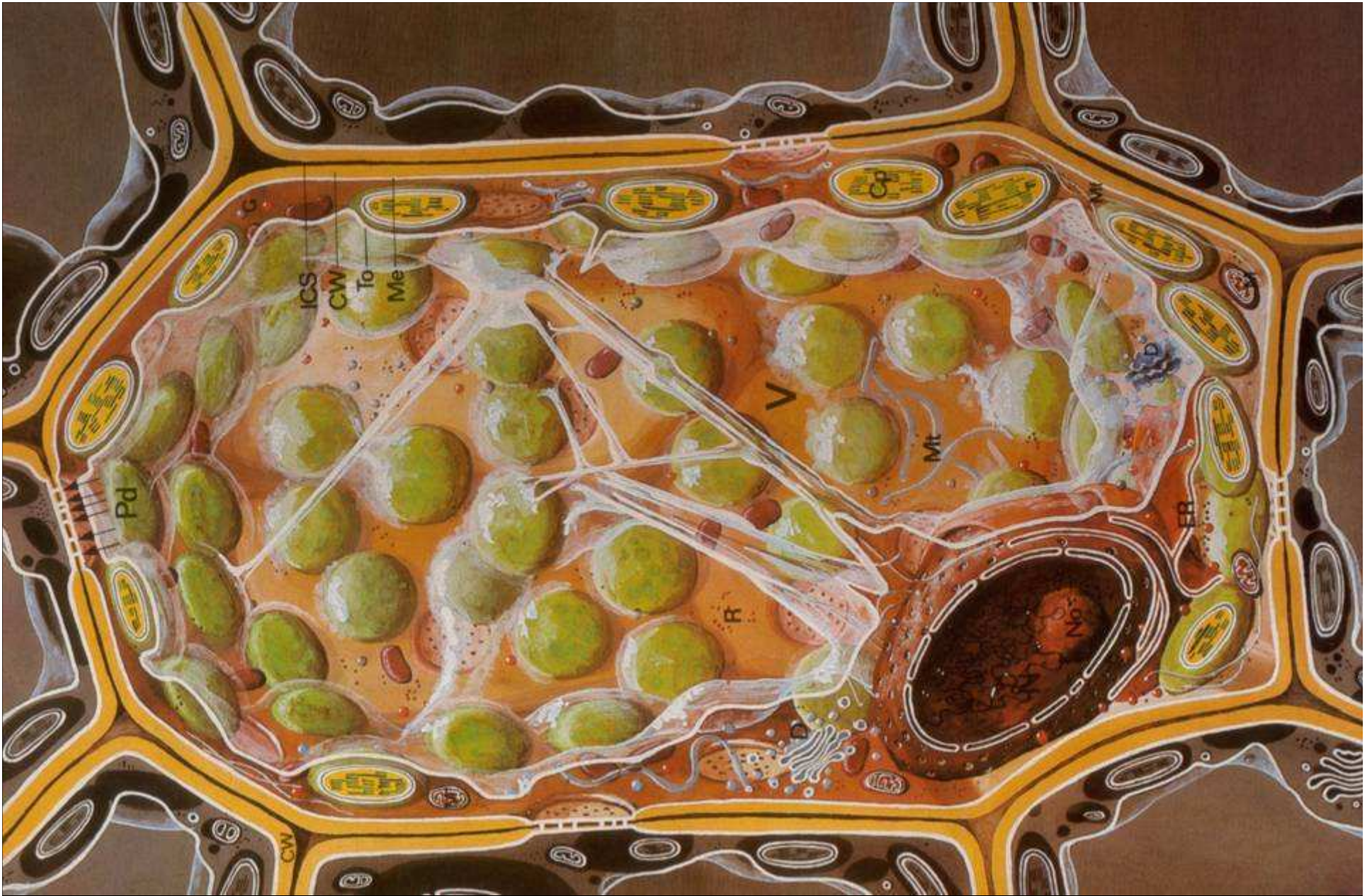
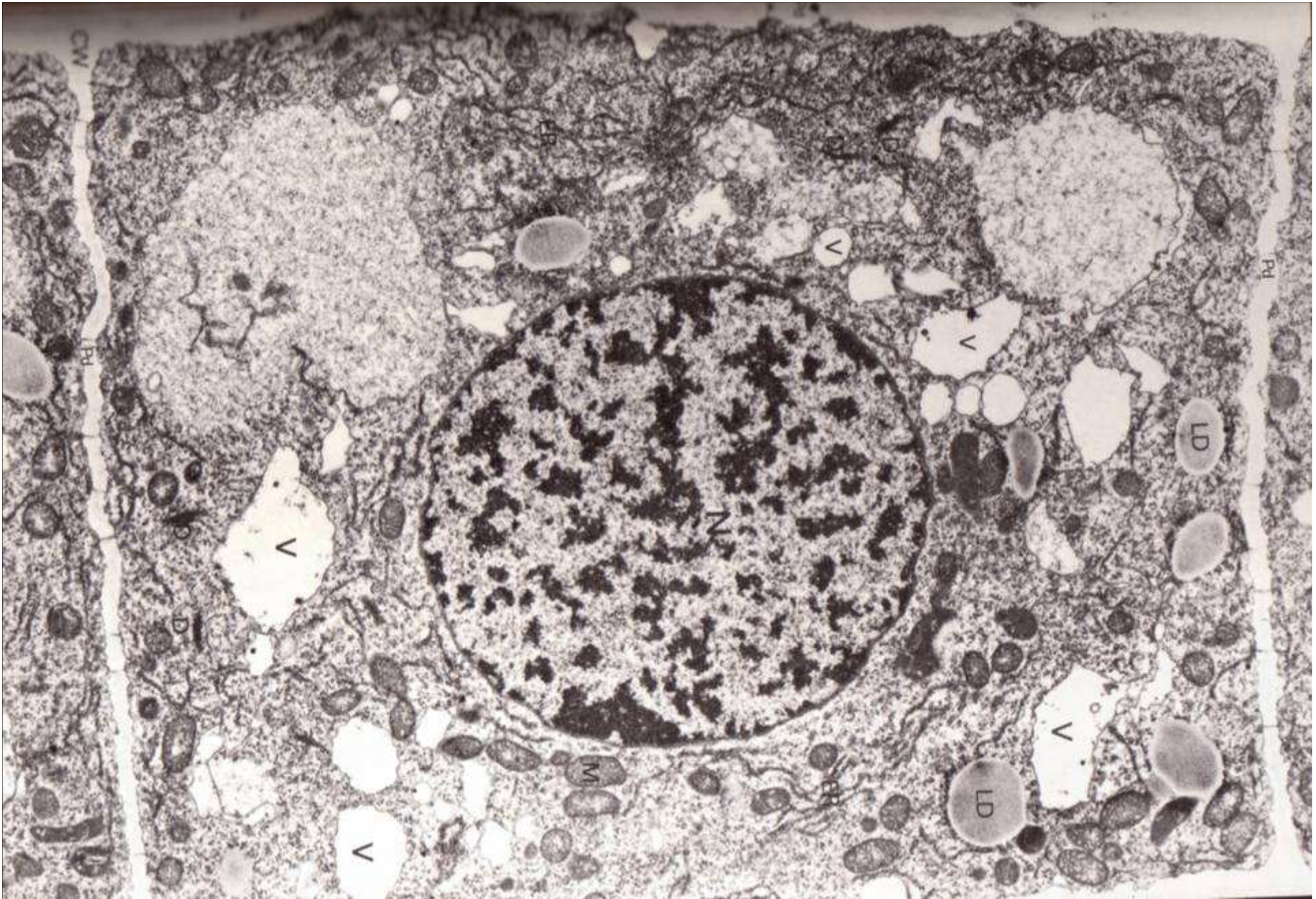


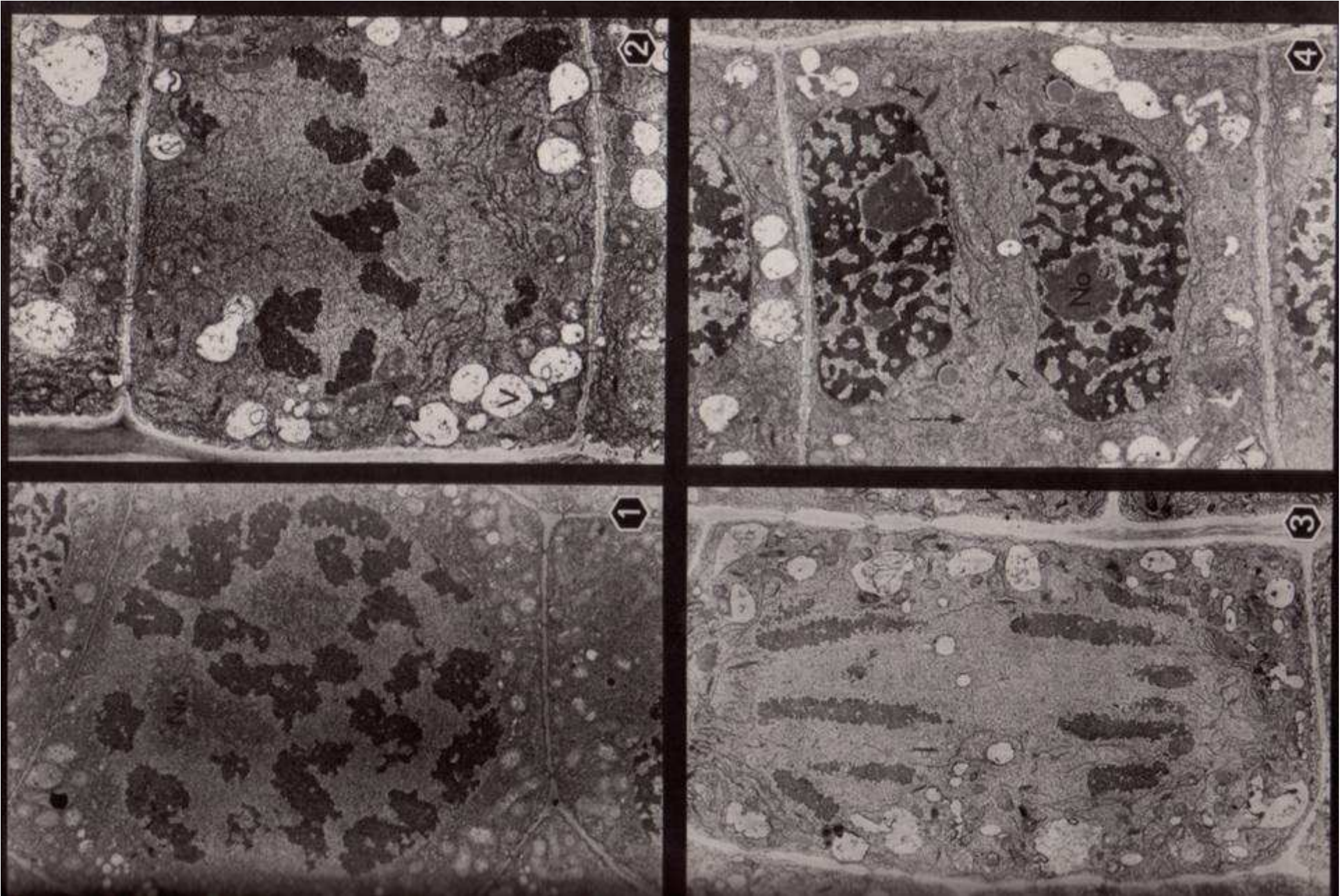
**Malý průvodce rostlinnou  
buňkou**



Ude, Koch: Die Zelle, 1982



Ude, Koch: Die Zelle, 1982







1. cytoplasma
2. jádro
3. mezimembránový prostor jad. membr.
4. /4.,5. ER (rER, sER)
5. /6.-8. Golgiho aparát (cis-, mid-, trans-)
6. /9. TGN
- 7./10. váčky (clathrinové)
- 8./11. váčky hladké
9. /12.vakuola a endosom

## Kompartmenty rostlinné buňky

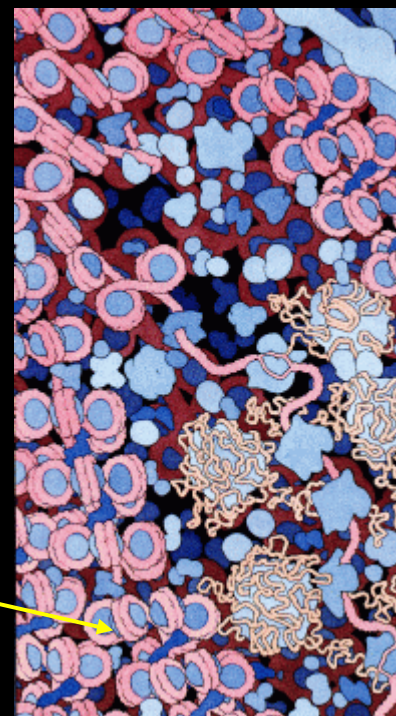
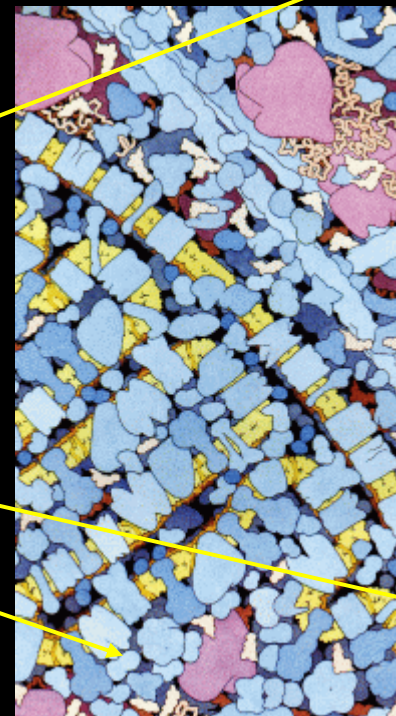
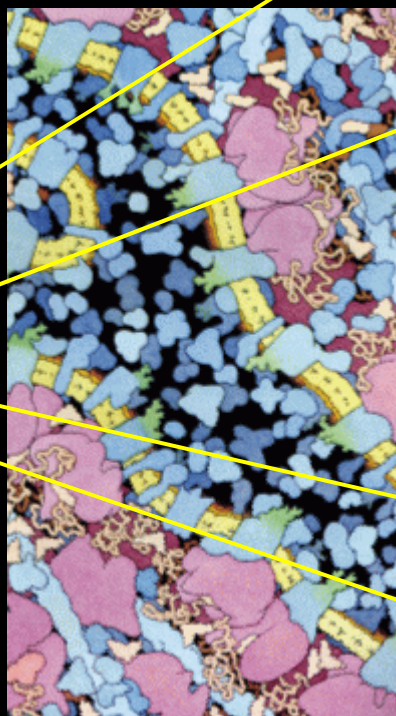
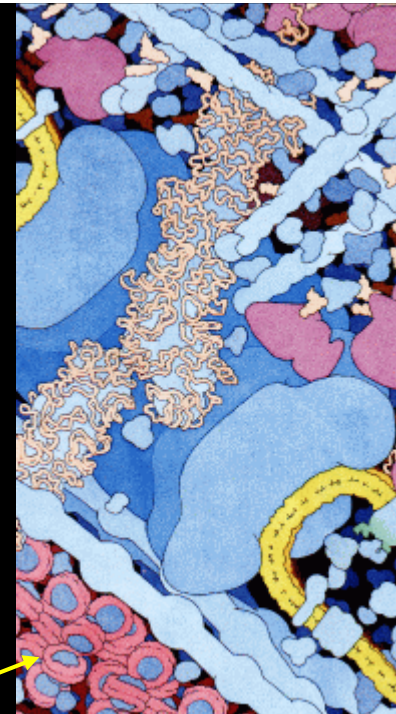
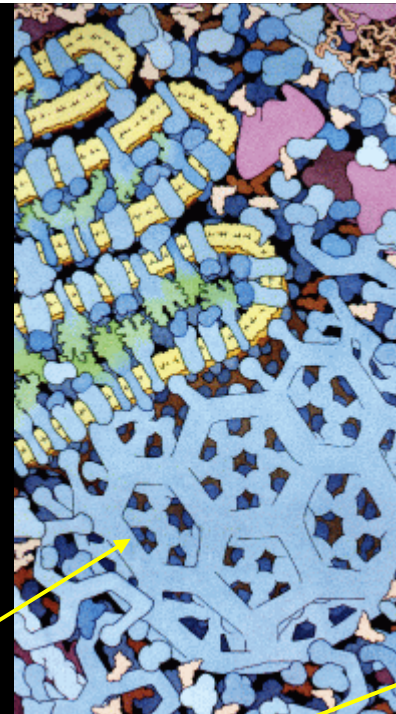
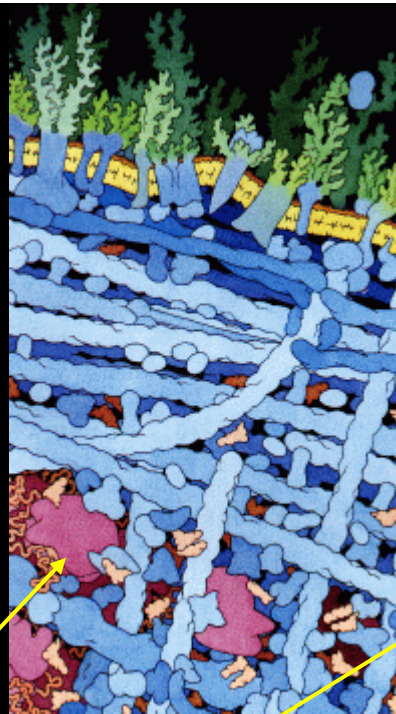
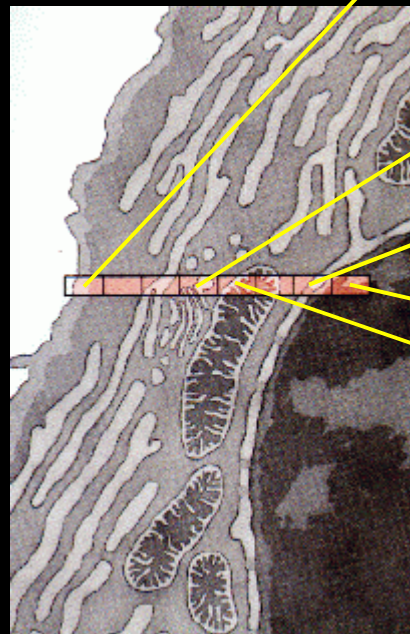
- 10./13. peroxisomy
11. /14. glyoxisomy
- 12./15. mezimembránový prostor plastidu
13. /16. stroma plastidu
14. /17. thylakoidy
15. /18. mezimembránový prostor mitochondrie
- 16./19. matrix mitochondrie (17./20. stěna)

# Obecně oblíbené omyly

- Cytoplasma je v podstatě vodný roztok, kde má smysl mluvit o pH, koncentraci atd. („cytosol“)
- Membrána je v podstatě fosfolipidová dvouvrstva.

Poměry uvnitř  
– realističtější  
představa

David S. Goodsell





# V buňce není homogenní prostředí

... snad až na obsah vakuoly?

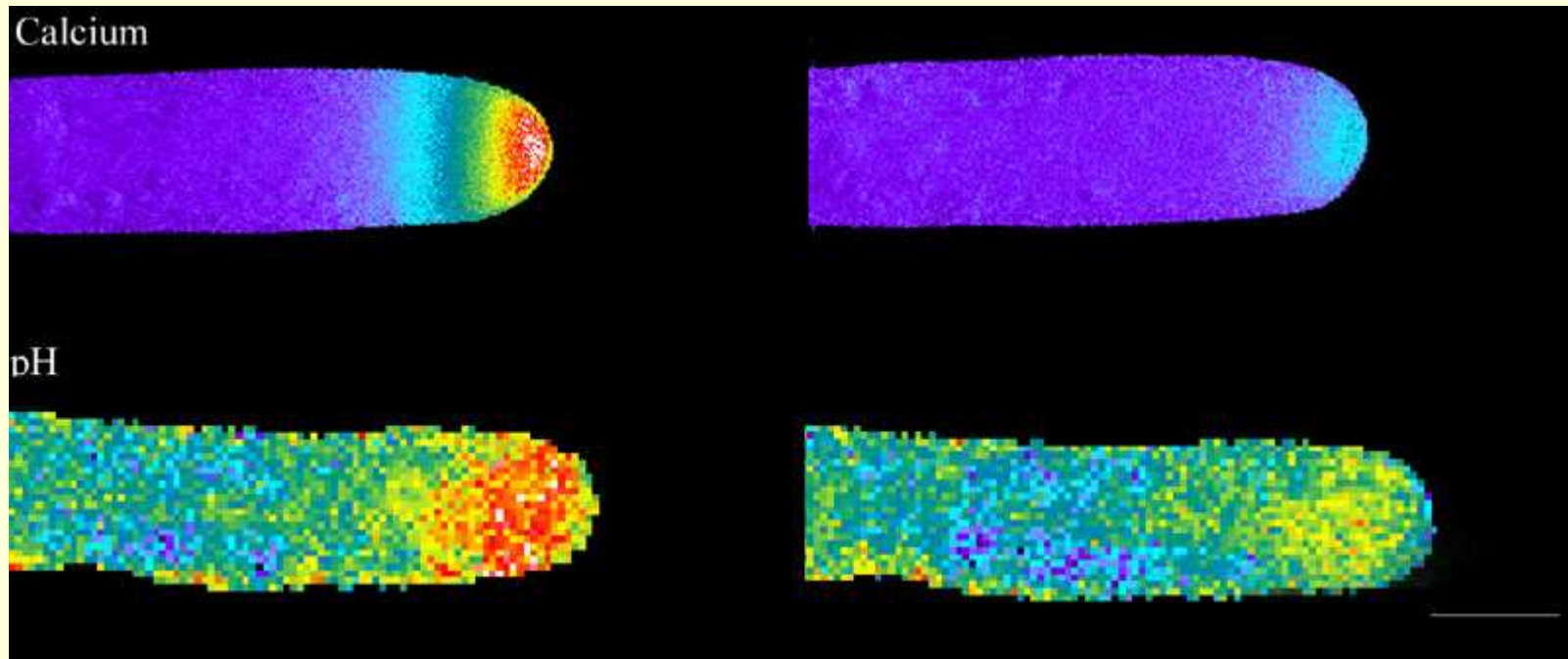


Krystaly  
oxalátu v  
buňkách  
*Aptenia* sp.

# Kolik protonů je ve váčku o objemu $0,1 \mu\text{m}^3$ při pH 7?

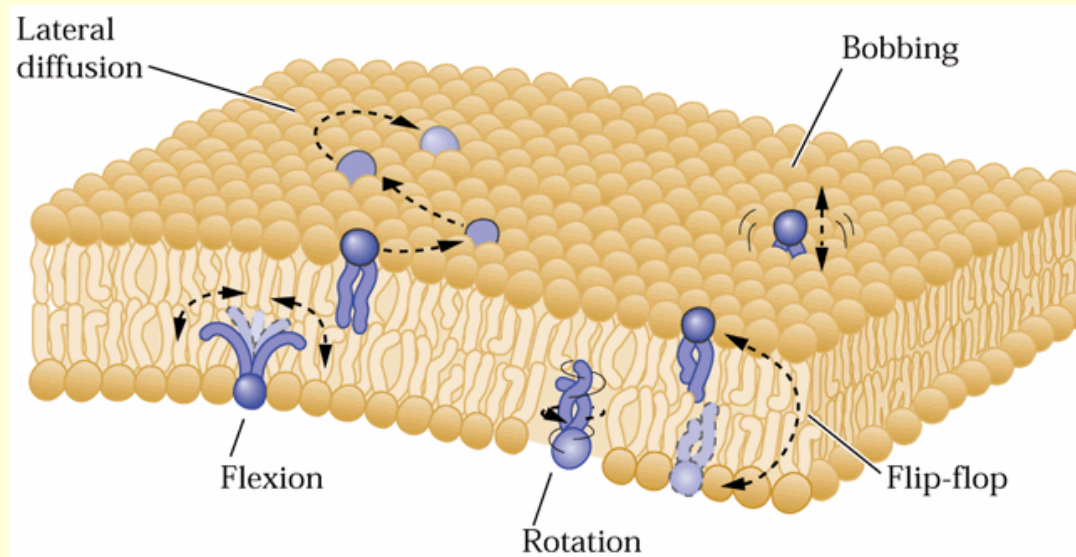
- pH7 ...  $6 \times 10^{23} \times 10^{-7}$  na 1 litr, t.j.
- na 1 litr  $6 \times 10^{16}$
- na 1  $\mu\text{l}$   $6 \times 10^{10}$
- 1  $\mu\text{l}$  je  $10^9 \mu\text{m}^3$
- **a tedy v našem váčku celých 6 protonů!**

# Gradients v cytoplasmě



Growing pollen tubes exhibit a "tip-focused" calcium gradient (top, left and right), oscillating between high (left) and low (right) levels. The pollen tube was injected with the calcium sensitive dye, fura-2-dextran, and photographed using ratio-metric ion imaging. Growing pollen tubes also exhibit a pH gradient in which the tip is slightly acidic (bottom, left and right). Back from the tip is a prominent alkaline band oscillating between high (left) and low (right) pH. The pollen tube was injected with the pH sensitive dye, BCECF-dextran, and subjected to ratio-metric ion imaging. Bar = 10  $\mu\text{m}$ . (From Hepler et al. 2006.)

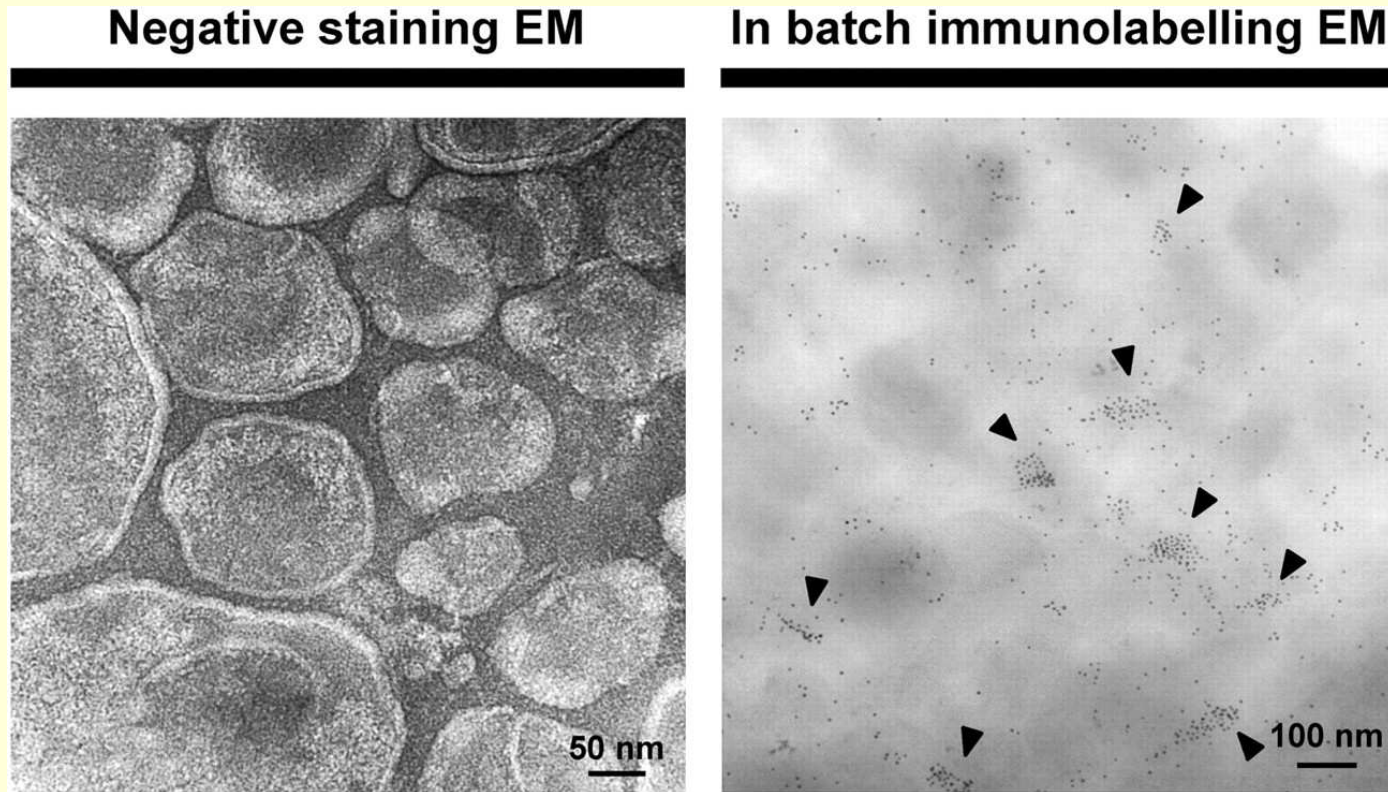
# Membrány: „černá membrána“ je abstrakce!



Ve skutečných hmotnostních poměrech  
**lipidy:proteiny:cukry** třeba **2:2:1**

V kořenech ječmene: **57 % lipidů jsou steroly**

# Mikroheterogeneita membrány: rafts, DRMs, microdomains...



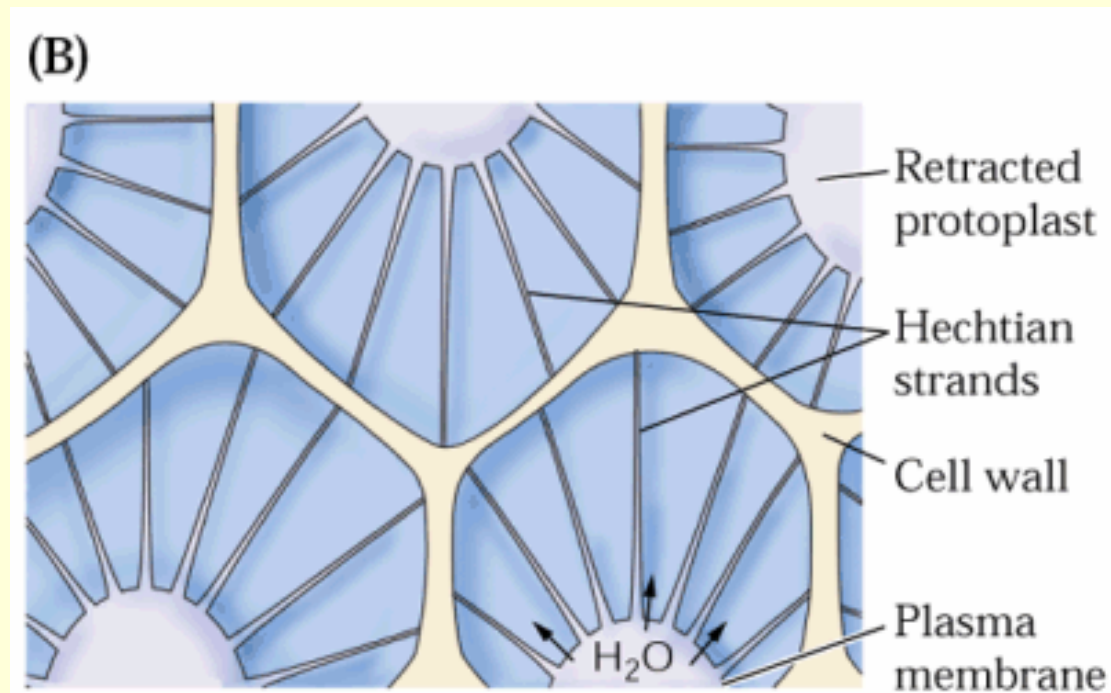
Remorin locates in membrane domains of the tobacco leaf plasma membrane. Transmission electron micrograph (EM) of tobacco plasma membrane vesicles with immunogold labeling to detect REM. Arrows on right point to areas of REM clustering in membrane domains of 70 nm diameter.

Eckardt, N. A. *Plant Cell* 2009;21:1326

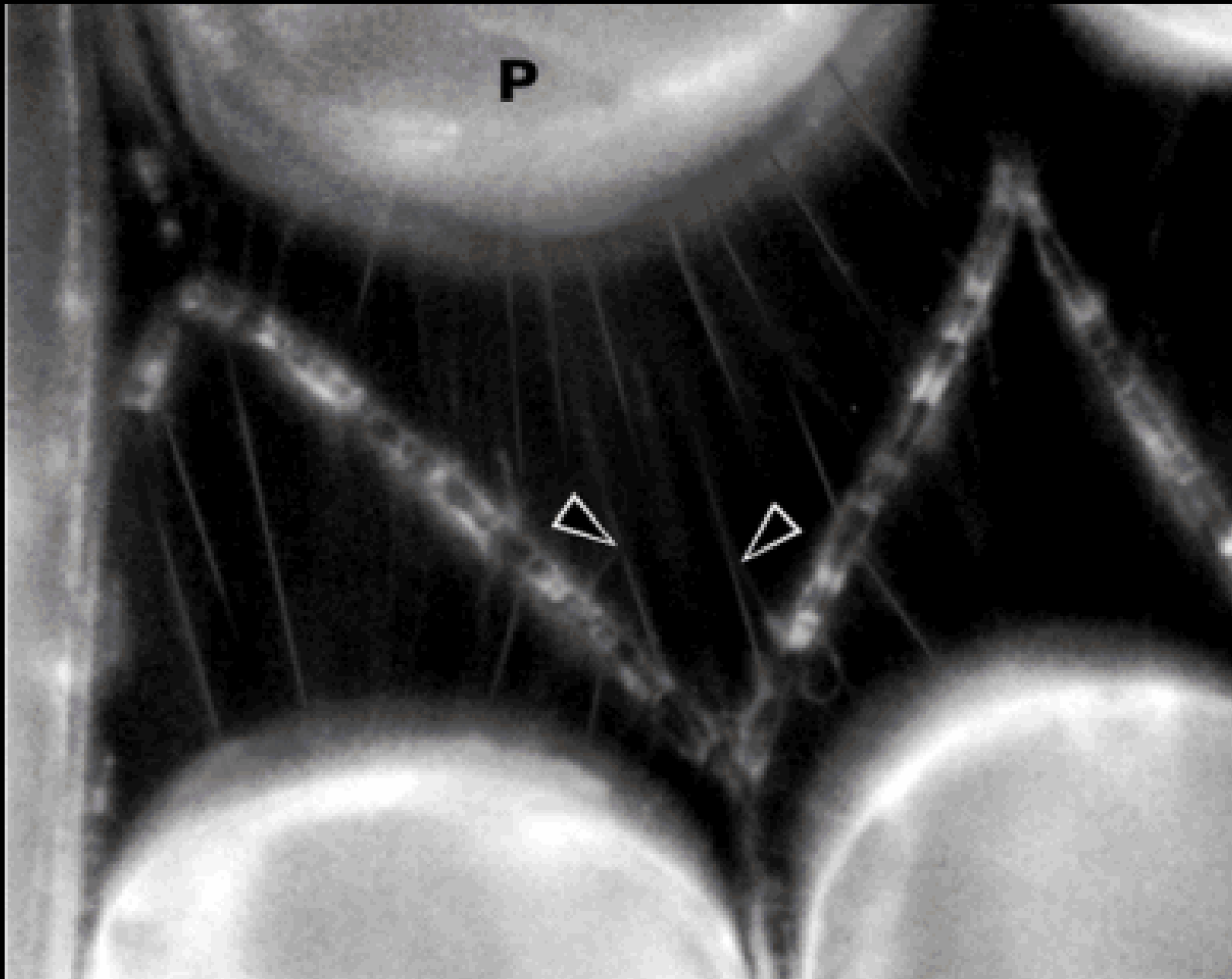


# Kompartmenty rostlinné buňky „letem světem“

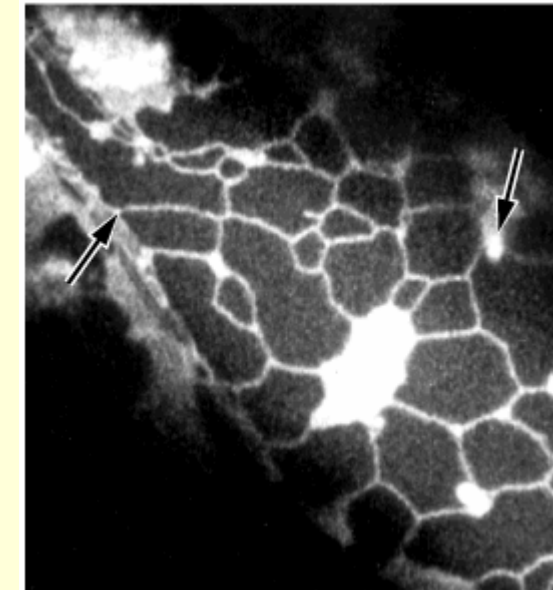
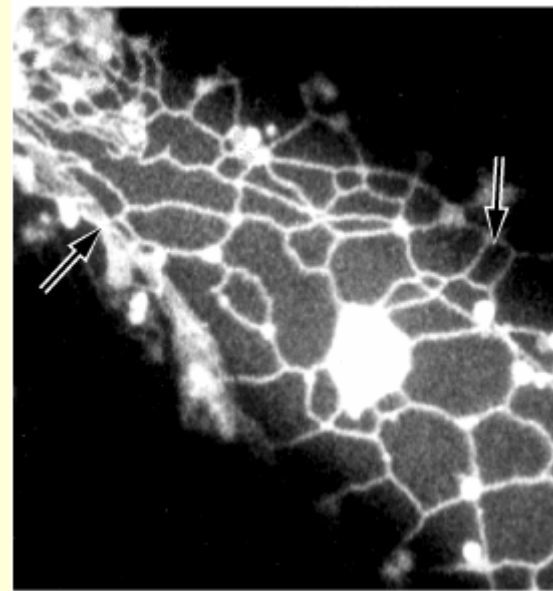
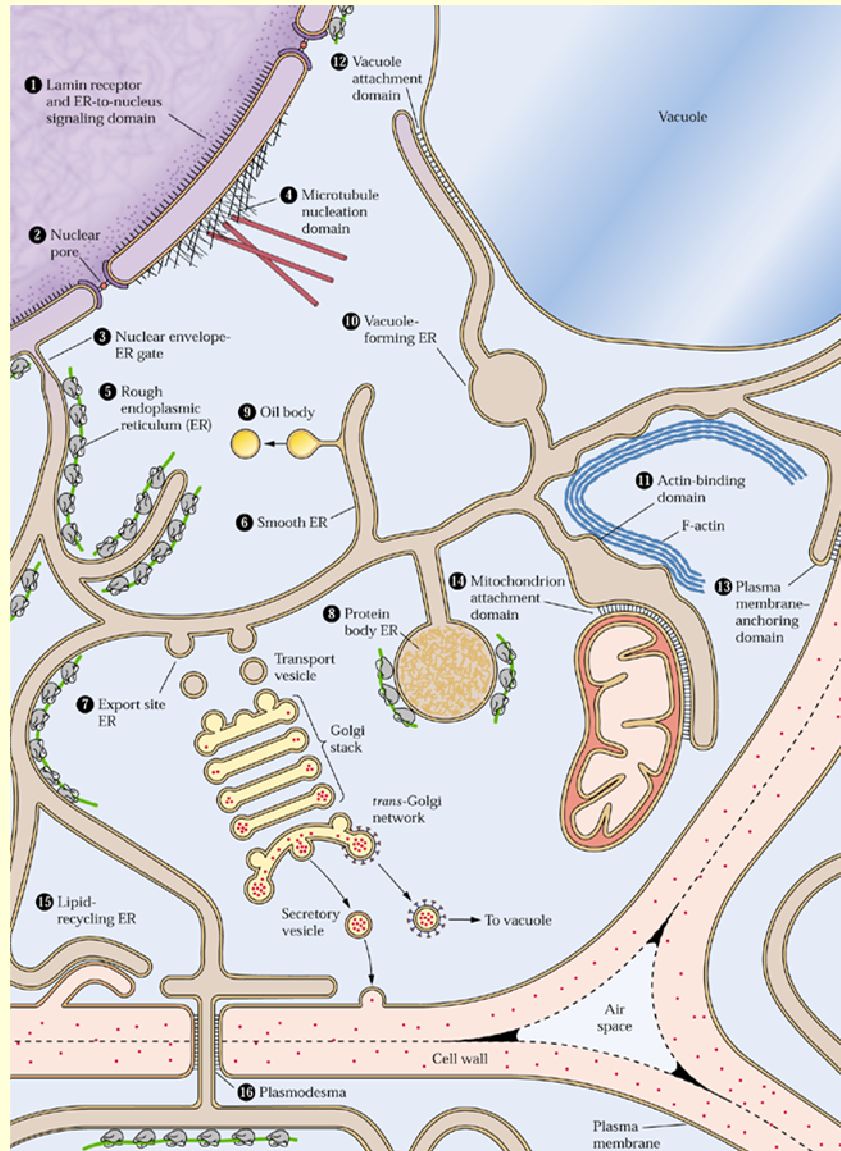
- Buňka jako „bug in a cage“ (F. Baluška)
- Kontinuum stěna-cytoplasma



# Kontinuum protoplast-buněčná stěna: Hechtovy provazce



# Endoplasmatické retikulum a Golgiho aparát

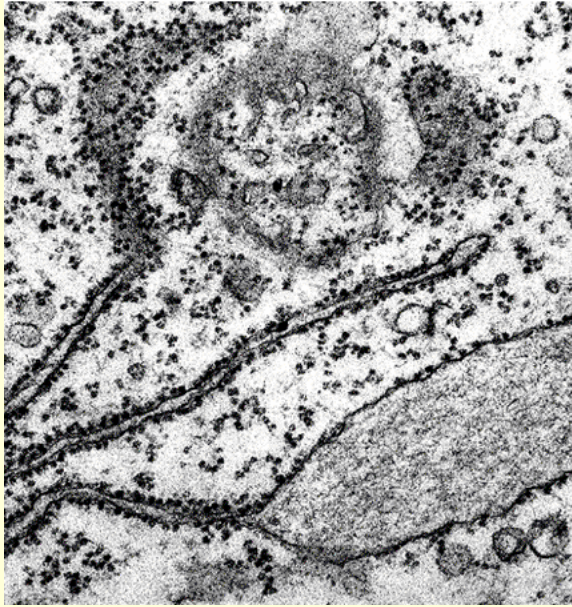


Video – J. Haseloff

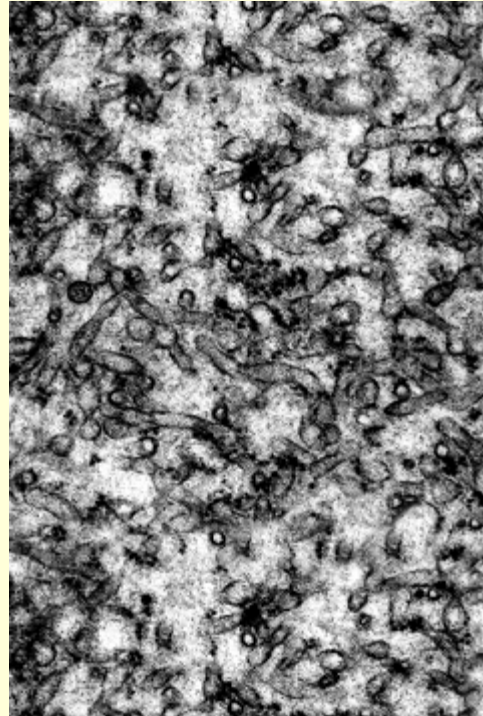




# Podoby a deriváty ER



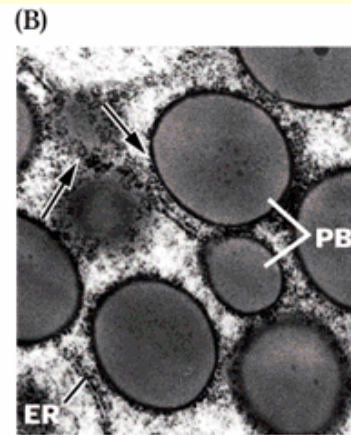
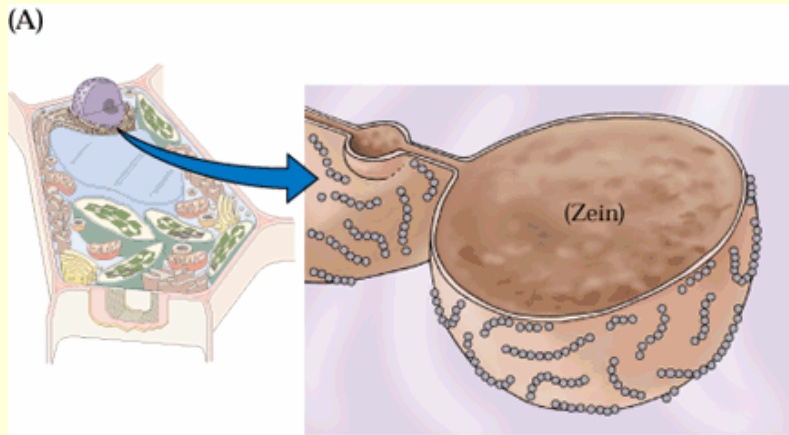
rER



sER

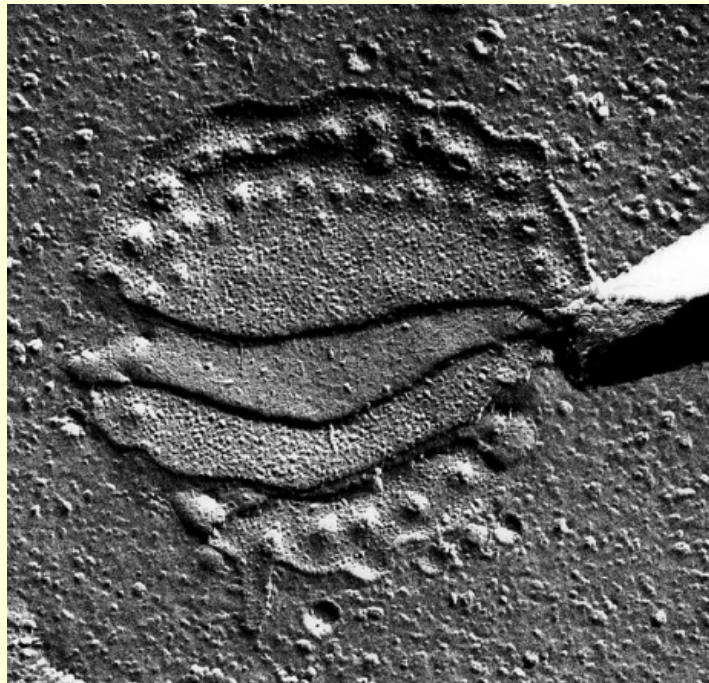
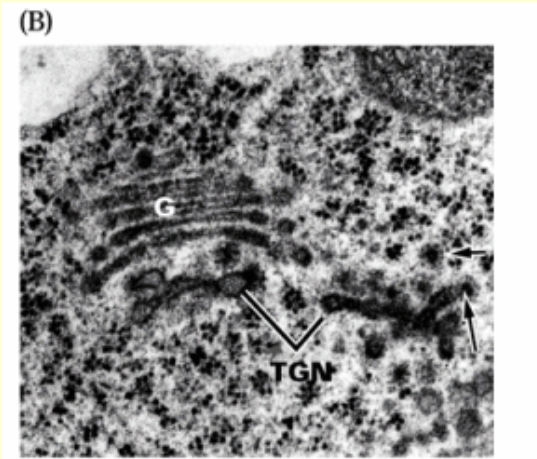


ER a aktin

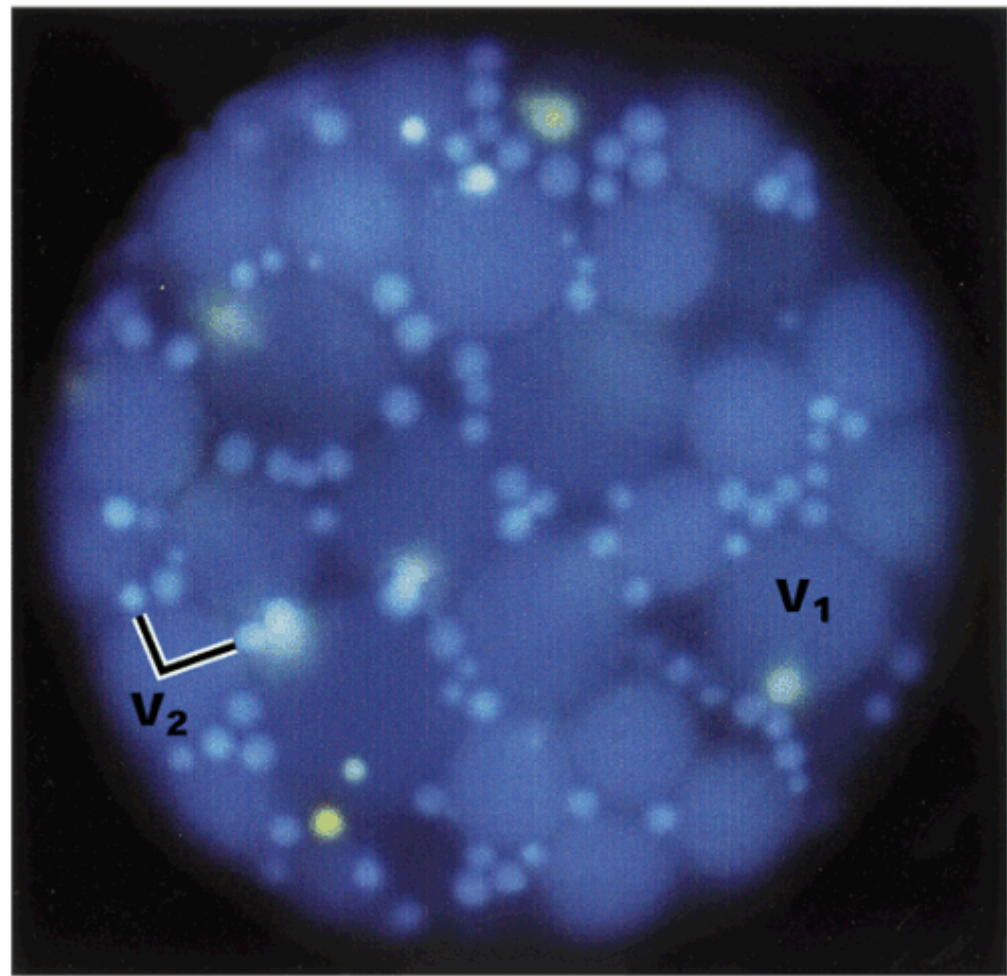


protein bodies

# Golgiho aparát

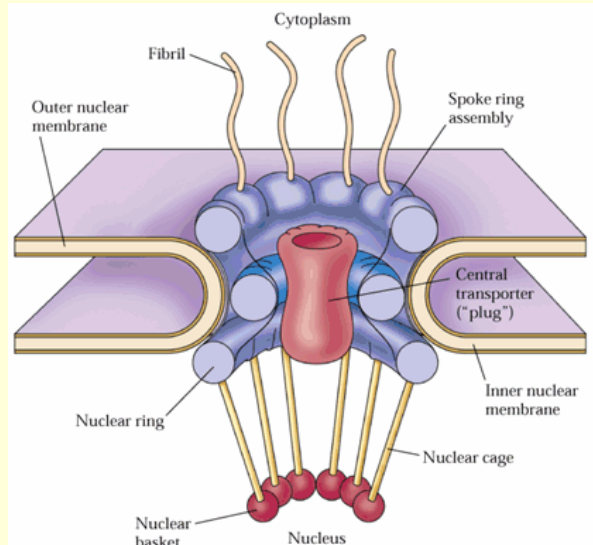
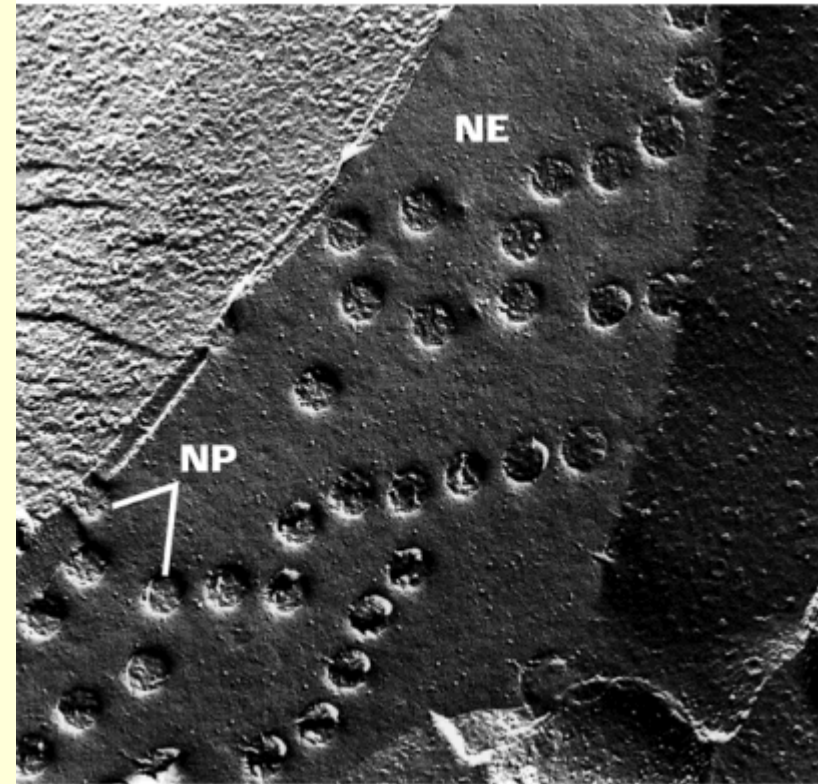
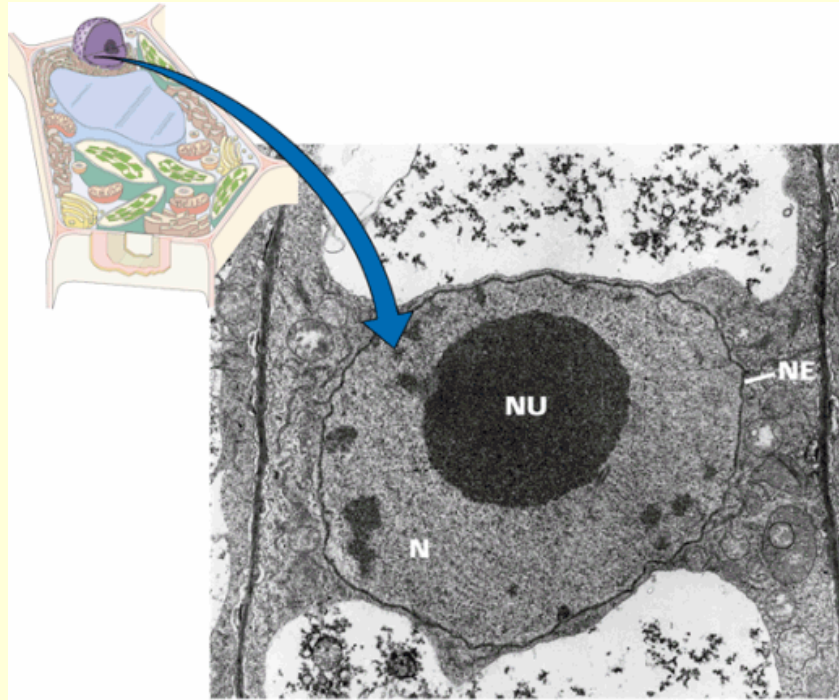


# Vakuola: více typů



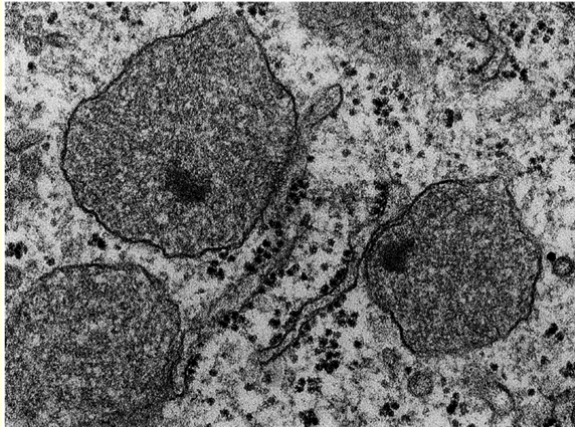
Aleuron. protoplast –  
zásobní (V1) a lytické  
(V2) vakuoly

# Jádro a jadérko

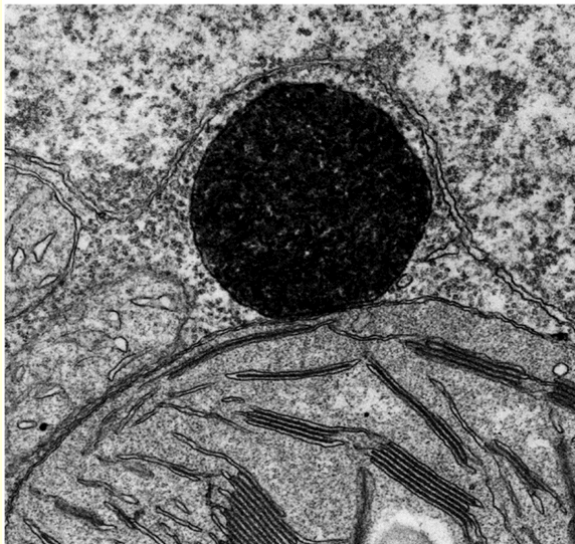


# Peroxisomy

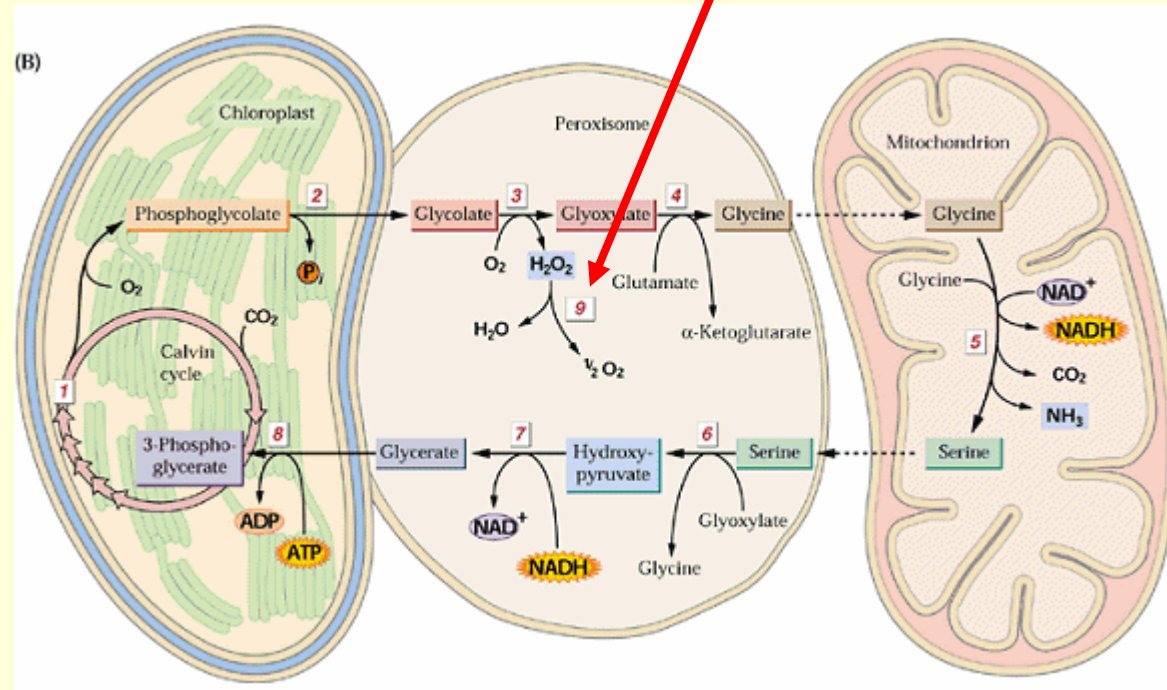
(A)



(B)

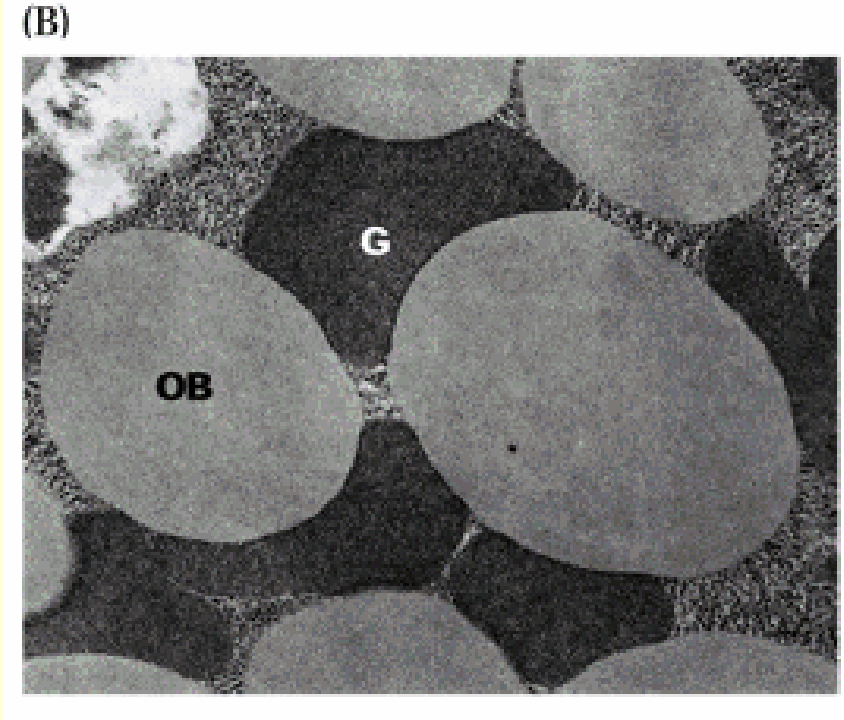
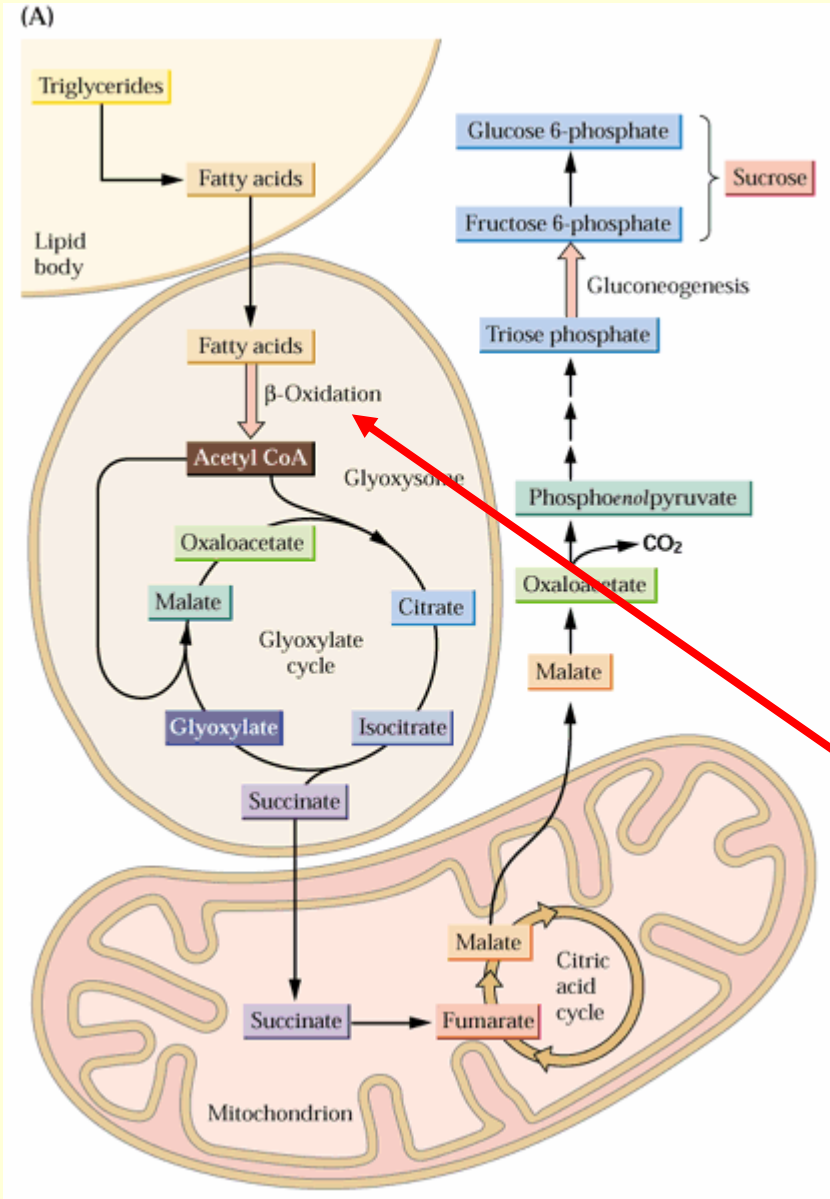


kataláza



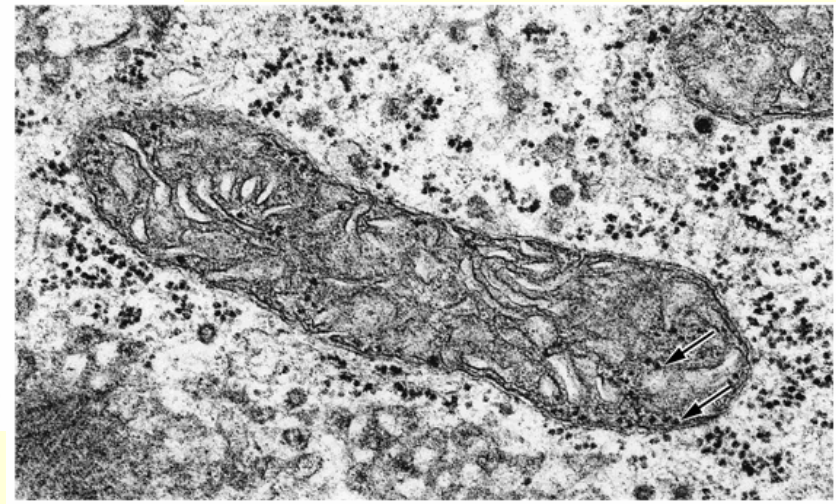
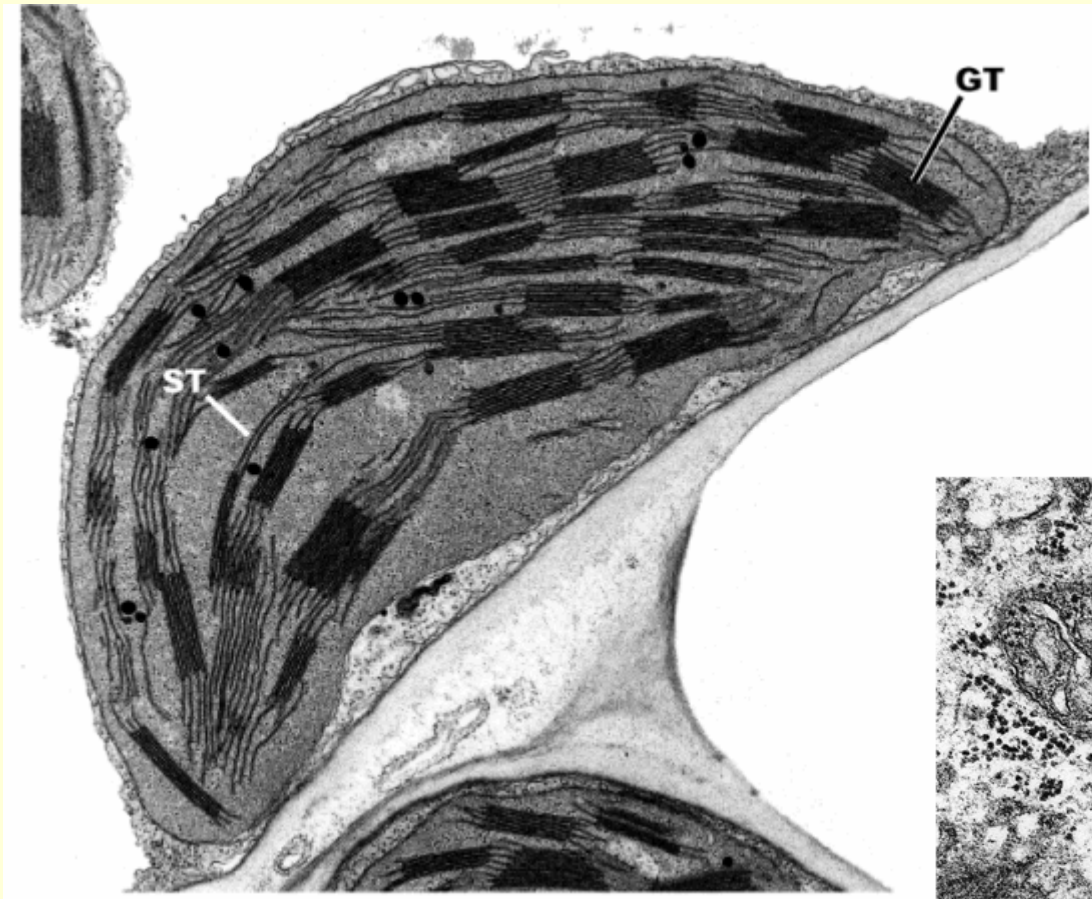
- „vypuzení“ toxických metabolitů ( $H_2O_2$ ) z cytoplasmy

# Glyoxisomy



produkce (a destrukce)  $H_2O_2$

# Plastidy a mitochondrie



... příliš velké téma na tuto přednášku