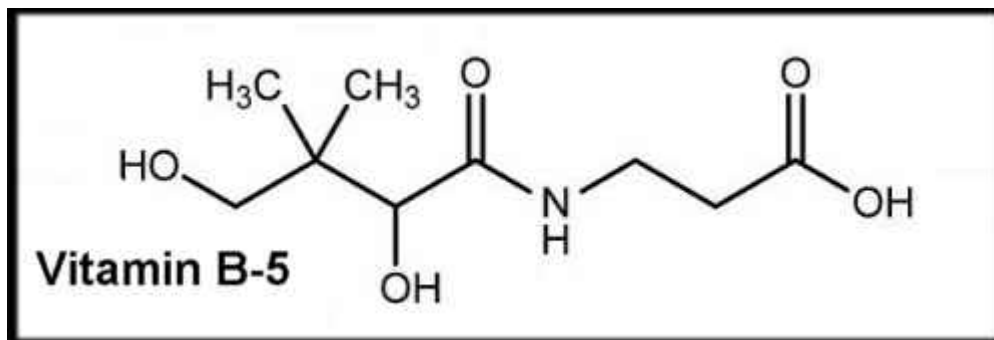


### 8. PANTOTHENIC ACID or VITAMIN B5:



#### Source:

- Its main sources are liver, milk, meat, eggs, wheat grain, wheat bran نخاله القمح, potatoes, sweet potatoes, tomatoes.

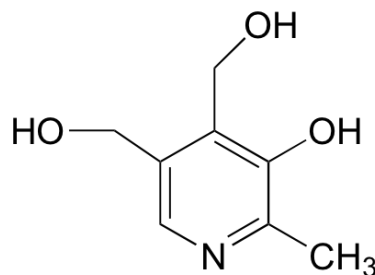
#### Physiological Significance:

- Pantothenic acid is essential for growth نمو of infants الرضع and children الاطفال,
- It plays a major role in the metabolism of proteins, carbohydrates, and fats.

#### Deficiency:

- Its deficiency causes nausea غثيان, vomiting تقيء, gastrointestinal disorders مشاكل في الجهاز الهضمي, improper growth النمو and fatty liver تدهن الكبد.

### 9. VITAMIN B<sub>6</sub> (Pyridoxine):



pyridoxine  
(vitamin B<sub>6</sub>)

**Source:**

- The best sources of pyridoxine are whole (but not enriched) grains, cereals الحبوب, bread, liver, avocados, spinach, green beans, and bananas.
- It is also found in milk, eggs, fish, chicken, beef, and liver.

**Physiological Significance:**

- Pyridoxine, or vitamin B<sub>6</sub>, is necessary for the absorption and metabolism of amino acids.
- It also plays roles in the use of fats in the body and in the formation of red blood cells.

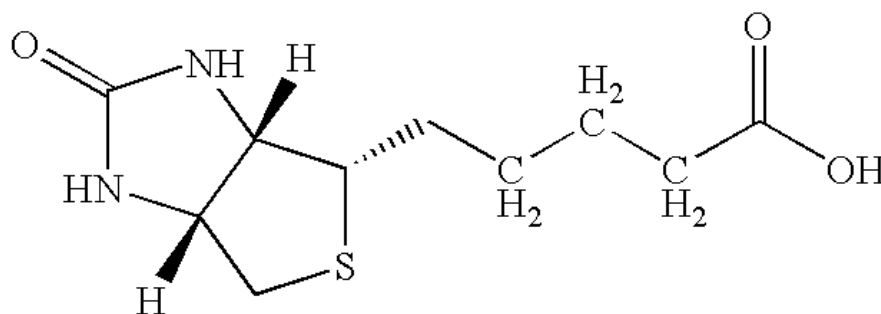
**Deficiency:**

- Pyridoxine deficiency is characterized by skin disorders مشاكل في الجلد, cracks at the mouth corners تشققات في زواي الفم, dizziness دوار, nausea, anemia, and kidney stones تكون حصى الكلى.

**10. VITAMIN b<sub>7</sub> (Biotin):**

Vitamin B7 (Biotin) Biotin is also known as “anti-egg white injury factor” or as H-factor.

B7



**Source:**

- Biotin occurs in combined state as biocytin. It is found in yeast خميرة, liver, kidney, milk.

**Physiological Significance:**

- Biotin serves as prosthetic group مجموعة مصنعة for many enzymes .

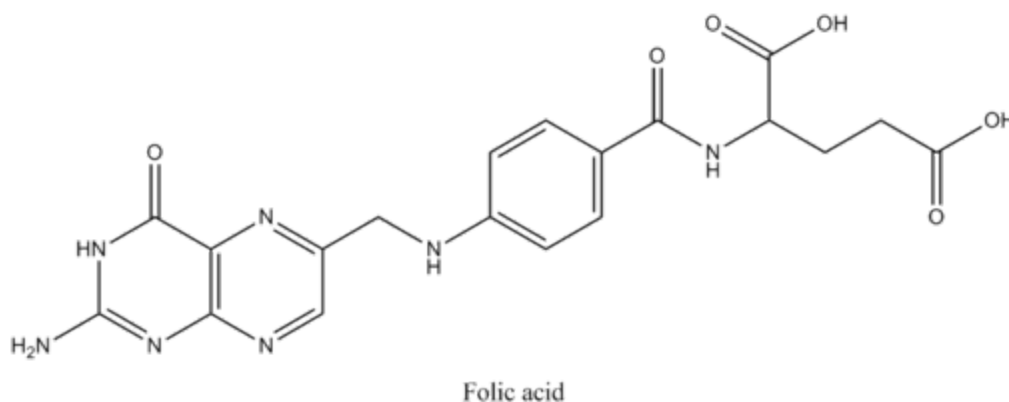
- It helps in synthesis تصنيع of fatty acids.

**Deficiency:**

- Its deficiency caused the destruction of intestinal bacteria تدمير البكتيريا الموجودة في الامعاء.
- It leads to nausea and muscular pain الم عضلي.

**11. VITAMIN B<sub>9</sub> or M or Bc (Folic Acid):**

Vitamin M or Folic Acid



**Source:**

- Folic acid is found in yeast, liver and kidney.
- Fish meat and green leafy vegetables, milk and fruits also provide folic acid.

**Physiological Significance:**

- Folic acid acts as a coenzyme and help in synthesis of purines and thymine during DNA synthesis.
- It helps in formation and maturation of red blood cells تكوين ونضوج خلايا الدم الحمراء.

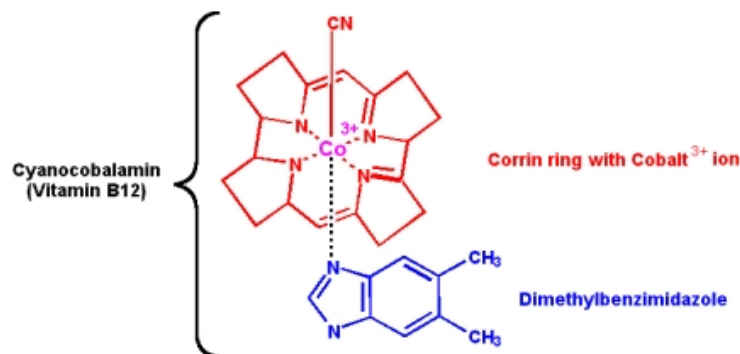
**Deficiency:**

- Folic acid deficiency gives rise to **anemia** فقر الدم.

- The patient suffers from retarded growth تأخر في النمو, weakness, inadequate lactation in females انقله في انتاج الحليب عند الاناث and gastrointestinal disorders.

## 12. VITAMIN B<sub>12</sub> (Cynocobalamin):

Vitamin B<sub>12</sub> or Cobalamin, or Anti-Pernicious Anaemic Factor (APA), one of the most recently isolated vitamins.



### Source:

- Cobalamin is obtained only from animal sources—liver, kidneys, meat, fish, eggs, and milk.

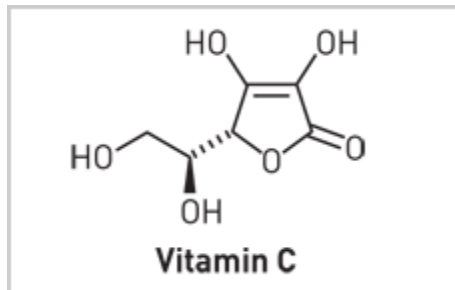
### Physiological Significance:

- It is necessary in minute amounts كمية قليلة for the formation of nucleoproteins البروتين النووي, proteins, and red blood cells.
- It is necessary for the functioning of the nervous system الجهاز العصبي.
- It stimulates the appetite of the subject يفتح الشهية.

### Deficiency:

- Due to its deficiency **Pernicious Anemia** فقر الدم الخبيث results which is characterized by the following symptoms :
- ineffective production of red blood cells تصنيع غير جيد لخلايا الدم الحمراء, faulty myelin (nerve sheath) synthesis تصنيع غير جيد للانسجة المغلفة الأعصاب, and loss of epithelium (membrane lining) of the intestinal tract فقدان بطانه الامعاء الطلائية.

### ١٣.. VITAMIN C (Ascorbic Acid or Antiscorbutic Vitamin):



#### Source:

- Sources of vitamin C include citrus fruits الحمضيات, fresh strawberries, , pineapple, and guava.
- Good vegetable sources are Broccoli, Tomatoes, Spinach.

#### Physiological Significance:

- Vitamin C is important in the formation and maintenance of collagen, the protein that supports many body structures and plays a major role in the formation of bones and teeth.
- It also enhances the absorption of iron from foods of vegetable origin.
- The connective tissue fibrils الياف الانسجة الرابطة and collagen are synthesized with the help of vitamin C.
- It play important role in wound repair التأم الجروح.

#### Deficiency:

- This well-known Scurvy لأسقربوط is the classic manifestation of severe ascorbic acid deficiency. Its symptoms are loss of the cementing action of collagen and include hemorrhages نزيف which lead to loosening of teeth and cellular changes in the long bones of children.

