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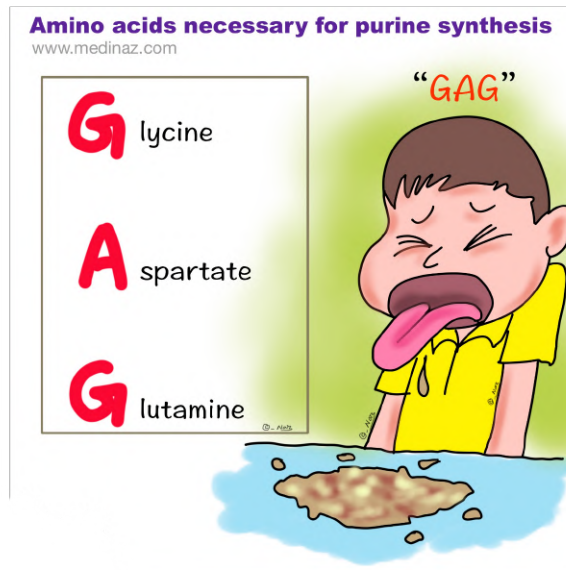
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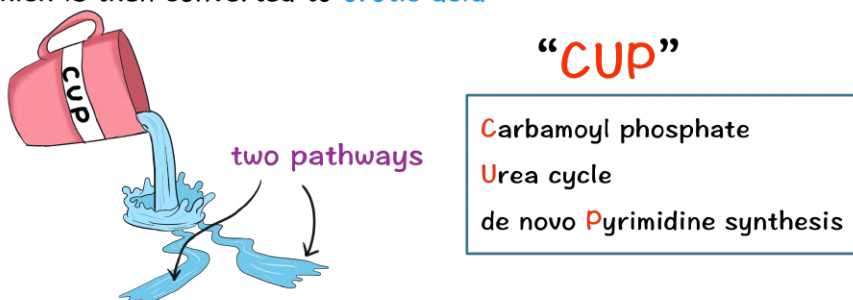
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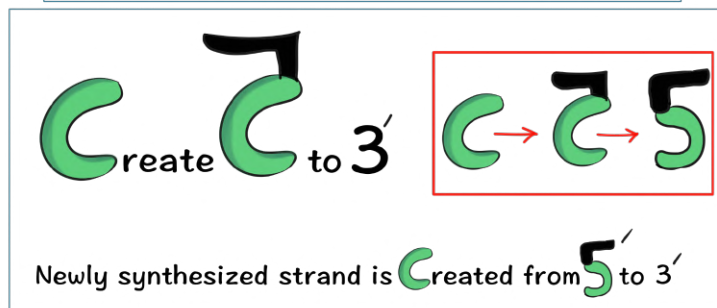
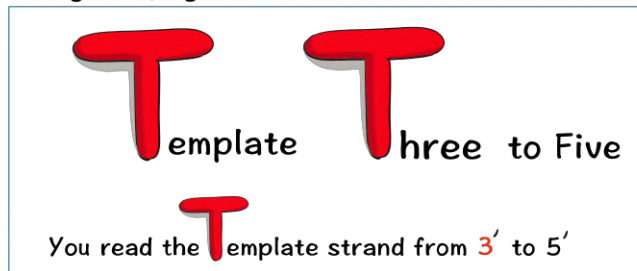
De novo Pyrimidine & Purine synthesis

- > **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**



DNA Replication:

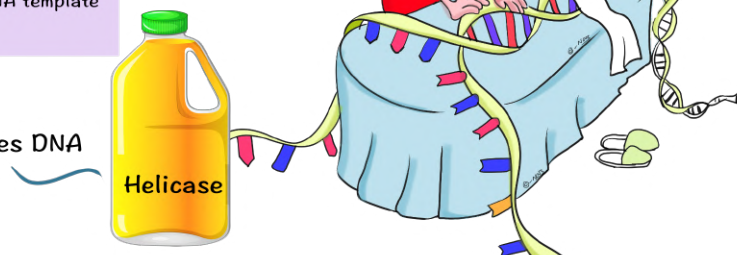
In both **prokaryotes** and **eukaryotes**, DNA replication is **semiconservative**, involves both continuous and discontinuous (Okazaki fragment) synthesis, and occurs in the **5' 3'** direction.



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

Helicase: Unwinds DNA template at replication fork.

Helicase Halves DNA



Vitamins

Fat soluble vitamins:

Fat Soluble Vitamins

“**DEAF King**”

Fat soluble

Vit **D**

Vit **E**

Vit **A**

Vit **K**



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:

Vitamin B-complex

“The **R**uling **N**ational **P**olitical
Party **B**ecomes **F**amous in **C**ity”

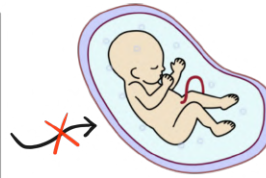
Vitamin supplement
will be free for
everyone

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)

B 1 (**T**hiamine: TPP)
B 2 (**R**iboflavin: FAD, FMN)
B 3 (**N**iacin: NAD⁺)
B 5 (**P**antothenic acid: CoA)
B 6 (**P**yradoxine: PLP)
B 7 (**B**iotin)
B 9 (**F**olate)
B 12 (**C**obalamin)



Isotretinoin
is teratogenic.



Vitamin D:

Deficiency

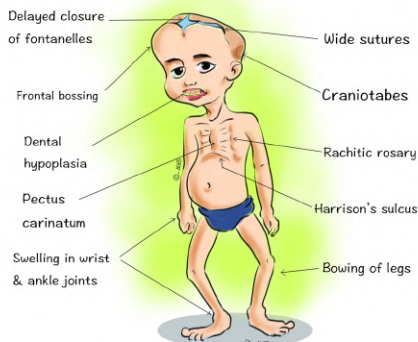
- > Rickets
- > Osteomalacia

Toxicity

- > Contraction of blood vessels
- > High blood pressure
- > Calcinosis

Rickets Clinical Features

www.medinaz.com



Rickets Clinical Features

www.medinaz.com

"RICKETS"

- R** = Rachitic rosary
- I** = pigeon chest
- C** = Craniotabes
- K** = Knock knees
- E** = End of long bones become wide
- T** = Teeth-delayed eruption & hypoplasia
- S** = Skull-Frontal bossing & delayed closure of fontanelles



Functions:

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

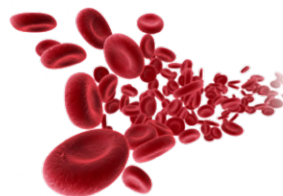
Pantothenic acid(B5):

- 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



“**AVID**in in egg whites
AVIDly binds biotin”

Succinyl-CoA sources

Valine

Odd-carbon fatty acid

Methionine

Isoleucine

Threonine

“**VOMIT**”



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