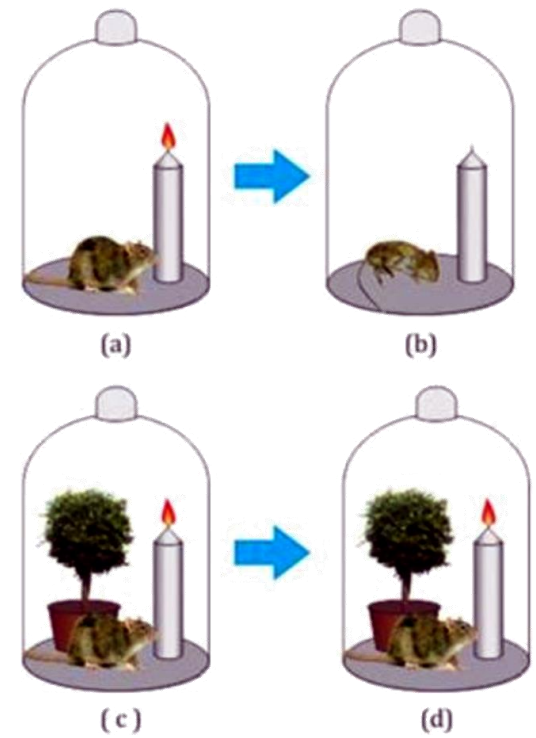


# Photosynthesis

## HISTORICAL BACKGROUND

### 1. Joseph Priestley (1733-1804)



- Q.** The essential role of air in the growth of green plants was revealed by
- A. Priestley
  - B. Van Niel
  - C. Blackman
  - D. Emerson

**Ans. A**

Role of air in the growth of green plants is experimentally provided by Priestley.

## **2. Jan Ingenhousz (1730-1799)**

**Worked on Hydrilla**

## **3. Julius von Sachs (1854)**

**Glucose is stored as starch in green parts of the plant**

## **4. Van Niel (1897-1985)**

**Sulphure bacteria**

## **5. Robert Hill**

**Stellaria**

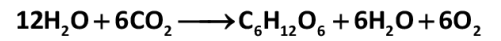
## **6. Cornelius van Niel (1897-1985)**

**Used radioactivity  $O^{18}$  in  $H_2O$**

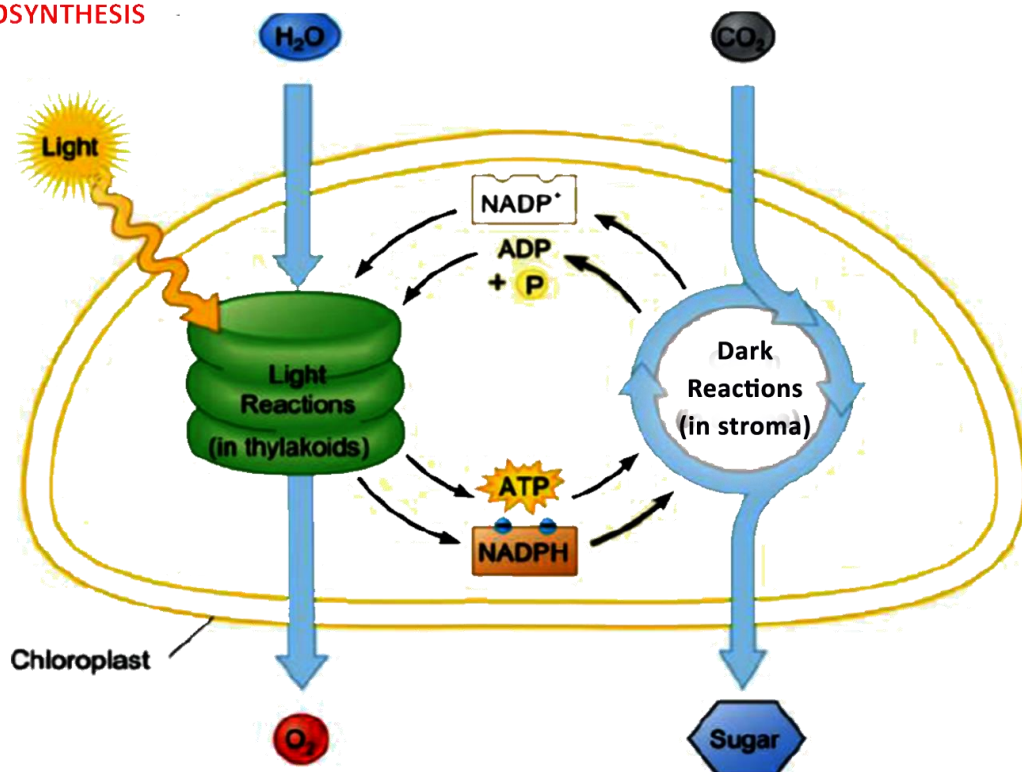
- Q.** A milestone contribution to the understanding of photosynthesis was made by Cornelius van Niel, which was based on the studies of
- Bacteria
  - Alga
  - Angiospermic plant
  - Lower plant

**Ans. A**

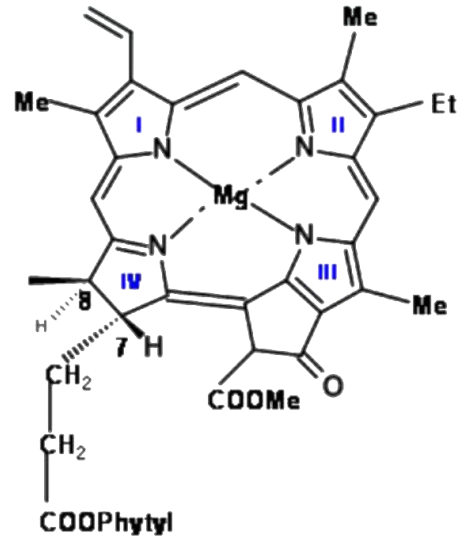
Van Niel studied purple and green sulphur bacteria and showed,  $O_2$  evolved from  $H_2O$  and not from  $CO_2$ .



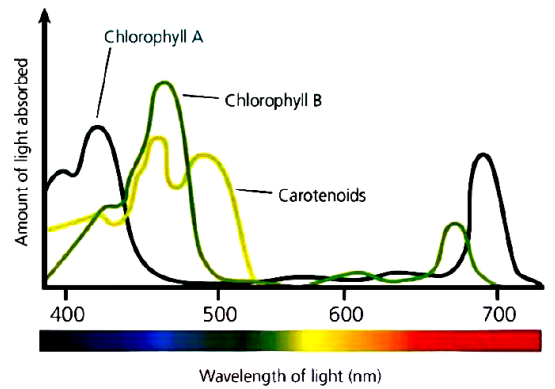
#### LOCATION OF PHOTOSYNTHESIS



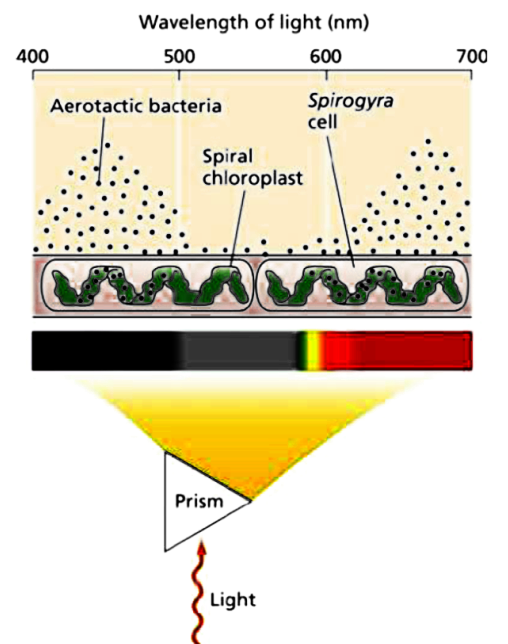
## Structure of Chlorophyll a



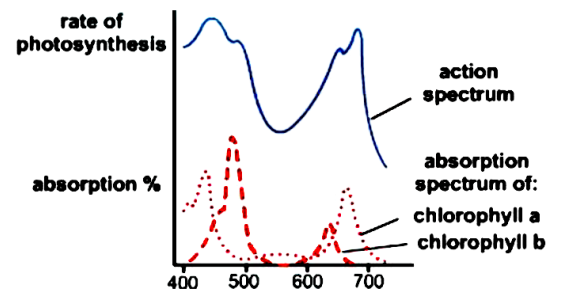
## ABSORPTION SPECTRUM



## T.W. Engelmann experiment



## ACTION SPECTRUM

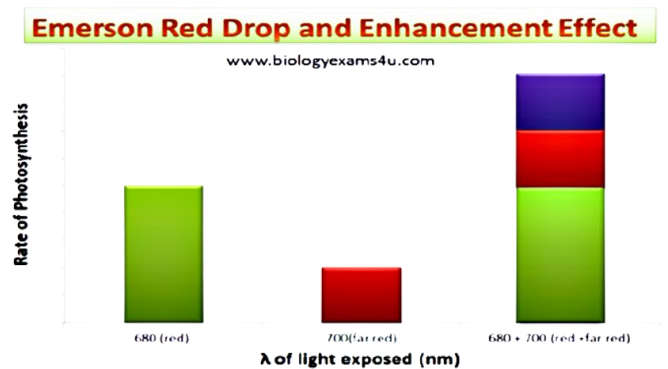


- Q.** Curve showing the effectiveness of different wavelength of light in photosynthesis was first given by Engelmann using all, except
- A. Filamentous green alga Cladophora
  - B. Unicellular green alga Chlorella
  - C. Suspension of aerobic bacteria
  - D. Prism to split the light in its components

**Ans.**

Hill used chlorella for proving that photosynthesis completed in two phase *i.e.*, light and dark phase.

## EMERSON RED DROP PHENOMENON:



**Q.** Emerson's enhancement effect and Red drop have been instrumental in the discovery of

[NEET-2016]

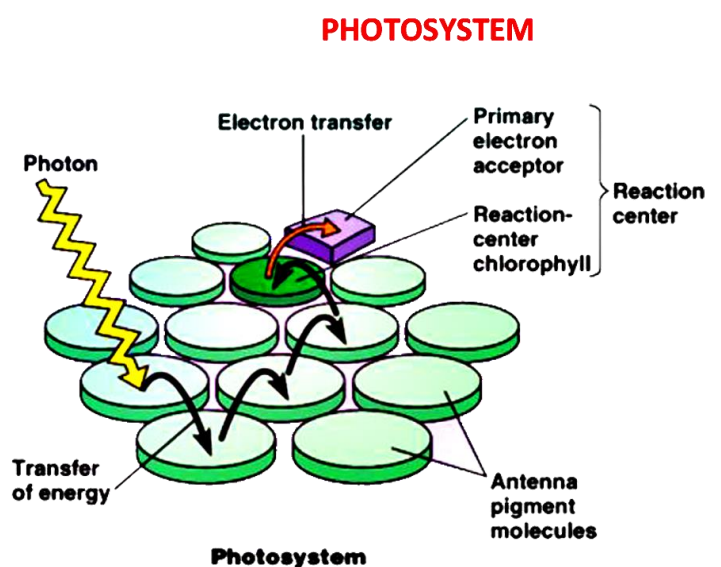
- A. Oxidative phosphorylation
- B. Photophosphorylation and non-cyclic electron transport
- C. Two photosystems operating simultaneously
- D. Photophosphorylation and cyclic electron transport

**Ans. C.**

Emerson performed photosynthetic experiment of chlorella. He provided monochromatic light of more than 680 nm and observed decrease in rate of photosynthesis Known as red drop.

Later he provided synchronised light of 680nm and 700 nm and observed Increase in rate of photosynthesis, known as enhancement effect .

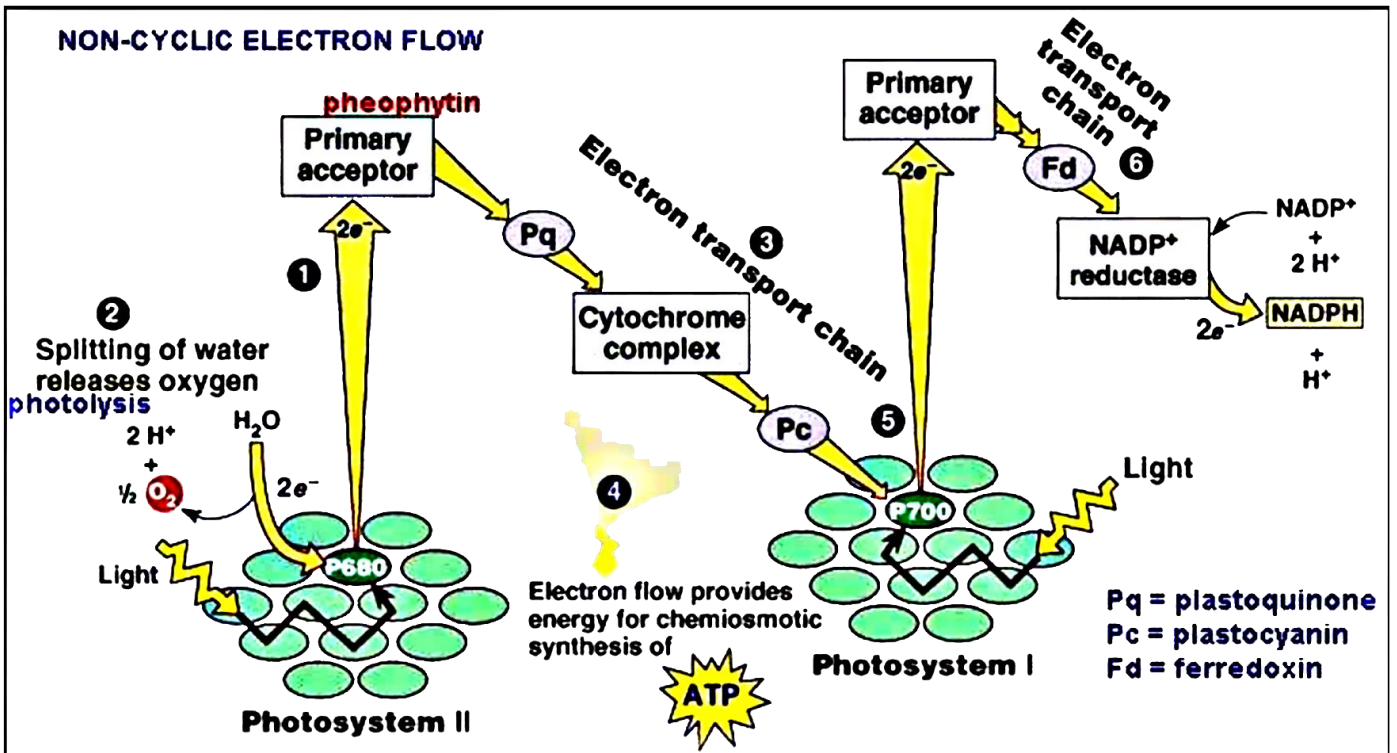
This experiment led to discovery of two photosystems - PS II and PS I.



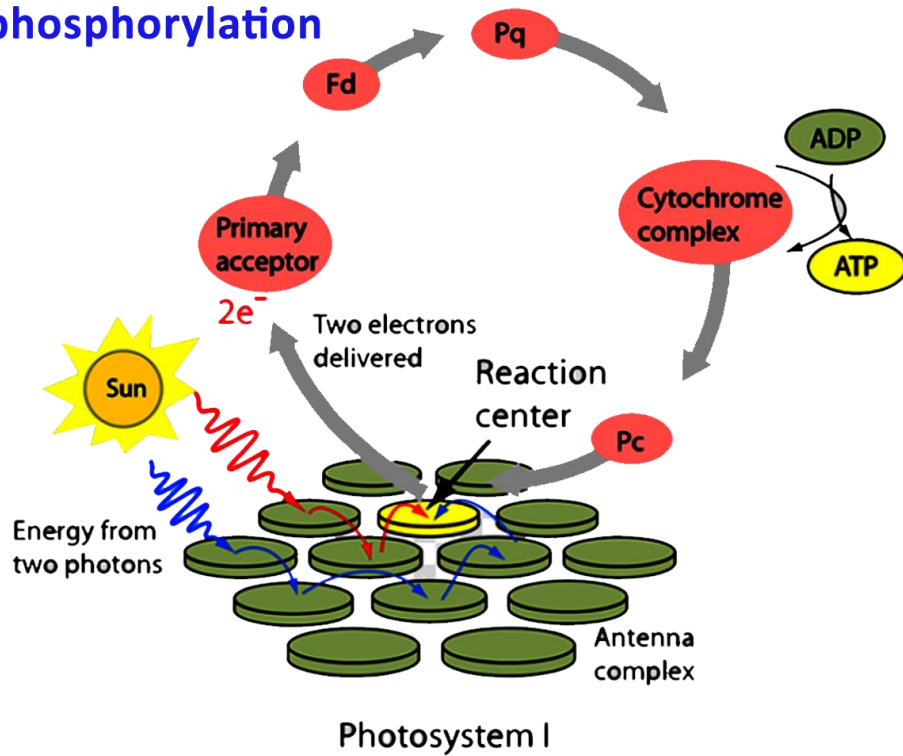
- Q.** Photosystem is composed of
- A. Light harvesting complex
  - B. Reaction centre
  - C. Accessory pigments
  - D. More than one is correct

**Ans. D.**

PS has LHC I or II, Reaction Accessory pigments.



## Cyclic Photophosphorylation



- Q.** Moll's half leaf experiment was done to show \_\_\_\_\_ was required for photosynthesis.
- A.  $H_2O$
  - B. Chlorophyll
  - C. Light
  - D.  $CO_2$

**Ans. D**

In this experiment, half leaf was enclosed in a test tube containing KOH (which absorbs  $CO_2$ ), half leaf was in air. When two halves were tested for starch, leaf in air showed the +ve test not other part, which shows  $CO_2$  is required for photosynthesis.