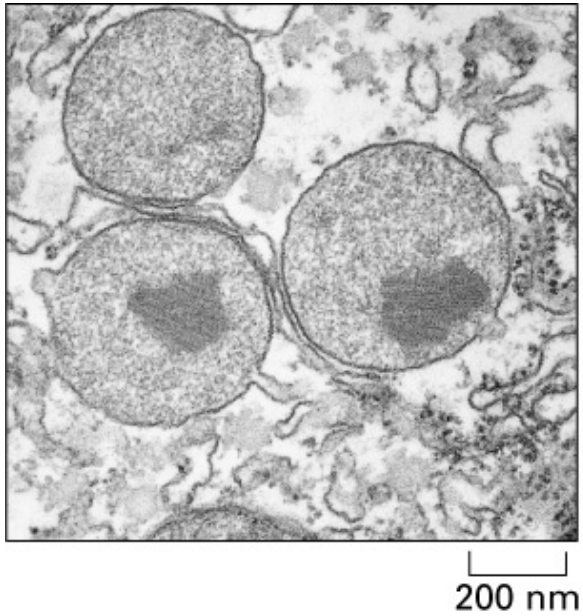
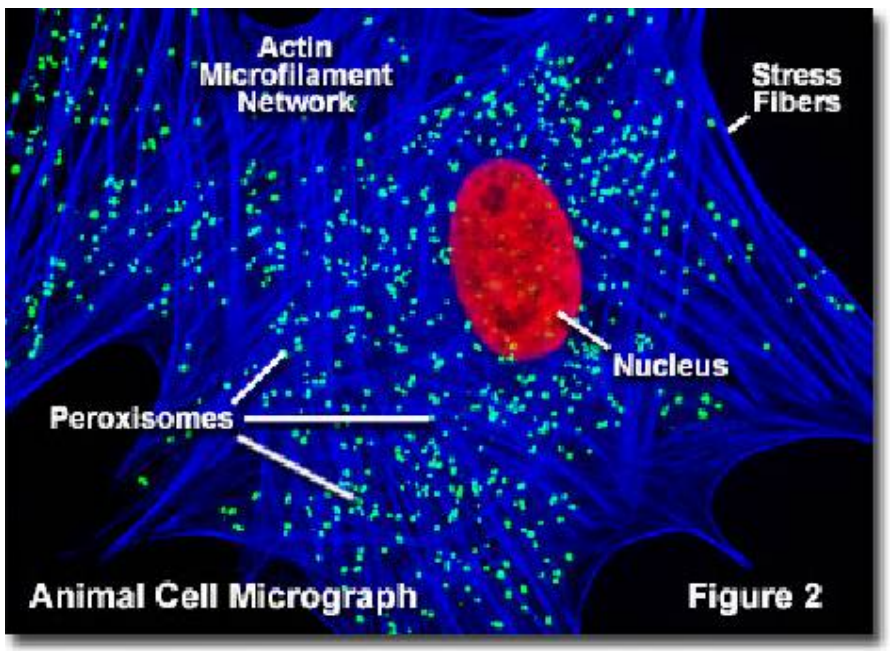




Peroxisomes

Cytoplasmic organelles
Bounded by a single membrane

Used by the cell as a place to sequester specific reactions. These often (but not always) generate hydrogen peroxide

Table 1. Peroxisomal disorders with neurological involvement

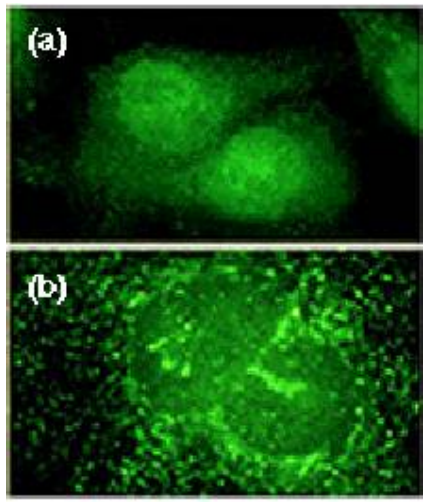
Group I :	**peroxisome assembly deficiency with a generalized loss of peroxisomal enzyme functions**
	Cerebro-hepato-renal syndrome (Zellweger)
	Neonatal adrenoleukodystrophy (NALD)
	Infantile Refsum disease
Group II :	**peroxisomes present; loss of several peroxisomal enzyme functions**
	Rhizomelic chondrodysplasia punctata (RCDP)
	Classical and atypical phenotypes
	Zellweger-like syndrome
Group III:	**peroxisomes present; loss of a single peroxisomal enzyme function**
	X-linked adrenoleukodystrophy
	Acyl-CoA oxidase deficiency (pseudo NALD)
	Bi(multi)functional protein deficiency
	Peroxisomal thiolase deficiency (pseudo-Zellweger)
	Dihydroxyacetone phosphate acyltransferase deficiency (RCDP phenotype)
	Alkyl-dihydroxyacetone phosphate synthase deficiency (RCDP phenotype)
	Hyperpipecolic acidemia
	Glutaryl-CoA oxidase deficiency
	Di- and trihydroxycholestanoic acidemia
	Classical Refsum disease

MINI-REVIEW

PEROXISOMAL DISORDERS

Bwee Tien Poll-The, Tom J. de Koning, Lambertus Dorland, Marinus Duran

Zellweger syndrome



Peroxisomes are not detected in Zellweger syndrome fibroblasts (a), but can be

PXR1 is a receptor on the surface of peroxisomes

These symptoms include an enlarged liver; facial deformities such as a high forehead, underdeveloped eyebrow ridges, and deformed ear lobes; and neurological abnormalities, such as mental retardation and seizures. Infants with Zellweger syndrome also lack muscle tone, sometimes to the point of being unable to move, and may not be able to suck or swallow.

Peroxisome

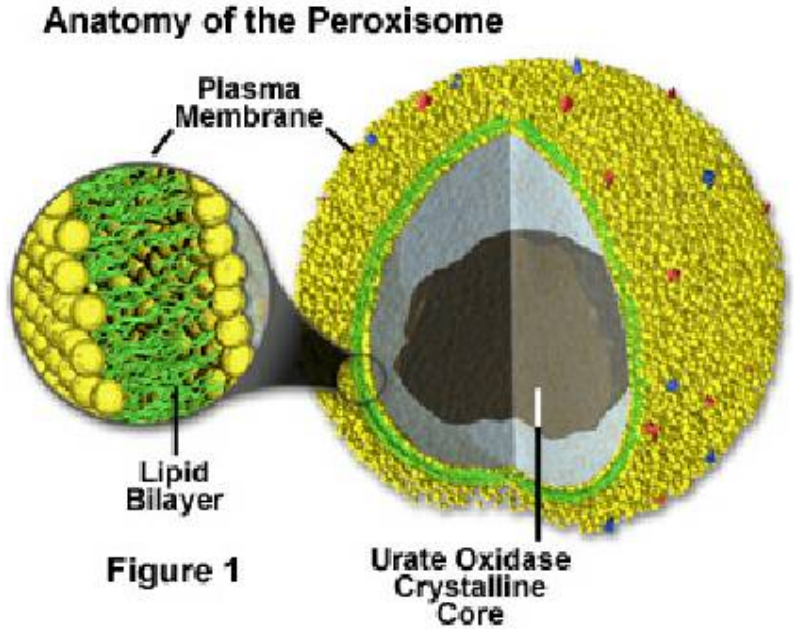


Figure 1

-self assembling, 1 day lifespan

-arose due to oxygenation

-proteins translated in cytosol, PTS directs them to peroxisomes

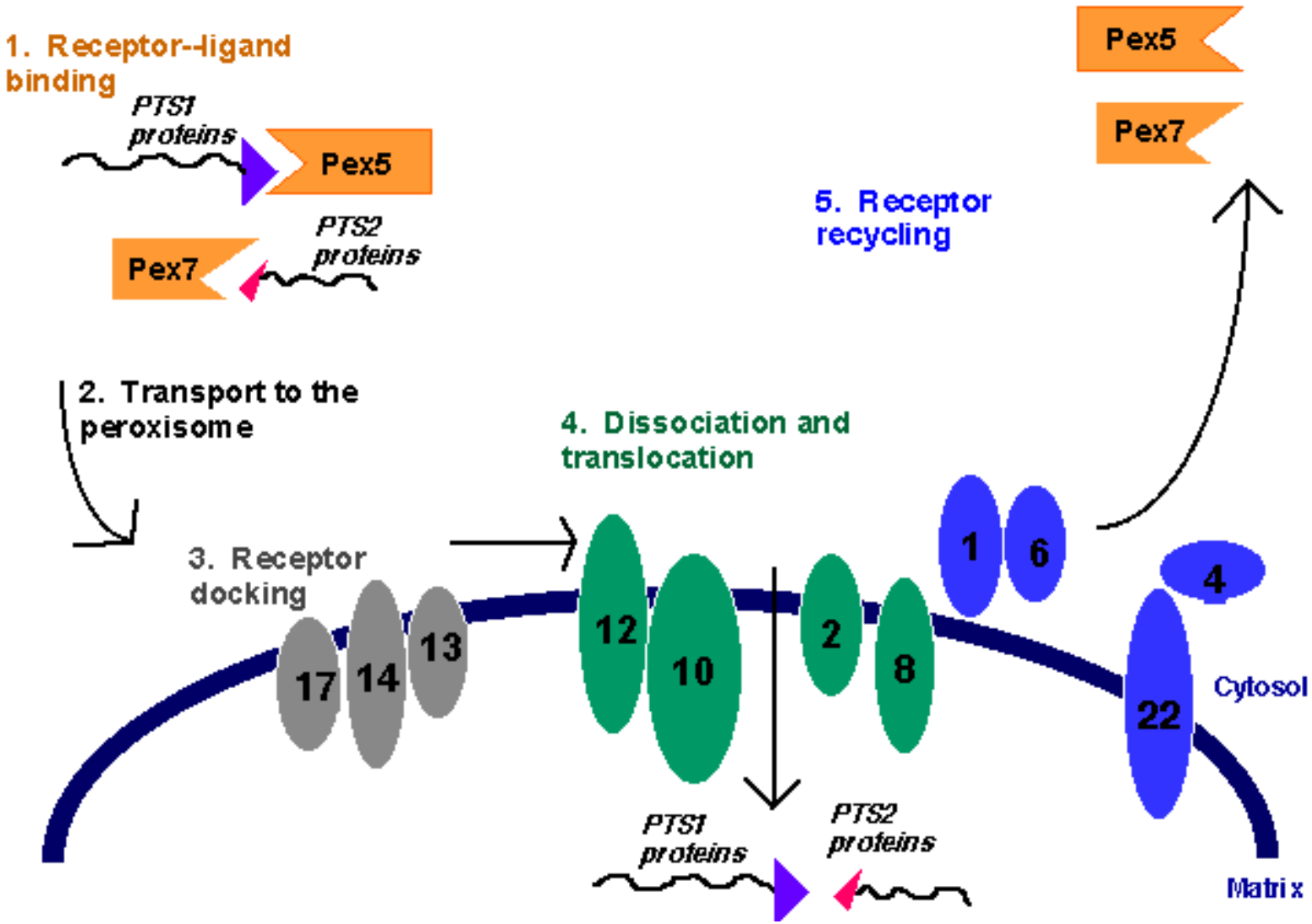
-PTS1 in matrix proteins is usually Ser-Lys-Leu at the C-terminus

-Pex5 is a PTS1 receptor that directs cytoplasmic proteins to per.

-also a PTS2 sequence

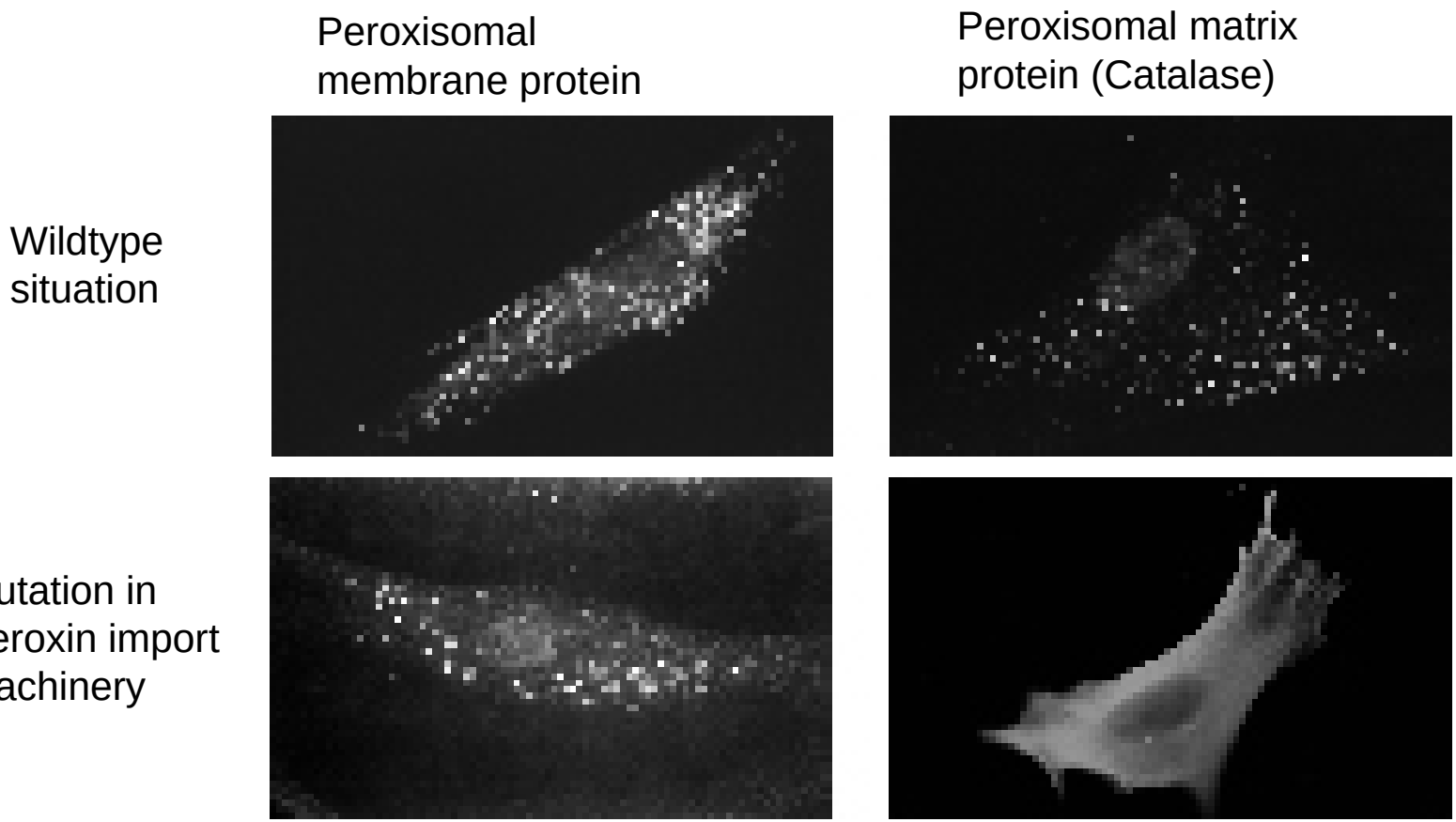
-membrane PEX proteins have a different targeting sequence

Protein import into peroxisomes



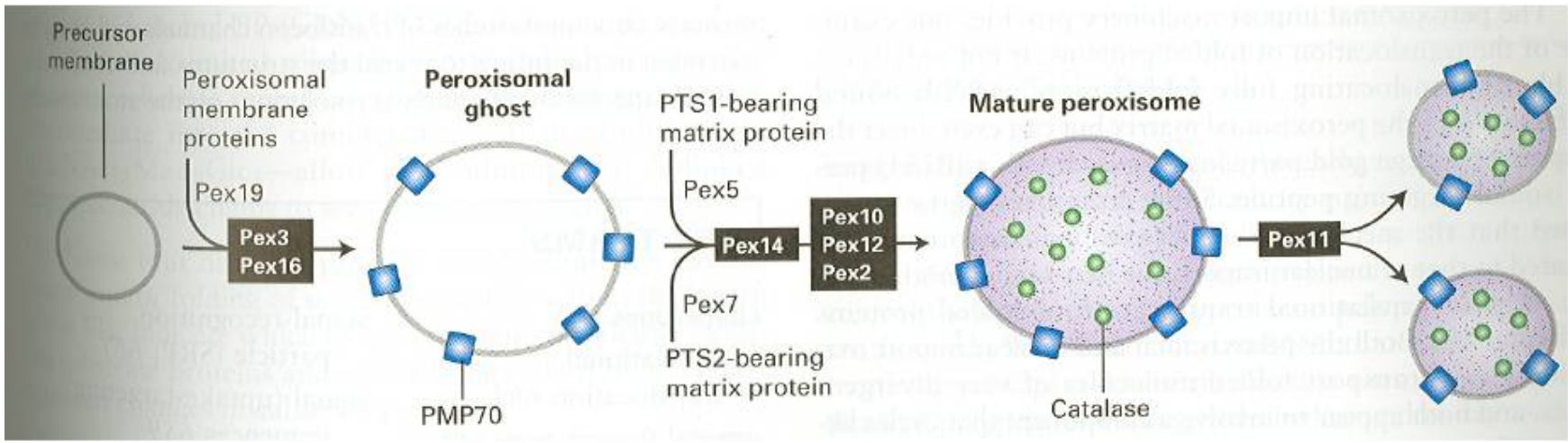
The Pex/Peroxin import machinery is only responsible for peroxisomal matrix proteins, not for membrane proteins

How would a mutation in the peroxisomal import machinery affect peroxisome biogenesis?



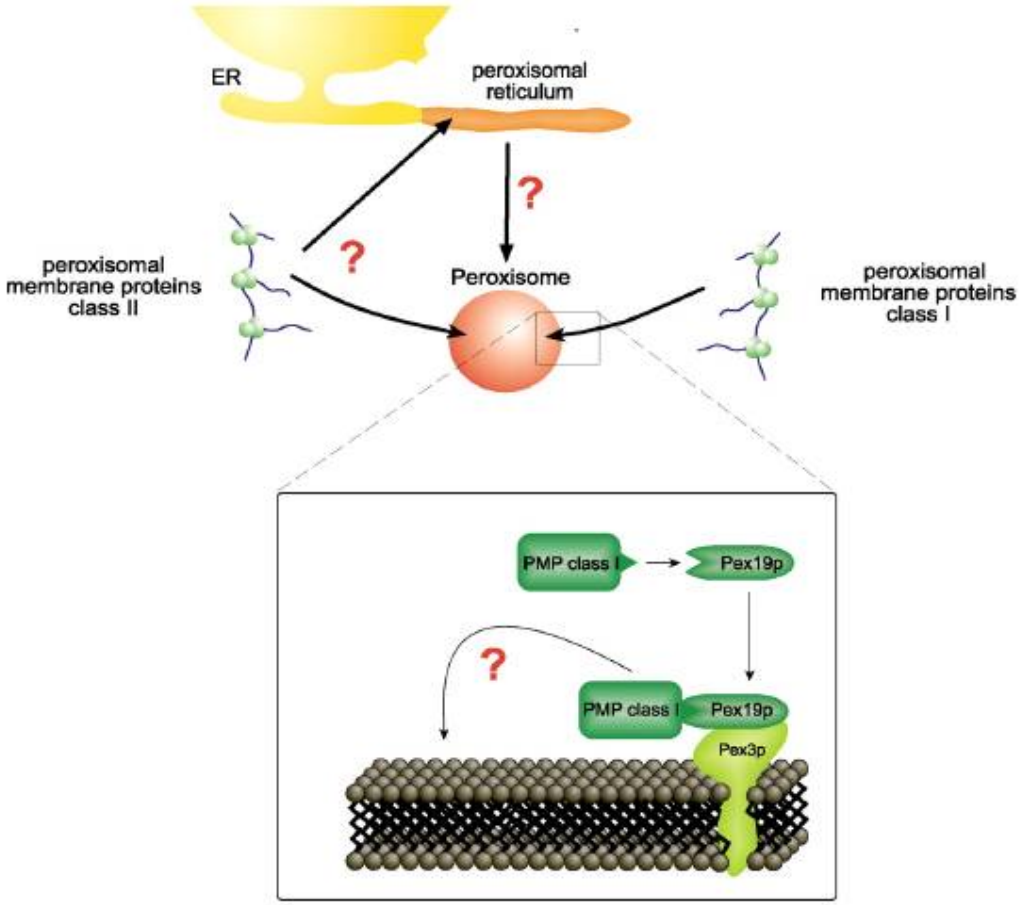
A mutation in a component of the peroxisomal import machinery (peroxins) leads to cytosolic distribution of peroxisomal matrix proteins, but not of peroxisomal membrane proteins

Peroxisomal Biogenesis



Pex11 is involved in peroxisome propagation

Peroxisomal Biogenesis



Ines Heiland and Ralf Erdmann

Peroxisomal Function and Enzymes

50 different enzymes
Lipid metabolism:
ß-oxidation of Very Long Chain Fatty Acids (VLCFA)
-provides the cell with a major source of metabolic energy
Hydrogen peroxide breakdown: catalase
Lipid bisynthesis (cholesterol)
Amine and bile acid synthesis
Purine catabolism by urate oxidase