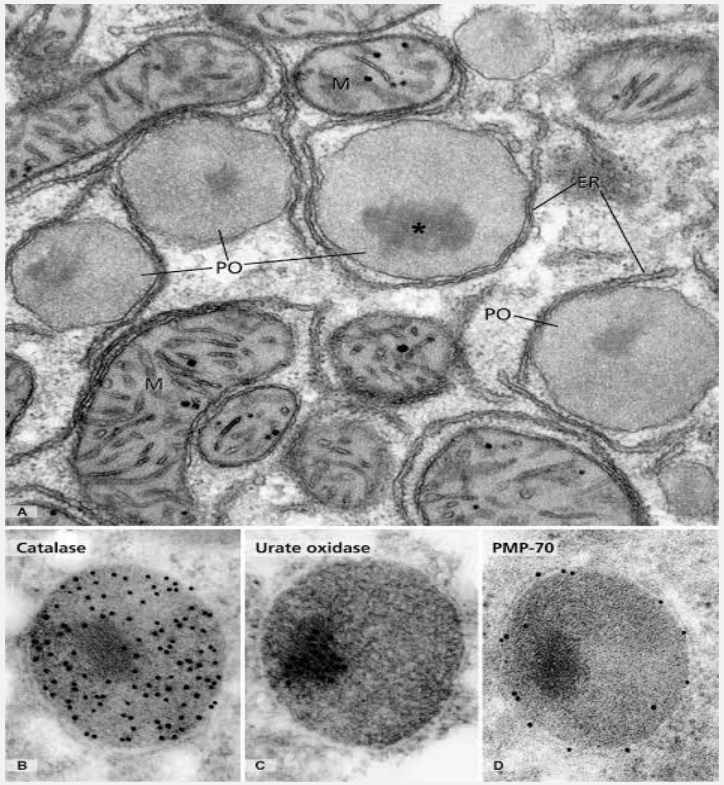
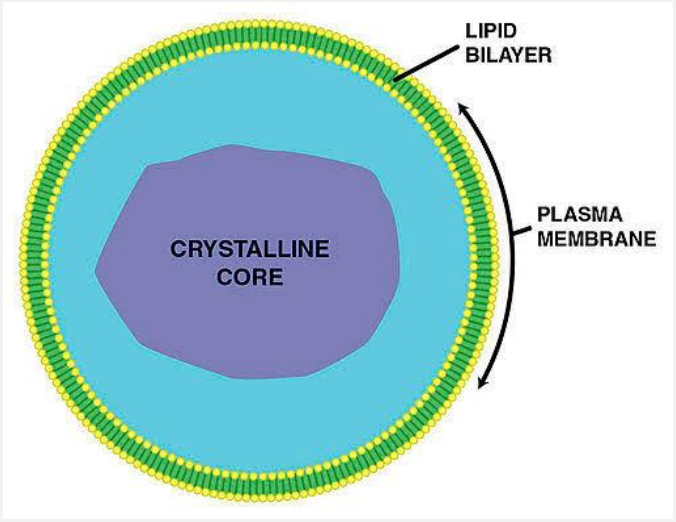
PEROXISOME

- Small membrane enclosed organelles
- Microboies (0.2-0.4 um); proximal tubules of kidney; Rhodin (1954)
- Christisn de Duve (1966) isolated from liver cells
- Glycosomes (Michels, 2006); trypanosomatid species
- Glyoxysomes in plants (Hayashi, 2000)
- Woronin body in filamentaous fungi (Wurtz, 2009)
- Some peroxisomal enzymes are restricted to few species

  * luciferase in fire flies

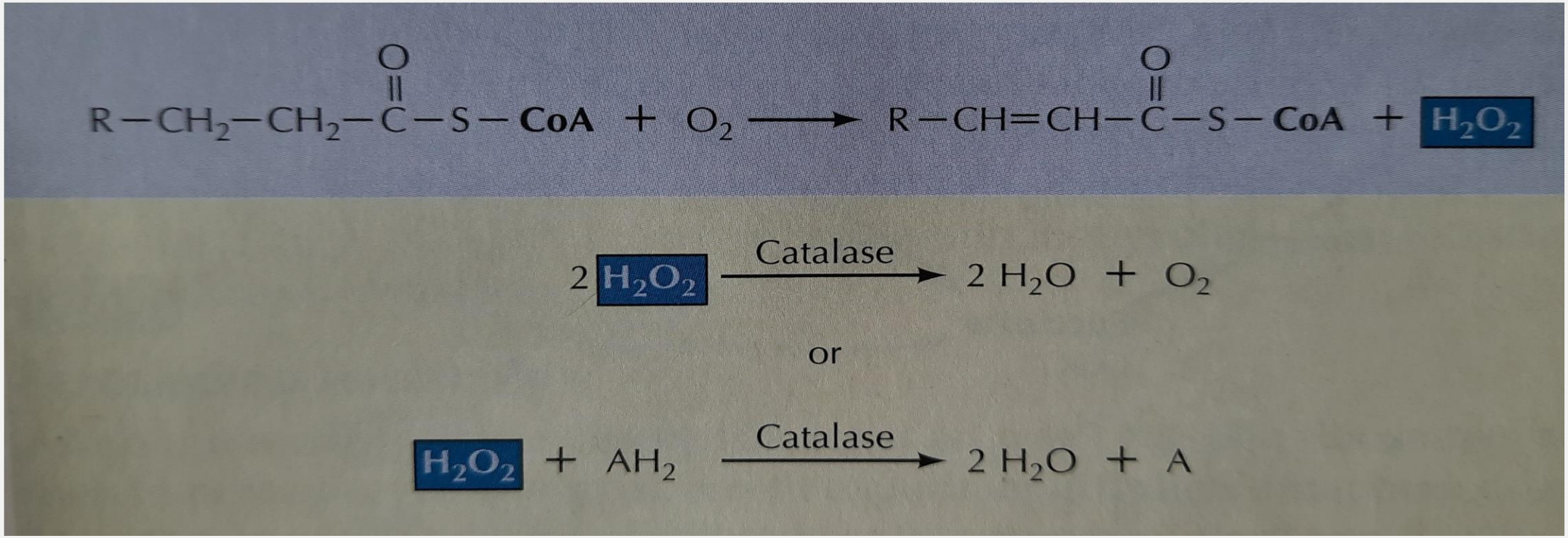
  * penicillin producing enzyme in *Penicillium*





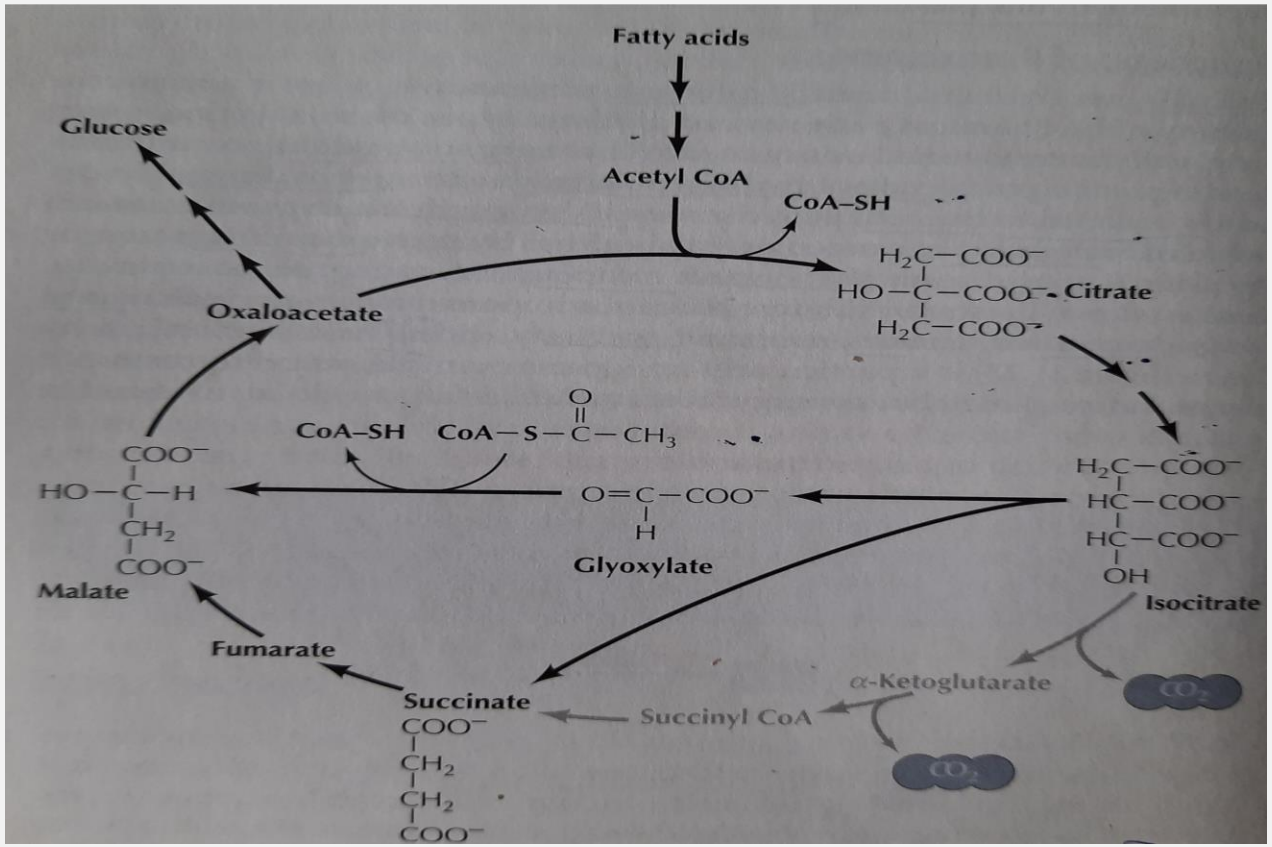
BASIC FUNCTIONS

- Oxidation reactions of fatty acids, purines, uric acid, amino acids
- Hydrogen peroxide production
- Catalase use H2O2 to oxidize phenol, formic acid, alcohol, formaldehyde etc.

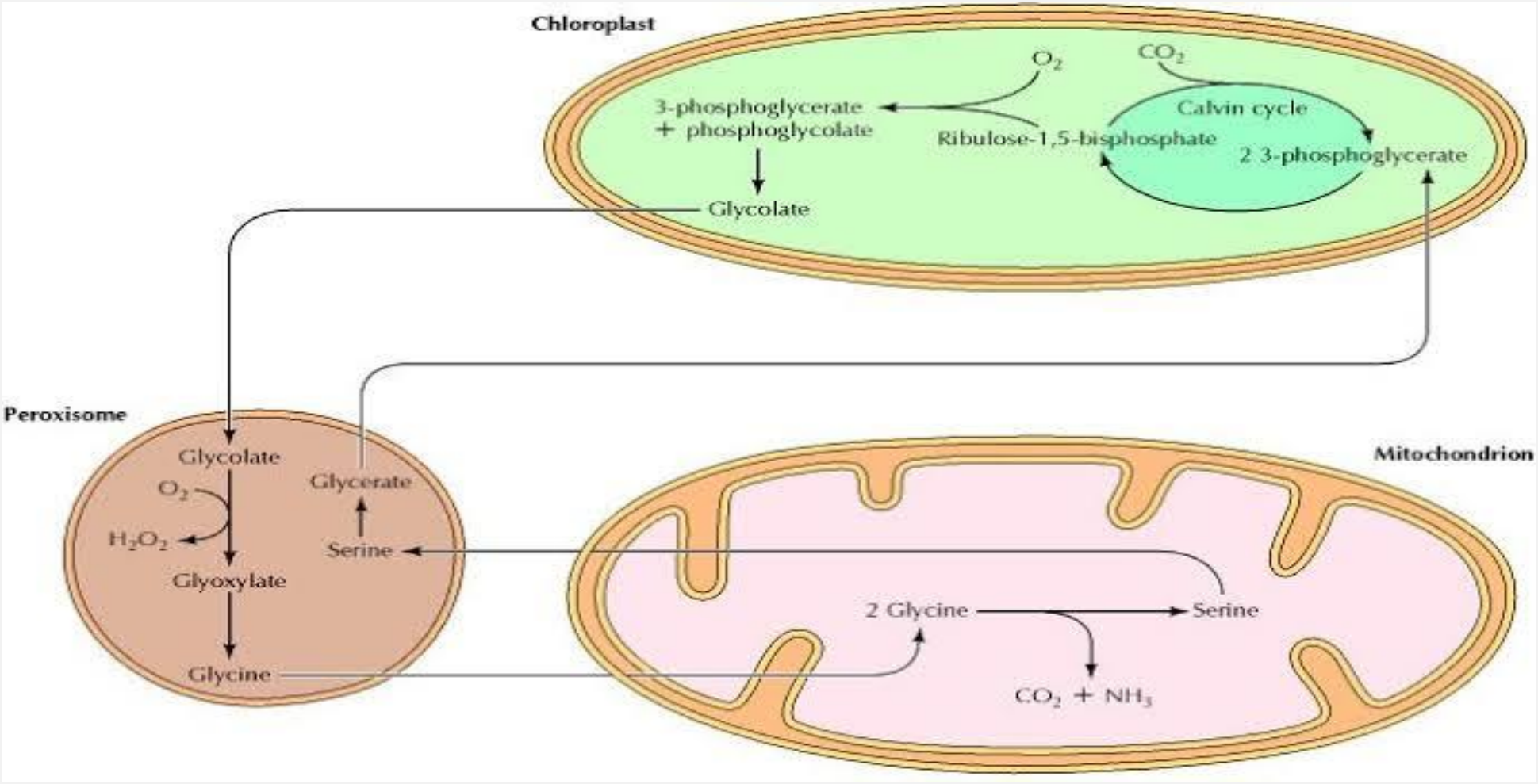


GLYOXYLATE CYCLE

- Stored fatty acids are converted into carbohydrates in plant seed
- Important for growth of germinating plants

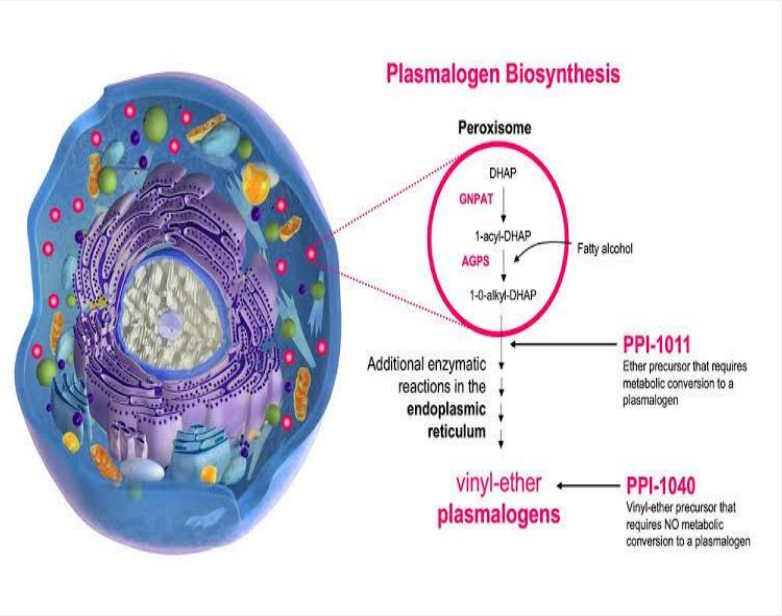


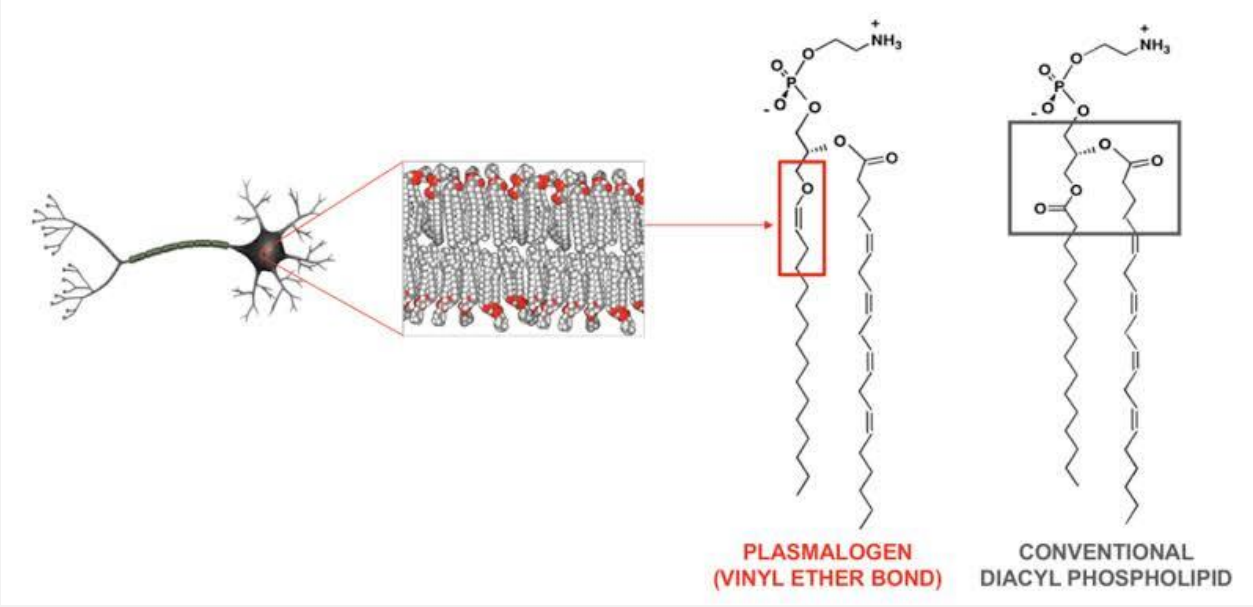
PEROXISOME INVOLVES IN PHOTORESPIRATION



PLASMALOGENS SYNTHESIS

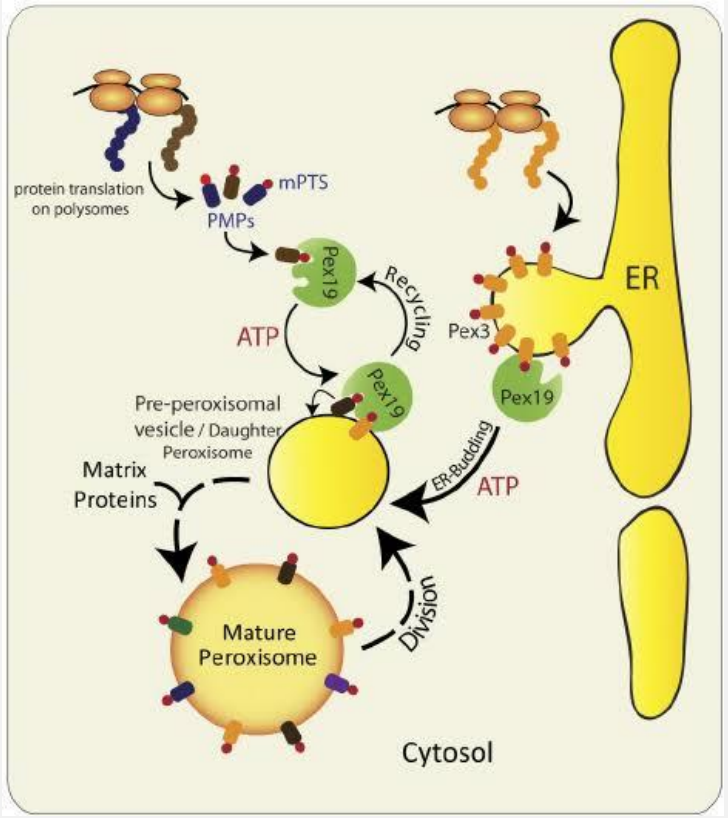
- Important phospholipid component in myelin
- Helps in insulation of axons of neuron
- Deficiency creats disorders related to neurological diseases

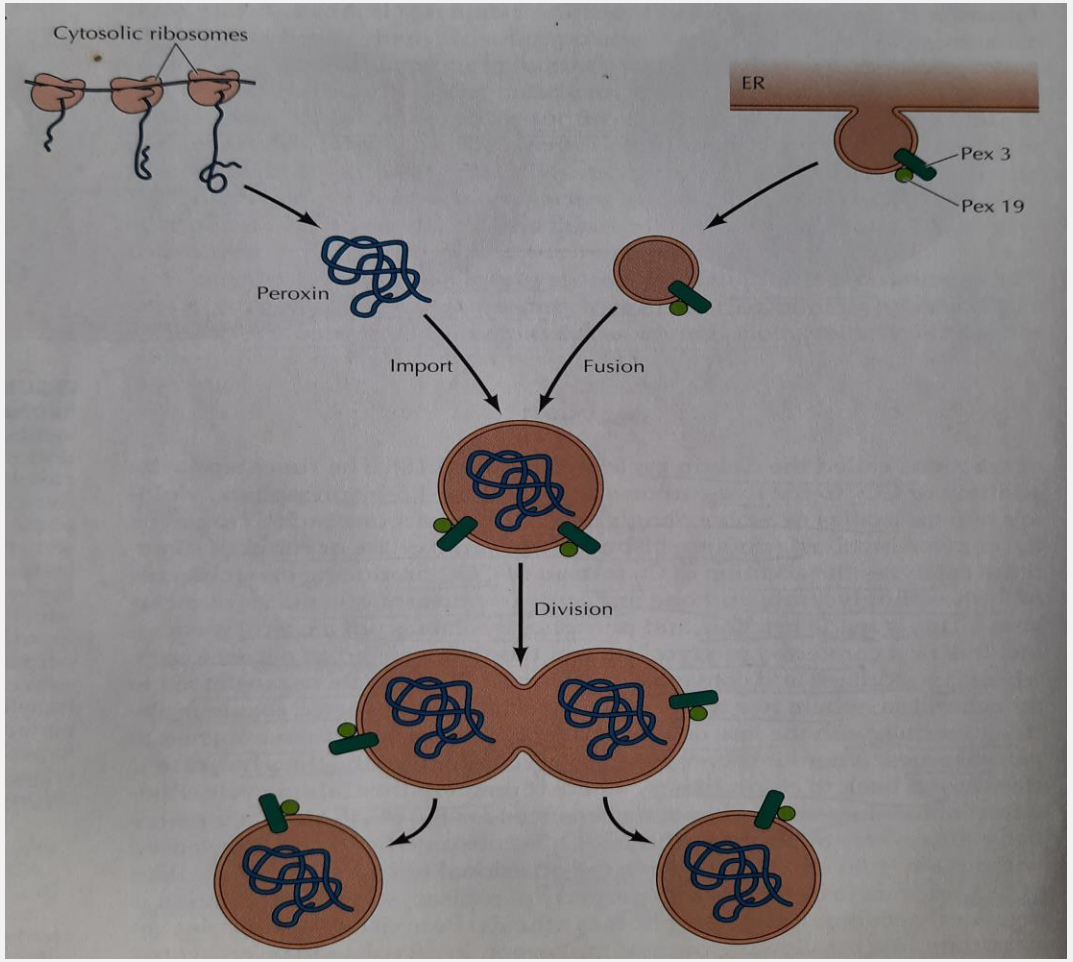




ASSEMBLY

- Peroxins proteins; synthesis in cytosolic ribosomes; import inside matix of petoxisome
- Budding from ER membrane
- Pex 3 & Pex 19 proteins



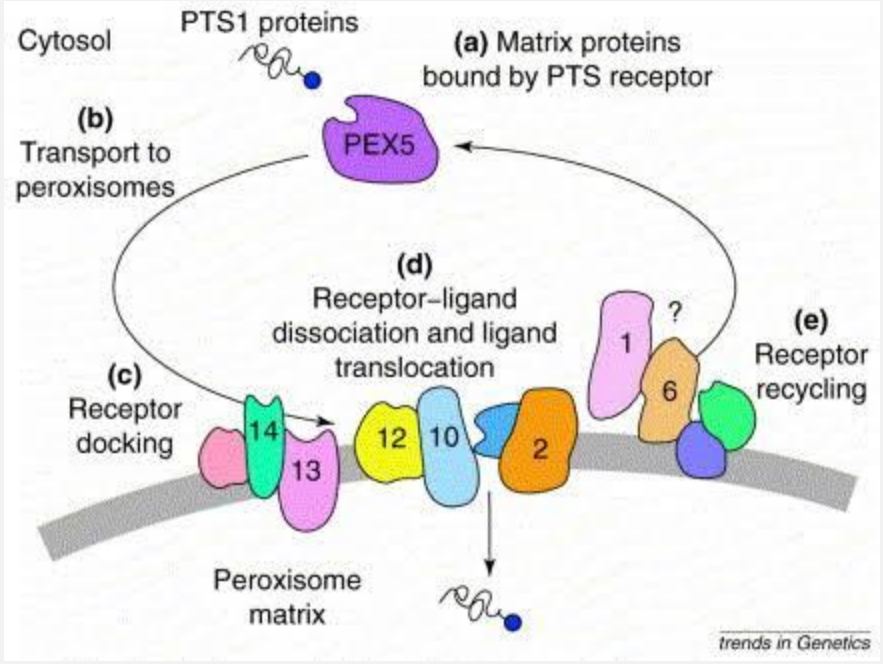


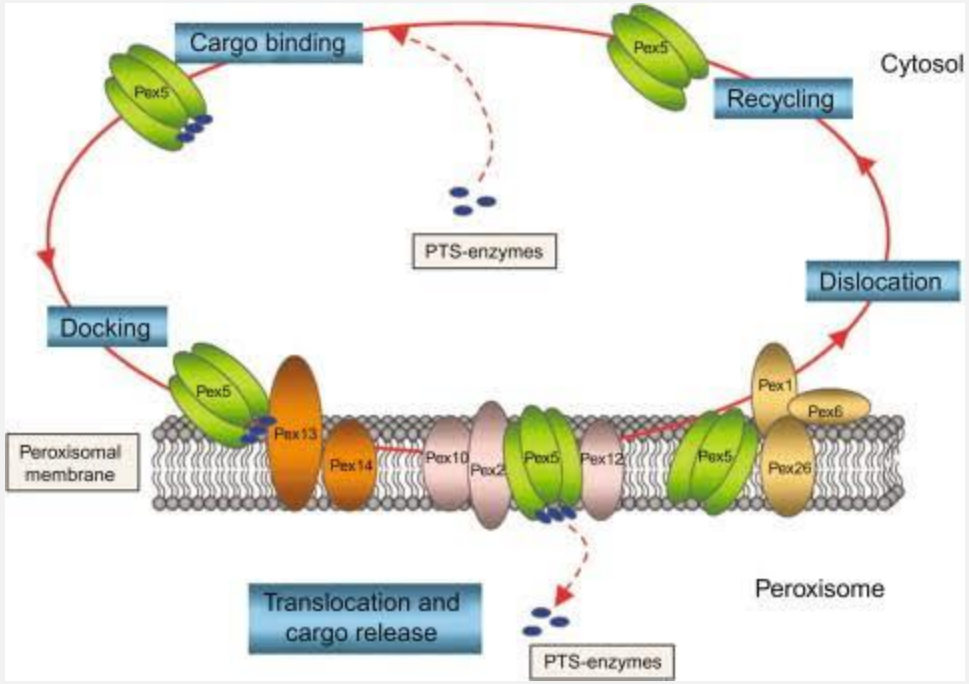
IMPORTS OF PROTEINS

- PTS1 (carboxy end) & PTS 2 (amino end)
- Role of Pex 5
- Import complex (importomer)

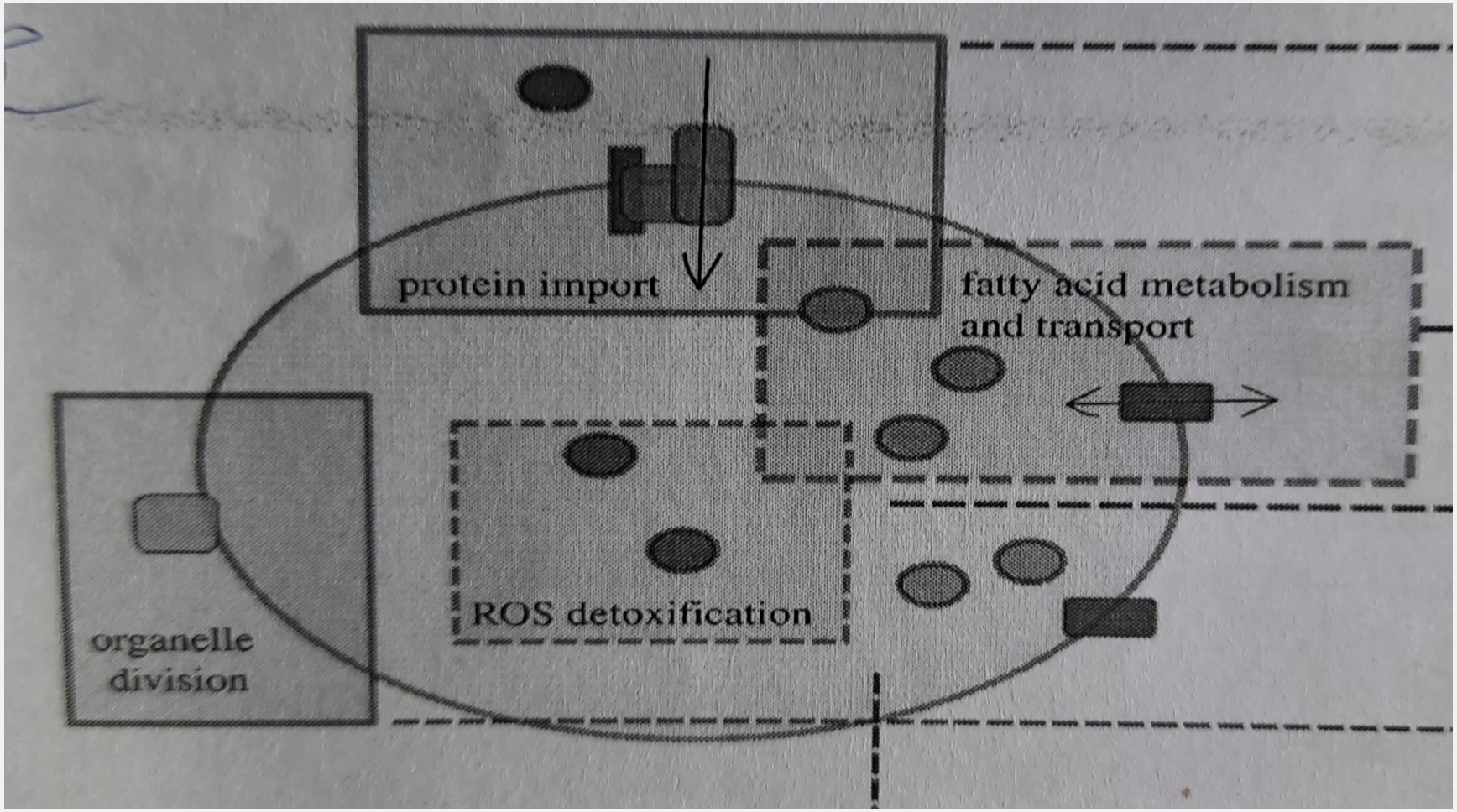
* receptor docking proteins; Pex 13, Pex 14

* receptor export module (cytoplasmic side); Pex 1, Pex 6, ubiquitinating enzymes, AAA ATPase, RING domain proteins





BIOGENESIS & MAINTENANCE



ZELLWEGER SYNDROME

- Deficiencies in PTS 1& 2 pathways related to perotein imports
- Mutation in Pex 2 (integral membrane protein)
- Empty peroxisome causes severe abnormalities in brain, liver, kidney