Zinc Absorption and Metabolism

The body’s handling of zinc resembles that of iron in some ways and differs in others. A key difference is the circular passage of zinc from the small intestine to the body and back.
Zinc Absorption

- Varies from about 15 – 40% 
- Depending on a person’s zinc status
  - If more is needed, more is absorbed
  - Dietary factors influence zinc absorption
    - Phytates bind zinc, limiting bioavailability
- Once absorbed into an intestinal cell, zinc has two options
  - Participate in the metabolic functions of the intestinal cell itself
  - Be retained within the intestinal cell by metallothionein until the body needs zinc
Zinc Recycling = Enteropancreatic circulation

- Some zinc eventually reaches the pancreas
- In the pancreas zinc is incorporated into many of the digestive enzymes
- The pancreas releases these digestive enzymes into the small intestine at mealtimes
- The small intestine thus receives two doses of zinc with each meal
  - From foods
  - From zinc-rich pancreatic secretions
- Recycling of zinc from pancreas to small intestine and back to pancreas is known as the enterohepatic circulation of zinc
Zinc Recycling continue...

- Each time zinc circulates through the small intestine, it may be:
  - Excreted in shed intestinal cells
  - OR reabsorbed into the body

- The body loses zinc primarily in feces

- Smaller losses occur in urine, shed skin, hair, sweat, menstrual fluids, and semen.
Enteropancreatic Circulation of Zinc

Zinc in food

If the body does not need zinc
Zinc is not absorbed and is excreted in shed intestinal cells instead. Thus, zinc absorption is reduced when the body does not need zinc.

If the body needs zinc

Mucosal cells in the intestine store excess zinc in metallothionein.

Metallothionein releases zinc to albumin and transferrin for transport to the rest of the body.

The pancreas uses zinc to make digestive enzymes and secretes them into the intestine.

Image of a plate with food, a pancreas, and a digestive tract.
Summary of the Figure

1. Some zinc from food is absorbed by the small intestine
2. And send to the pancreas
3. To be incorporated into digestive enzymes
4. That return to the small intestine
5. This cycle is called the enteropancreatic circulation of zinc