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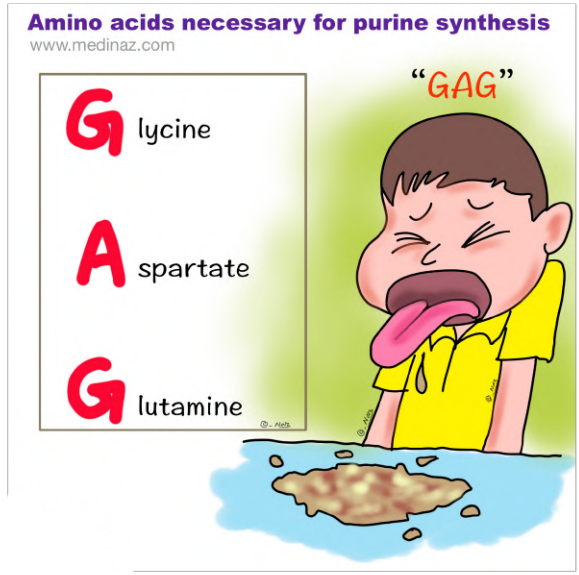
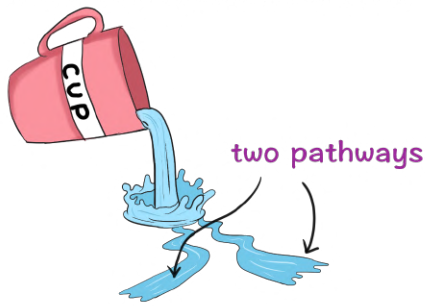



## De novo Pyrimidine & Purine synthesis

> Ribonucleotides are synthesised first and are converted to deoxyribonucleotides by Ribonucleotide reductase

> Carbamoyl phosphate is involved in 2 metabolic pathways: de novo pyrimidine synthesis and Urea cycle

> Ornithine transcarbamoylase deficiency (OTC, key enzyme of urea cycle) leads to an accumulation of carbamoyl phosphate, which is then converted to orotic acid

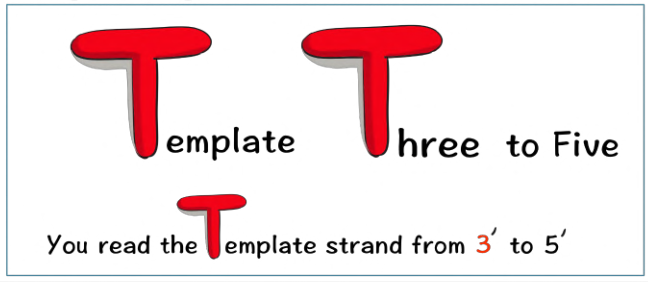


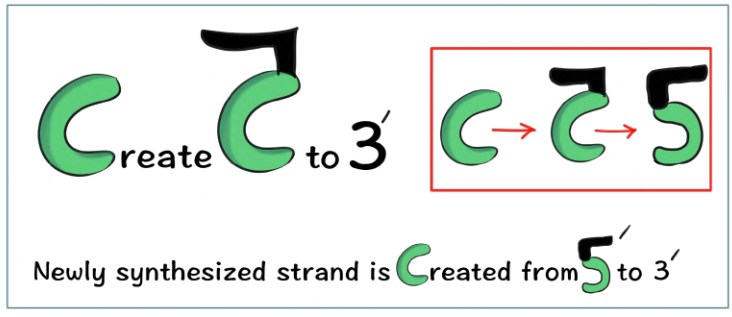

"CUP"

Carbamoyl phosphate
Urea cycle
de novo Pyrimidine synthesis

## DNA Replication:

In both prokaryotes and eukaryotes, DNA replication is semiconservative, involves both continuous and discontinuous (Okazaki fragment) synthesis, and occurs in the 5′ 3′ direction.



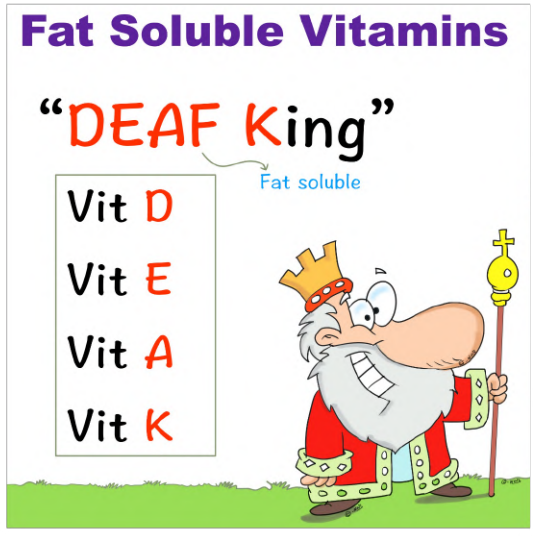




DNA Topoisomerase: Create a single- or double-stranded break in the helix to add or remove supercoils.

Helicase: Unwinds DNA template at replication fork.

# Vitamins

## Fat soluble vitamins:




**High yield points**

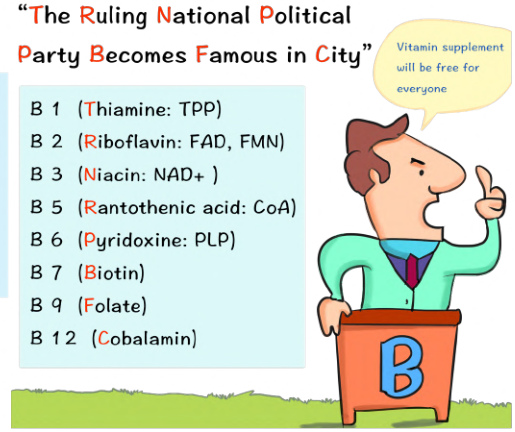
- Absorption dependent on gut and pancreas
- Toxicity more common than for water-soluble vitamins
- Fat-soluble vitamin deficiency can cause by cystic fibrosis and celiac disease

## Water soluble vitamins:

B 1 (thiamine), B 2 (riboflavin),
B 3 (niacin), B 5 (pantothenic acid),
B 6 (pyridoxine), B 7 (biotin),
B 9 (folate), B 12 (cobalamin),
C (ascorbic acid)

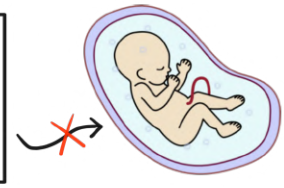
### Vitamin B-complex

"The Ruling National Political Party Becomes Famous in City"




B 1 (Thiamine: TPP)
B 2 (Riboflavin: FAD, FMN)
B 3 (Niacin: NAD+ )
B 5 (Rantothenic acid: CoA)
B 6 (Pyridoxine: PLP)
B 7 (Biotin)
B 9 (Folate)
B 12 (Cobalamin)

Isotretinoin is teratogenic.



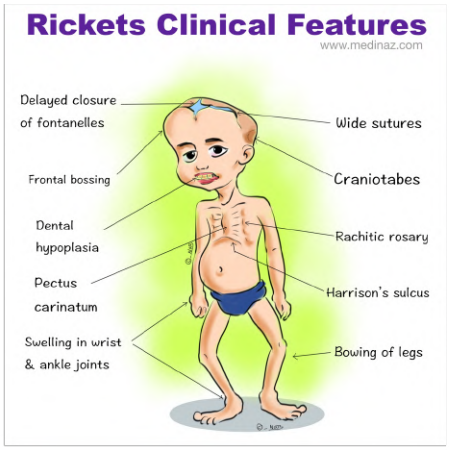
## Vitamin D:

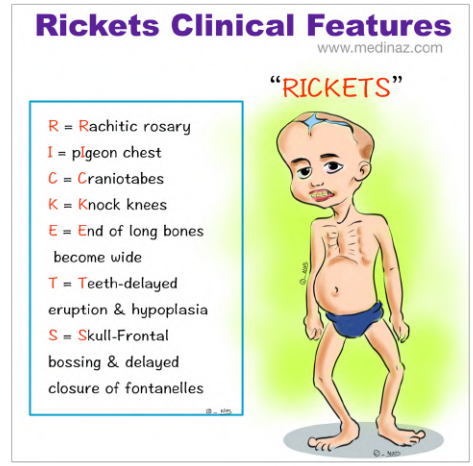
### Deficiency

> Rickets
> Osteomalacia

### Toxicity

> Contraction of blood vessels
> High blood pressure
> Calcinosis




## Functions:

> Increase intestinal absorption of $Ca^{2+}$ and $PO_4^{3}$
> Increase bone mineralization at low levels
> Increase bone resorption at higher levels.

## Pantothenic acid(B5):

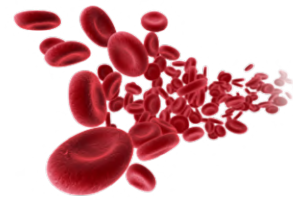
- Endogenously synthesized by bacterial flora in the intestine
- Vitamin that contains Beta alanine
- Deficiency:

  Burning foot syndrome or nutritional melalgia or peripheral nerve damage

## Pyridoxine(B6):

Deficiency:

- Peripheral neuropathy
- Personality changes (Depression and confusion)
- Convulsion
- Microcytic hypochromic anaemia
- Pellagra like symptoms
- Oxaluria, homocystinuria, Xanthurenic aciduria



## Biotin:

Cofactor for carboxylation enzymes

Deficiency:

Dermatitis

Alopecia

Enteritis

"AVIDin in egg whites

AVIDly binds biotin"

## Succinyl-CoA sources

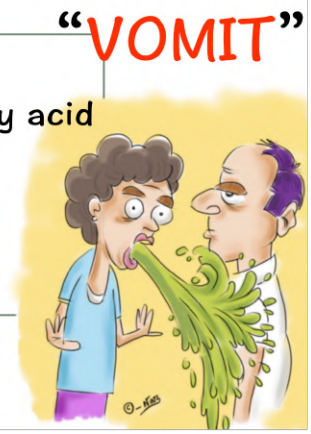
Valine

Odd-carbon fatty acid

Methionine

Isoleucine

Threonine



## Von-Gierke disease:

Glycogen accumulation in liver and kidneys

Uric acid (Gout)

Glucose-6-phosphatase deficiency

## Pompe disease = Pump failure

## Cori disease:

Accumulation of limit dextrin–like structures in Cytosol

## McArdle disease:

Muscle cramps

Myoglobinuria (red urine) with strenuous exercise

Myophosphorylase deficiency