

Thiamine

Vit. B₁

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Q) ⇒ Thiamine (Vit B₁)

Deficiency containing Vitamin - Thiamine & Biotin

Thiamine proenzyme - Thiamine pyrophosphate (TPP)

Source -

- 1) Aleurone layer of cereals.
- 2) Unpolished Rice
- 3) Parboiled Rice
- 4) Milk
- 5) All grains with Aleurone layer

RDA -

Adults - 1-1.5 mg/day

Children - 0.7-1.2 mg/day

Pregnancy - 2mg/day

[@ Senty. dr.]

Biochemical functions -

- 1) In transmission of Nerve impulse
 - 2) For acetyl synth. it is Required.
 - 3) The requirement of Thiamine is greater when carb. hydr. is only source of Energy.
- # Dietary Thiamine

Carbohydrate

Coenzyme of Thiamine pyrophosphate (TPP) -

①

Pyruvate

→ Acetyl CoA
pyruvate dehydrogenase

②

← Ketoglutarate

→ Succinyl CoA
Ketoglutarate dehydrogenase

③ Ribose 5 phosphate $\xrightarrow{\text{Transketolase}}$ Glyceraldehyde 3-phosphate

④ Branched chain AA $\xrightarrow{\alpha \text{ keto acid dehydrogenase}}$ α keto acid

Leucine, Isoleucine, Valine

Absorption -

Jejunum & proximal ileum helps in absorption & transporting it to tissue

2 Methods

At levels higher than $5 \text{ mg/day} \Rightarrow$ Passive
less than $5 \text{ mg/day} \Rightarrow$ Active

Deficient manifestation -

Beriberi dsz -

- ① Wet Beriberi - Cardiovascular manifestation. $\uparrow$ stimulation of stomach/any organ
- characterised by "edema" of legs, face, trunk & serous cavity
 - Breathless & palpitations are present
 - Calf muscles swollen
 - fast & bounding pulse is observed. Heart becomes weak & death may occur

- ② Dry Beri Beri - "Neurological Beri Beri" / "Neurological manifestation"
- resulting in peripheral neuritis
- Edema not seen
 - limbs progressively become too weak & person become "bedridden" & may "die".

③ Infantile Beri-Beri = Seen in "Infant born" to mother suffering from thiamine defi.

- Breast milk contain low thiamine
- characterised by sleeplessness, vomiting, convulsion etc.

④ Wernicke Korsakoff syndrome -

This disorder also known as "Cerebral beri-beri"

- It is mostly "Seen in chronic alcoholics". The body demand in Alcoholics ↑.
- Improper absorption of thiamine lead to this syndrome.
- characterised by loss of memory, apathy & Rhythmic to & fro motion of eye balls.

Antimetabolite -

Pyriethiamine & Thiaminase

(plants) → (ferns) found in sea food / Japan people sea food
∴ Thiaminase

Thiamine Antagonist -

Pyriethiamine & Oxythiamine

⇒ deficiency state (more points)

① Carbohydrate metabolism is impaired, Accumulation of Pyruvate increase in tissue

② Normally, pyruvate does not cross Blood Brain Barrier, But in thiamine deficiency it crosses.

Polynaritis → Entry of pyruvate in Brain

③ Impairment in Nerve impulse induction -