vitamin C ↓ (R) vitamin D ↓ (A, C)
	selective serotonin and noradrenaline reuptake inhibitor (SSNRI): venlafaxine	magnesium ↓ (R)	
bronchodilators	corticosteroids inhaled	calcium ↓ (R, A) potassium ↓	vitamin D ↓ (R, C)
diuretics	thiazide diuretics (such as hydrochlorothiazide)	magnesium ↓ (A) potassium ↓ (A) calcium ↑ (R, A)	vitamin B ₁ ↓ (A) vitamin B ₆ ↓ (A) vitamin B ₁₂ ↓ (A)

		zinc ↓ (A)	folic acid ↓ (A)
	loop diuretics (such as furosemide)	magnesium ↓ (A) potassium ↓ (A) calcium ↓ (A) zinc ↓ (A)	vitamin B ₁ ↓ (A) vitamin B ₆ ↓ (A) vitamin B ₁₂ ↓ (A) folic acid ↓ (R, A, C)
	potassium-saving diuretic (such as triamterene)	zinc ↓ (A)	vitamin B ₁ ↓ (A) vitamin B ₆ ↓ (A) vitamin B ₁₂ ↓ (A) folic acid ↓ (C)
	spironolactone	potassium ↑	
gout medication	allopurinol	iron ↑	
	colchicine	calcium ↓ potassium ↓ magnesium ↓	vitamin B ₁₂ ↓ (R)
gynaecological drugs and sex hormones	oral contraceptives (“contraceptive pill”): estrogens, progesterone	magnesium ↓ (R, A) calcium ↓↑ zinc ↓ (A) iron ↑	vitamin B ₂ ↓ vitamin B ₁₂ ↓ (R) folic acid ↓ (R, A) vitamin C ↓ (R)
immunosuppressive drugs	azathioprine		folic acid ↓ (R)
	cyclosporine A	magnesium ↓ (A) potassium ↓↑ (A)	
	rituximab	magnesium ↓ (A) potassium ↓ (A)	
cardiac drugs	cardiac glycosides (digitalis preparations such as digoxin, digitoxin)	magnesium ↓ (A) potassium ↓↑ (A)	vitamin B ₁ ↓ (R, A)

	calcium antagonists		folic acid ↓
corticosteroids	glucocorticoids	calcium ↓ (R, A) magnesium ↓ (A) potassium ↓ (A) zinc ↓ (A)	vitamin C ↓ (R, A) vitamin D ↓ (C) due to calcium deficiency
lipid-lowering and cholesterol lowering drugs	colestyramin	magnesium ↓ calcium ↓	vitamin A ↓ (R) vitamin D ↓ (R) vitamin E ↓ (R) vitamin K ↓ (R) vitamin B ₁₂ ↓ (R) folic acid ↓ (R) vitamin C ↓ (R) in case of liver diseases
	nicotinic acid		vitamin B ₆ ↓ (C)
gastrointestinal therapeutics	antacids with Al/Mg- hydroxide	iron ↓ (R) calcium ↓ (R) magnesium ↑ (R) zinc ↓ (R) copper ↓ (R) phosphorus ↓ (R)	vitamin B ₁₂ ↓ (R) folic acid ↓ (R)
	sodium bicarbonate	zinc ↓ (R)	folic acid ↓ (R) vitamin B ₁₂ ↓ (R)
	proton pump inhibitors (such as omeprazole, pantoprazole)	magnesium ↓ (A) calcium ↓ iron ↓ (R) zinc ↓	vitamin B ₁₂ ↓ (R) folic acid ↓ (R) vitamin D ↓ vitamin C ↓ (R)

	H ₂ receptor antagonist cimetidine	zinc ↓ (R) iron ↓ (R) calcium ↓ (R)	folic acid ↓ (R) vitamin B ₁₂ ↓ (R) vitamin D ↓ (R)
	H ₂ receptor antagonist famotidine	zinc ↓ (R) iron ↓ (R) calcium ↓ (R)	folic acid ↓ (R) vitamin B ₁₂ ↓ (R)
	sulfasalazine (inflammatory bowel disease)		folic acid ↓ (R, C)
	laxatives (long-term use)	magnesium ↓ (A) potassium ↓ (A) sodium ↓ (A) calcium ↓ (A) zinc ↓ (A)	folic acid ↓ (R)
cytostatics	antimetabolite methotrexate, pemetrexate	magnesium ↓ zinc ↓	folic acid ↓ (C) vitamin D ↓
	antimetabolite capecitabine		vitamin B ₆ ↓
	antimetabolite 5- fluorouracil (5-FU)		vitamin B ₁ ↓ (R, C) Niacin ↓ (R) vitamin D ↓ (R)
	rituximab	magnesium ↓ (R) potassium ↓ (R)	
	platinum analogue (such as cisplatin)	magnesium ↓ (A) potassium ↓ (A) zinc ↓ (A)	
	interleukin-2		vitamin C ↓ (R)

Explication:

A – the biofactor is eliminated increasingly

B – resorption disorder: absorption of the biofactor in the gastrointestinal tract is impaired

C – antagonist: the drug is opponent to the vitamin and impedes or inhibits its effect

↓ - reduction of the biofactor level or biofactor function

↑ - increase of the biofactor level or biofactor function