

## Optimizing Liver Detoxification Pathways

with  
**Dr. Ritamarie Loscalzo**

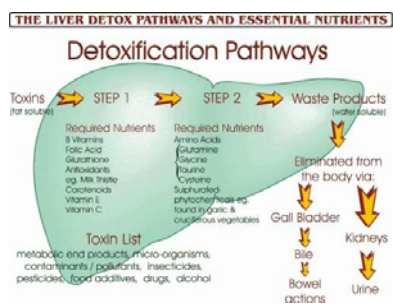
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## The Body's Clean-Up Crew

- Liver
- Kidney
- Skin
- Digestive Tract
- Sweat
- Lungs



**THE LIVER DETOX PATHWAYS AND ESSENTIAL NUTRIENTS**

**Detoxification Pathways**

Toxins (fat soluble) → STEP 1 → STEP 2 → Waste Products (water soluble)

**Required Nutrients**

STEP 1: B Vitamins, Folic Acid, Glutathione, Antioxidants (eg. Milk Thistle, Coenzyme Q, Vitamin E, Vitamin C)

STEP 2: Amino Acids (Glutamine, Glycine, Taurine), Cysteine, Sulfurated phytochemicals (found in garlic & cruciferous vegetables)

**Toxin List**  
metabolic end products, micro-organisms, contaminants / pollutants, insecticides, pesticides, food additives, drugs, alcohol


**Eliminated from the body via:**  
Gall Bladder → Bile → Bowel actions  
Kidneys → Urine

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## Phases of Liver Detox

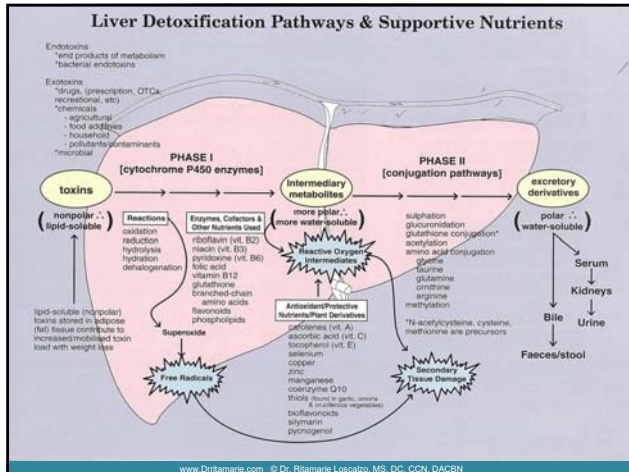
- Blood vessel from digestive tract straight to liver
- 98% neutralized by liver before they get into circulation (if HEALTHY!!)
- **Phase 1:** Simple process: all get the same one or two different reactions
- **Phase 2:** Complicated process to render water soluble for elimination
  - ✓ Amino acids
  - ✓ Vitamins
  - ✓ Minerals
  - ✓ Antioxidants

**\*\* Different process for hormones, heavy metals, pesticides, hydrocarbons**

- **Pathological detoxifier:** Phase 1 faster than phase 2


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# Dr. Ritamarie: Optimizing Liver Detoxification Pathways



## Inducers of Phase 1

- Alcohol
- Caffeine
- Aspirin and Tylenol
- Nicotine
- Phenobarbital, Steroids, and Sulfa
- Charcoal-broiled meats
- Exhaust fumes

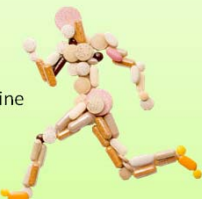


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## Phase 1 Nutrients

### Speed Up Phase 1

- Vitamin C
- B vitamins, especially B2 and B3
- Glutathione
- Bioflavonoids
- NAC
- Magnesium
- Selenium
- Iron
- Choline, inositol
- Cysteine, methionine



### Slow Down Phase 1

- Naringenin from grapefruit
- Turmeric
- Capsaicin
- Clove oil
- Quercetin
- Calendula

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## When Phase 2 Gets Backed Up

- Build up of toxic intermediates
- Stored as fat
- Storage in brain (fat) and myelin
- Creates symptoms**
  - ✓ Headaches
  - ✓ Sluggishness
  - ✓ Brain fog
  - ✓ Focus problems



Like the famous I Love Lucy scene

<http://www.drRitamarie.com/go/ILoveLucy>

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## Understanding Phase 2 Detoxification

→ Your liver adds another substance to a toxin to make it water-soluble and less harmful so it can be easily and safely excreted.  
Also called the **conjugation pathway**.

### → Pathways in Phase 2

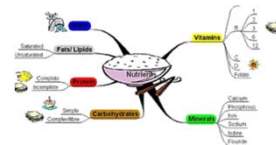
- ✓ Glutathione conjugation
- ✓ Amino acid conjugation
- ✓ Methylation
- ✓ Sulfation
- ✓ Acetylation
- ✓ Glucuronidation
- ✓ Glycination (one of the most important amino acid conjugations)



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## Nutrients Needed for Detox

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>▪ Amino acids</li> <li>▪ Vitamin C</li> <li>▪ Vitamin E</li> <li>▪ Glutathione</li> <li>▪ Sulfur containing substances like MSM</li> </ul> | <ul style="list-style-type: none"> <li>✓ Vitamin B1</li> <li>✓ Vitamin B2</li> <li>✓ Vitamin B3</li> <li>✓ Vitamin B5</li> <li>✓ Vitamin B6</li> <li>✓ Vitamin B12</li> </ul> | <ul style="list-style-type: none"> <li>▪ Folate (natural form of folic acid)</li> <li>▪ EFAs: black current oil, flax oil, EPA</li> <li>▪ Magnesium</li> <li>▪ Molybdenum</li> <li>▪ Manganese</li> <li>▪ Iron</li> <li>▪ Selenium</li> <li>▪ Zinc</li> </ul> |
|---|---|---|



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## Methylation

### Gets Rid of

- ✓ Dopamine
- ✓ Histamine
- ✓ Phenols
- ✓ Homocysteine
- ✓ Heavy metals
- ✓ Neurotransmitters
- ✓ Steroid hormones, i.e., estrogen

### Nutrients Required

- ✓ Choline: avocado, soy, sunflower
- ✓ Molybdenum
- ✓ B vitamins
- ✓ Betaine: beets
- ✓ SAMe: 500 mg x3
- ✓ Methionine
- ✓ Magnesium
- ✓ Methyl folate
- ✓ Methyl B-12
- ✓ Methyl Donors: TMG, DMG, MSM



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## Sulfation

### Gets Rid of

- ✓ Phenols
- ✓ Bile acids
- ✓ Thyroid hormones
- ✓ Acetaminophen
- ✓ Aspartame
- ✓ Bacteria endotoxins
- ✓ Neurotransmitters
- ✓ Xenoestrogens
- ✓ Steroid hormones
  - Cortisol
  - Androgens
  - Female Hormones

### Inhibitors


- ✓ NSAIDs
- ✓ Excessive molybdenum
- ✓ Vitamin B6 over 100 mg

### Support


- ✓ Amino acids: methionine, cysteine, taurine
- ✓ High sulfur foods: brassicas, MSM
- ✓ Glutathione
- ✓ NAC
- ✓ Magnesium




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Glucuronidation	
<b>Gets Rid of</b> <ul style="list-style-type: none"> <li>✓ Bilirubin</li> <li>✓ Bile acids</li> <li>✓ Excess hormones</li> <li>✓ Aspirin, salicylates</li> <li>✓ OTCs</li> <li>✓ Morphine</li> <li>✓ Pollutants</li> <li>✓ Fatty acid derivatives</li> <li>✓ Retinoids</li> <li>✓ Food additives and preservatives (Benzoates)</li> <li>✓ Aspartame</li> <li>✓ Menthol</li> <li>✓ Vanillin (synthetic vanilla)</li> </ul>	<b>Inhibitors</b> <ul style="list-style-type: none"> <li>✓ Aspirin, Probenecid</li> <li>✓ Fluoride</li> </ul> <b>Support</b> <ul style="list-style-type: none"> <li>✓ Omega-3 <ul style="list-style-type: none"> <li>➢ DHA</li> <li>➢ EPA</li> </ul> </li> <li>✓ Limonene: Citrus essential oil</li> <li>✓ SAME</li> <li>✓ Magnesium</li> <li>✓ B-vitamins</li> </ul> 


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Glutathione Conjugation	
<b>Gets Rid of</b> <ul style="list-style-type: none"> <li>✓ Heavy metals <ul style="list-style-type: none"> <li>➢ Mercury</li> <li>➢ Cadmium</li> <li>➢ Lead</li> </ul> </li> <li>✓ Solvents</li> <li>✓ Herbicides</li> <li>✓ Fungicides</li> <li>✓ Polycyclic aromatic hydrocarbons</li> <li>✓ Lipid peroxides</li> </ul>	<b>Inhibitors</b> <ul style="list-style-type: none"> <li>✓ Aspirin, fluoride</li> <li>✓ Deficiencies in selenium, zinc, B2</li> </ul> <b>Support</b> <ul style="list-style-type: none"> <li>✓ Brassicas, garlic</li> <li>✓ Limonene</li> <li>✓ Vitamin C</li> <li>✓ Milk thistle</li> <li>✓ Essential Fatty Acids</li> <li>✓ NAC, Cysteine, Glycine, Glutamic Acid</li> <li>✓ Zinc, Selenium</li> <li>✓ B vitamins</li> <li>✓ Alpha lipoic acid</li> </ul> 

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Acetylation	
<b>Gets Rid of</b> <ul style="list-style-type: none"> <li>✓ Sulfa drugs</li> <li>✓ Antibiotics</li> <li>✓ Histamine</li> <li>✓ Serotonin</li> <li>✓ PABA</li> <li>✓ Procaine</li> <li>✓ Hydrazines</li> <li>✓ Sulfur amides</li> <li>✓ Tobacco</li> <li>✓ Other environmental toxins</li> </ul>	<b>Inhibitors</b> <ul style="list-style-type: none"> <li>✓ Cigarette smoke</li> <li>✓ Refined food</li> </ul> <b>Support</b> <ul style="list-style-type: none"> <li>✓ Thiamine (B1)</li> <li>✓ Pantothenic acid (B5)</li> <li>✓ Vitamin C</li> <li>✓ Cruciferous vegetables</li> <li>✓ Garlic and onions</li> <li>✓ Soy</li> <li>✓ Grapes</li> <li>✓ Berries</li> </ul> 

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Amino Acid Conjugation	
<b>Gets Rid of</b> <ul style="list-style-type: none"> <li>✓ Xenobiotics</li> <li>✓ Pollutants</li> <li>✓ Salicylates</li> <li>✓ Benzoate</li> <li>✓ Toluene</li> <li>✓ Aspirin</li> </ul>	<b>Inhibitors</b> <ul style="list-style-type: none"> <li>✓ Low protein diet</li> <li>✓ High toxic exposure</li> <li>✓ Fluoride</li> </ul> <b>Support</b> <ul style="list-style-type: none"> <li>✓ Glycine***</li> <li>✓ Taurine</li> <li>✓ Glutamine</li> <li>✓ Arginine</li> <li>✓ Ornithine</li> <li>✓ Sodium</li> <li>✓ Potassium</li> <li>✓ Alkaline diet</li> <li>✓ Curcumin</li> </ul> 

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## Substances That Inhibit Phase 2 Detoxification

- **Glutathione conjugation:** Selenium deficiency, vitamin B2 deficiency, glutathione deficiency, zinc deficiency, alcohol, antibiotics
- **Amino acid conjugation:** Low protein diet
- **Methylation:** Methyl folate or vitamin B12 deficiency
- **Sulfation:** Non-steroidal anti-inflammatory drugs (e.g., aspirin), tartrazine (yellow food dye), molybdenum deficiency
- **Acetylation:** Vitamin B2, B5, or C deficiency
- **Glucuronidation:** Aspirin, probenecid



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## Foods Helpful for Detoxification

- Brassicas – Indole-3-carbinol  
✓ Especially broccoli sprouts and seeds
- Citrus peels: limonene
- Caraway: limonene
- Turmeric
- Avocado
- Basil
- Beets
- Carrots
- Tomatoes
- Leafy bitter greens
- Cardamom
- Cayenne
- Chlorella
- Cilantro
- Cinnamon
- Dandelion
- Dill
- Fennel
- Garlic
- Ginger
- Grapefruit
- Green juices
- Jerusalem artichoke
- Onion
- Peppermint
- Rosemary
- Sea vegetables
- Thyme
- Wheat grass



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## Foods That Support Phase 2 Detoxification

- **Glutathione conjugation:** Brassica family foods (cabbage, broccoli, Brussels sprouts); limonene-containing foods (citrus peel, dill weed oil, caraway oil)
- **Glucuronidation:** Fish oils, limonene-containing foods
- **Methylation:** Beets, brassicas, leafy greens
- **Sulfation:** Brassicas, garlic, onion
- **Amino Acid Conjugation:** Protein
- **Acetylation:** Garlic, onions, soy, berries, grapes, brassicas



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## Herbs That Support Detox



Milk thistle



Dandelion



Burdock



Echinacea



Artichoke leaf



Turmeric

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## Foods That Disrupt Detox

- Alcohol
- Artificial colorings and flavorings
- Caffeine
- Processed meats and non-organic meats
- Trans fats
- Refined foods
- Allergy producing foods  
(The "Top 6" plus all known)
  - Gluten
  - Soy
  - Dairy Products
  - Eggs
  - Corn
  - Peanuts



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## Steps to Optimizing Detoxification

1. Avoid exposures to toxins
2. High-nutrient content diet
3. High-fiber diet
4. Optimize digestion
5. Exercise
6. Pure water
7. Pure air
8. Reduce stress



Following the body's natural  
pathways to rid itself of disease

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## Factors Affecting Detoxification Ability

- Genetics
- Exposures
- Nutritional  
Status
- Liver Strength
- Stress



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## Glutathione: The Goddess of Detox

- Produced by the liver
- Depleted by lifestyle and exposure:
  - Poor diet
  - Pollution
  - Trauma
  - Infection
  - Radiation
  - Stress
  - Medication
  - Aging
- Requires vitamins B6, methylated forms of B12, and methyl folate to produce
- Created from amino acids - glycine, glutamine, and cysteine
- Supports immune system, brain



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### How Can You Make More Glutathione?

- Broccoli sprouts
- Garlic
- Onions
- **Cruciferous vegetables:** Collards, kale, cabbage, broccoli, cauliflower, arugula, kohlrabi, mustard greens, radish, watercress, and wasabi
- **Adequate vitamins:** B6, methylated form of B12, and methyl folate – whole foods; not processed
- **Amino acids:** Cysteine, glycine, and glutamine – need efficient protein digestion, stomach acid, and enzymes
- **Minerals:** Zinc and selenium – whole foods, green foods
- **Herbs:** Milk thistle, turmeric, ashwagandha, and others



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### Other Foods And Herbs To Assist Liver Detoxification

- Turmeric
- Green tea
- NAC (n-acetyl cysteine) 500 mg twice a day
- Vitamin C: 1000 mg twice a day
- Omega-3 fats
- Quality amino acids from easily digested protein (raw, greens, sprouts, sprouted nuts, seeds, grains and legumes, raw protein powders when extra needed during detox)



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### Detox Daily Activities

1. Skin brushing
2. Tongue cleaning
3. Saunas and steam baths
4. Yoga and cleansing breath
5. Detox baths
6. Colonics and enemas
7. Castor oil and clay packs
8. Exercise
9. Abdominal massage



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### The Biggest Mistakes People Make When Detoxing

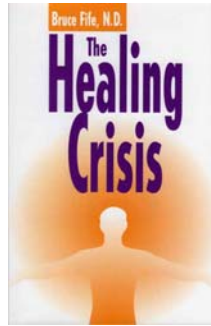
- Going too fast
- Not addressing stress
- Working too hard
- Not exercising
- Not keeping colon clean
- Not giving liver extra help



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### How to Tell the Difference Between “Detox” and “Crisis”

- Healing crisis vs. true crisis
- Intense but shorter
- Comes on and leaves quickly
- Leaves you feeling better afterwards



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### How to Enhance, Slow Down, or Stop Detox as Needed!

- Nutrients
- Foods that slow Phase 1
- Foods that enhance Phase 2



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### Antidotes For Excessive Detox Symptoms

- **Symptoms**
  - ✓ Skin rashes
  - ✓ Headaches
  - ✓ Fatigue
  - ✓ Nausea
  - ✓ Irritable bowel
  - ✓ Confusion and memory problems

- **Immediate relief**
  - ✓ Buffered vitamin C
  - ✓ Enema
  - ✓ Sulfur rich foods: crucifers, garlic, onion, MSM
  - ✓ Detox bath
  - ✓ Sweating: exercise or sauna



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### Preparing For Deep Toxin Release

- **Remove all processed food** from environment
- **Remove toxic cleaners**, chemicals, and body care products
- **Get ready to sweat – regularly**
  - ✓ Interval training: exercise all-out for 30 – 60 seconds then slow down and repeat
  - ✓ Saunas
  - ✓ Steam room
- **Create a stress management/transformation routine**
  - ✓ Yoga
  - ✓ Meditation
  - ✓ HeartMath™
  - ✓ Prayer
  - ✓ Journaling
  - ✓ Your choice



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### Everyday Detox Daily Schedule

- Morning: Water with lemon, lemon oil, and peppermint -- optionally cayenne
- Green breakfast with chia seeds
- HeartMath™ before each meal
- Chew, chew, chew (or blend)
- 4 cups brassicas
- 2 teaspoons ground broccoli seeds
- Broccoli sprouts
- 1 tablespoon ground milk thistle seeds
- Greens at each meal
- Exercise



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### 28-Day Deep Detox Process

- **Week 1:** Elimination Phase
- **Week 2:** Ramping Up Phase 2 Liver Support
- **Week 3:** Phase 2 Liver Support
- **Week 4:** Rebuild and Nourish



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