

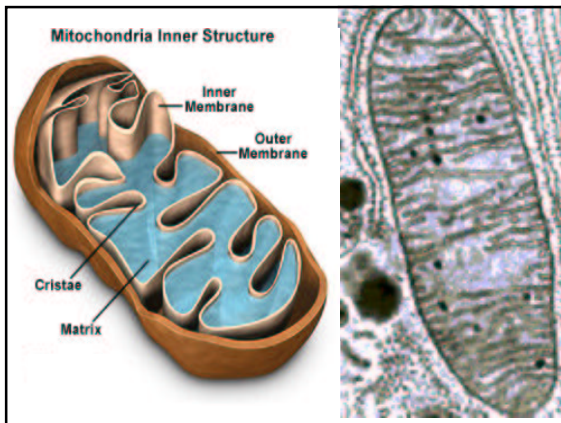
MITOCHONDRIA

metabolism

brain, heart, kidney, lung, liver (rest)
skeletal muscle (play)

“powerhouse” for cells (*i.e.*, ATP production)

THE site for oxygen consumption



“warm-” and cold-blooded” animals

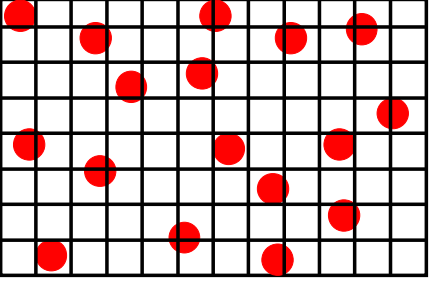
e.g., mouse and lizard

3-6-fold difference in resting
metabolism (at similar size)

stereology: N_v ? V_v ?

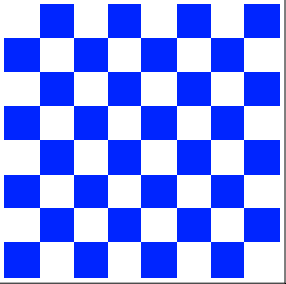
scaling: S for cristae?

fractals: S for cristae? ...



A_A, L_L
 $A_A = n_o z^2 / (4 A)$;
 $N_V = N_A / D$
 $D = 6 (V / S) = 6 (V_V / S_V) = 6 (A_A / S_V)$
 $= 6 (n_o z^2 / (4 A)) / (n_n z / A)$

CELLS & GEOMETRY



tiling, tessellation

MAMMALIAN LIVER

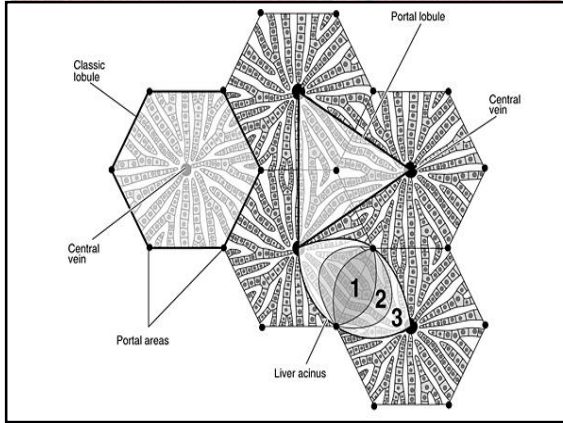
largest organ (1-2 kg)

left-RIGHT lobe

exocrine: bile and hormones(!)

endocrine: sugars

filtrates blood arriving from intestine



EXERCISE

side length l
shortest length s , longest length $L1 + L2$
 $s = \text{Sqrt}[L1^2 + L2^2]$
determine $P(L1)$ and $A(L1)$
mean path length = $(s + L1 + L2) / 2$
set $A = 1$ to determine particular values

blood supply A^{-1}
relation for perimeter and mean path length
