Water Soluble Vitamins
Water-Soluble Vitamins

- Dissolve in water
- Generally readily excreted
- Subject to cooking losses
- Function as a coenzyme
- Participate in energy metabolism
- 50-90% of B vitamins are absorbed
- Marginal deficiency more common
Thiamin (Vitamin $B_1$)

• The first B vitamin that researchers discovered.

• Thiamine plays a vital role in the transmission of nerve impulses by keeping nerves healthy.

• Thiamine also allows body to break down alcohol and metabolize carbohydrates and amino acids.
Food sources of Thiamine

The following are good dietary sources of thiamin:

• legumes (beans, lentils), beef and pork,

• Brewer's yeast, whole grain breads and cereals, oatmeal,

• enriched pastas, rice bran and wheat germ, milk, nuts, seeds and oranges.
Rich Foods to Include in Your Diet
Deficiency of Thiamin

- Occurs where polished rice is the only staple

- Symptoms of thiamin deficiency (also known as "beriberi") can result from inadequate intake or excessive loss of thiamin from the body, an increased requirement for thiamin, or consumption of anti-thiamin factors in food.
Some people are at a higher risk for thiamin deficiency, including

- chronic alcoholics,
- patients who receive intravenous feeding for more than seven days without additional multivitamins or dietary thiamin, and
- people on kidney dialysis.
Deficiency of Thiamin

- Beriberi has been divided into three sub types:

  1. **Dry beriberi** refers to neuromuscular complications such as peripheral neuropathy and weakness;

  2. **Wet beriberi** refers to cardiovascular complications such as heart failure (Shoshin-type beriberi); and
3. **Cerebral beriberi** refers to central nervous system (brain) complications such as

- Wernicke's encephalopathy (abnormal eye movements, stance/gait abnormalities, mental dysfunction) or
- Korsakoff's psychosis (apathy, confusion, severe memory deficits/amnesia).
Wet and Dry BeriBeri

Cardiovascular (wet) beriberi

"Pedal edema before and after the application of pressure to the shin."
Excess intake of thiamine

- Thiamin is generally considered safe and nontoxic, even at high doses.

- Doses higher than 100 mg may cause drowsiness or muscle relaxation, and some people report a burning sensation when thiamin is received via injection.
RDA for Thiamin

- 1.1 mg/day for women
- 1.2 mg/day for men
- Daily Value on food label is 1.5 mg
- Most exceed RDA in diet
- Low income people and older people may barely meet needs (highly processed and unenriched foods, sugar, fat, alcohol)
- Surplus is rapidly lost in urine; non toxic; no Upper Level
Alcohol and Thiamin

- Alcoholics are at greatest risk for thiamin deficiency because absorption and use of thiamin are profoundly diminished and excretion is increased by alcohol consumption.

- Poor quality diet makes it worse.

- Little stored in body, so alcoholic binge of 1-2 weeks may result in deficiency.