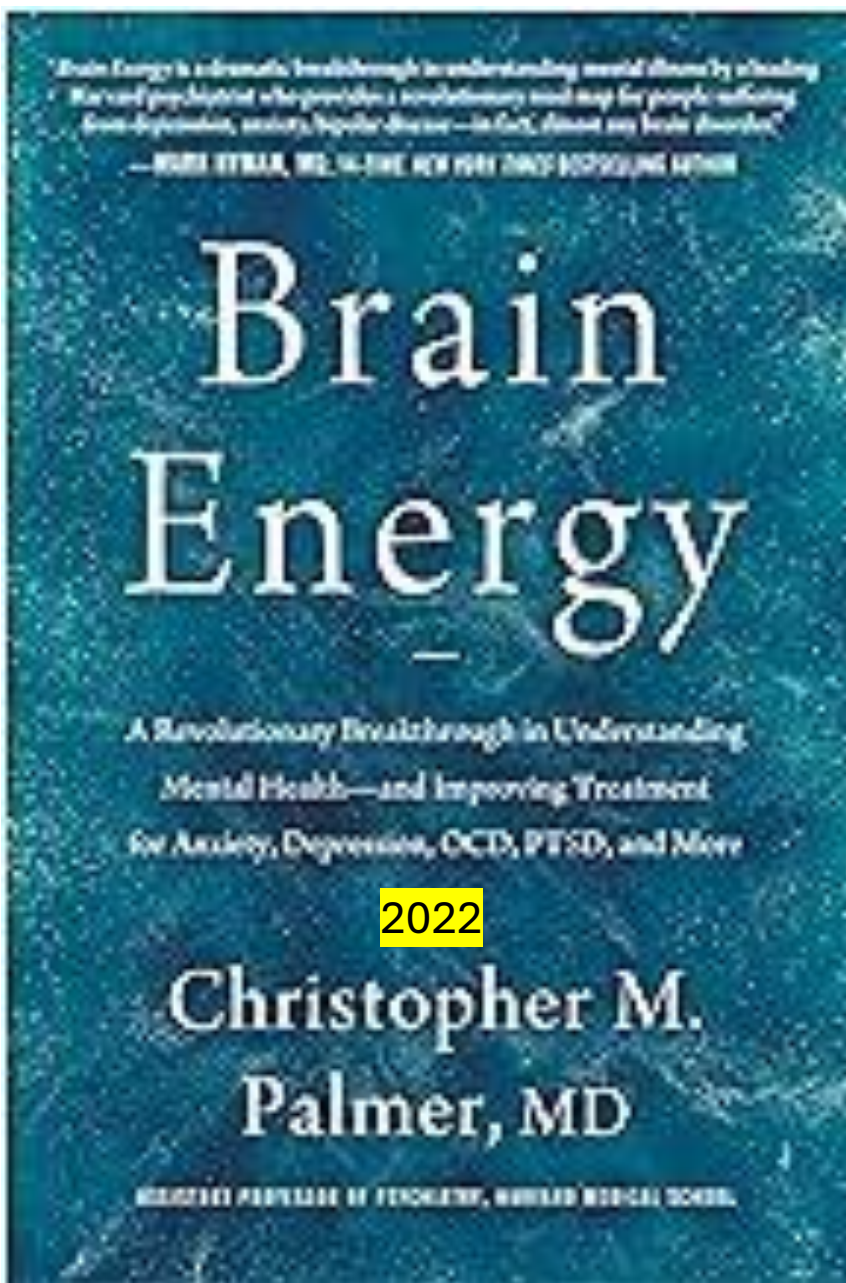


MENTAL HEALTH AND CELLULAR FUNCTION

Handouts 2



HARVARD
PSYCHIATRIST

Brain Energy, Mitochondria, Metabolism

and Mental Health

with Dr. Chris Palmer

start 2:09 end 20:00

<https://www.youtube.com/watch?v=oC-sQogfh3Q&t=42s>

**Dr. Chris Palmer | Brain Energy: The Metabolic Theory
of Mental Illness | The Metabolic Link Ep. 47**

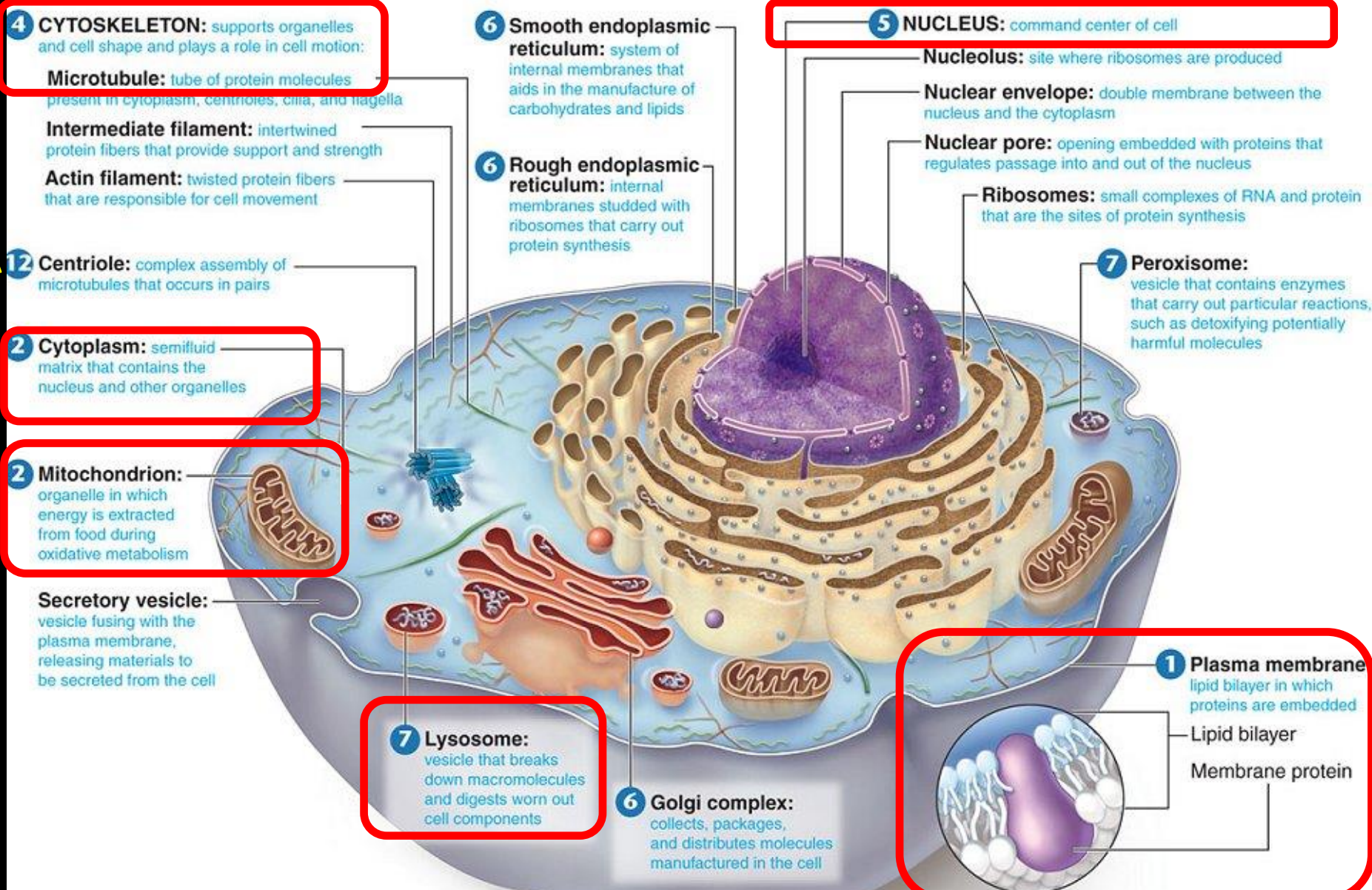
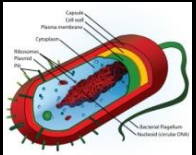
2:34 start end 1 hr 4 min. (includes several advertisements
that seem healthy to me)

<https://www.youtube.com/watch?v=lrPtrDLvfEQ>

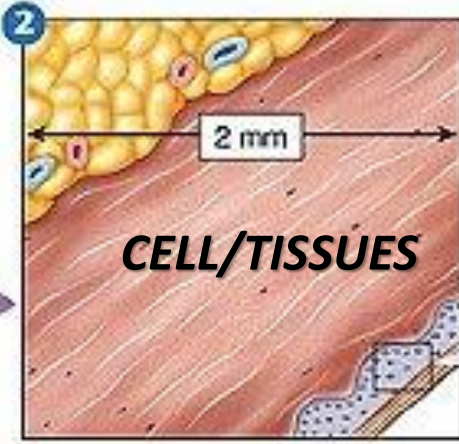
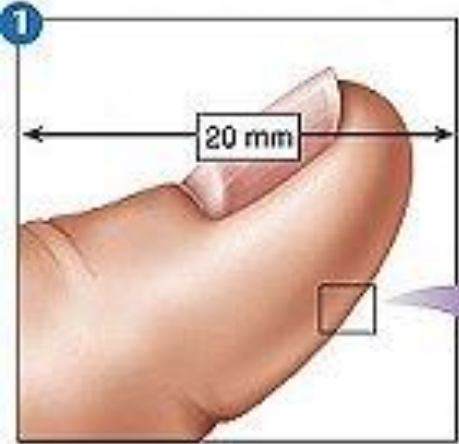
NUCLEATED CELL (EUKARYA)

10-15 microns

BACTERIA AND MITOCHONDRIA
2 microns

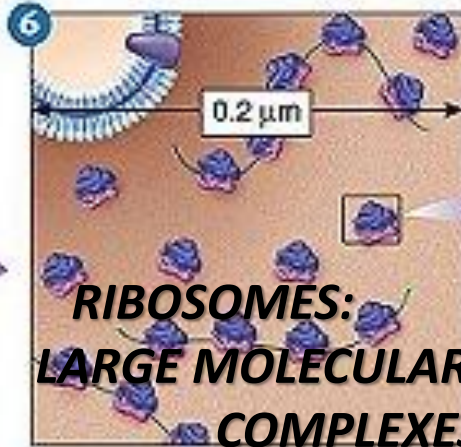
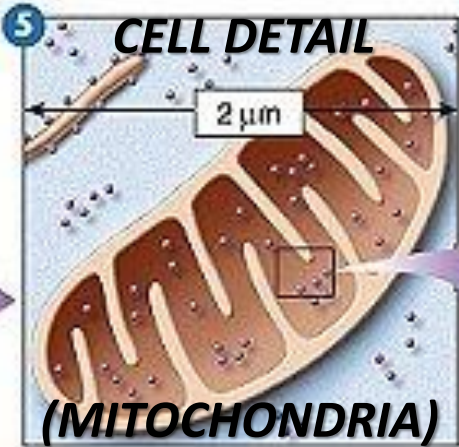
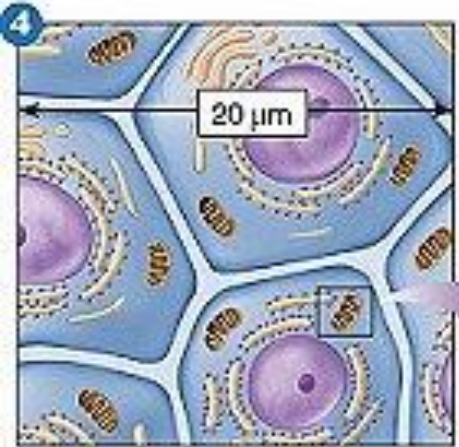
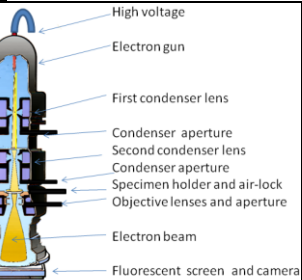


OPTICAL LIGHT
1960s



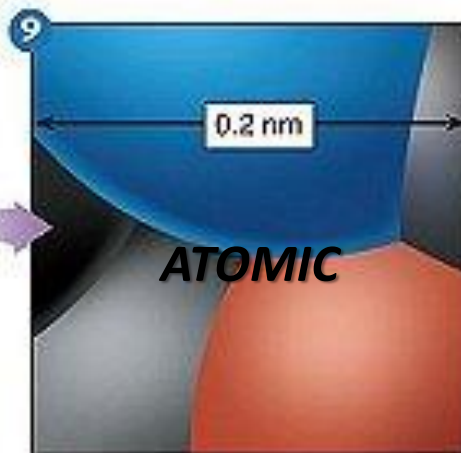
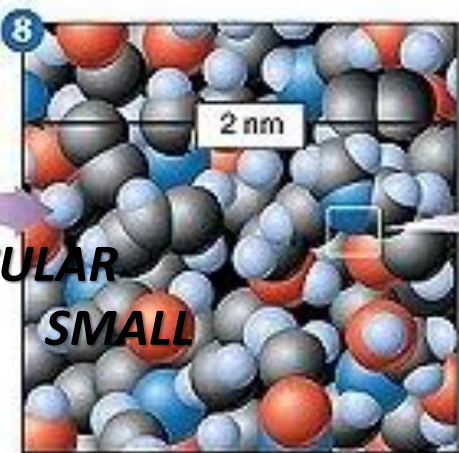
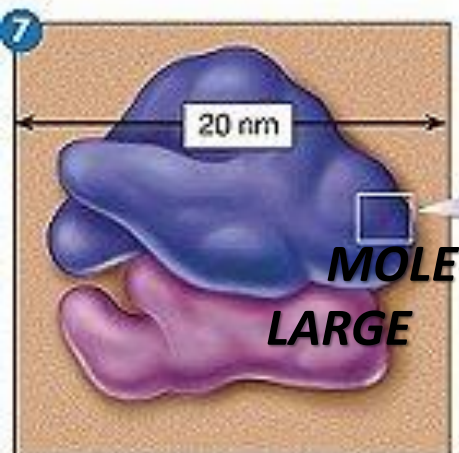
mm=.001M
(1/1000 meter)
10⁻³ Meters

ELECTRONS
1970s



micrometer (micron)=
1 millionth of a meter
10⁻⁶ Meters

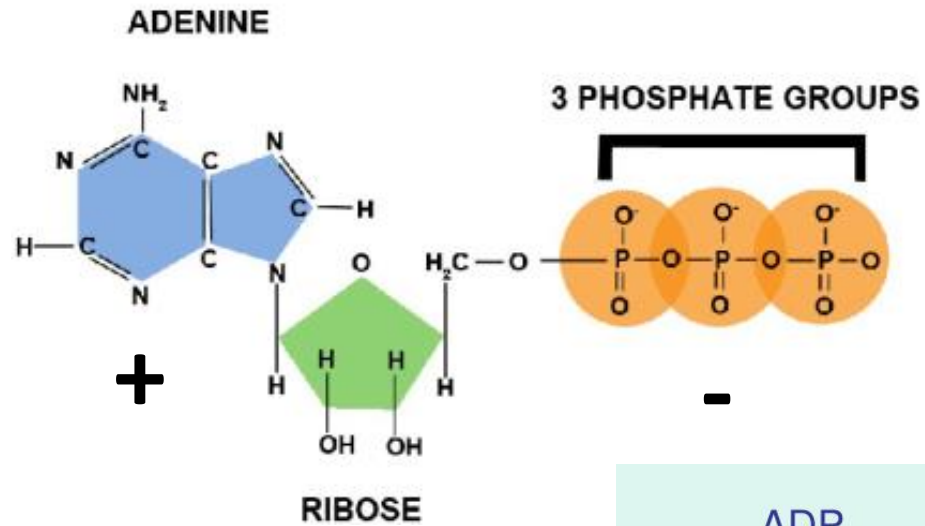
SINGLE PARTICLE CRYO ELECTRON MICROSCOPY
2000s



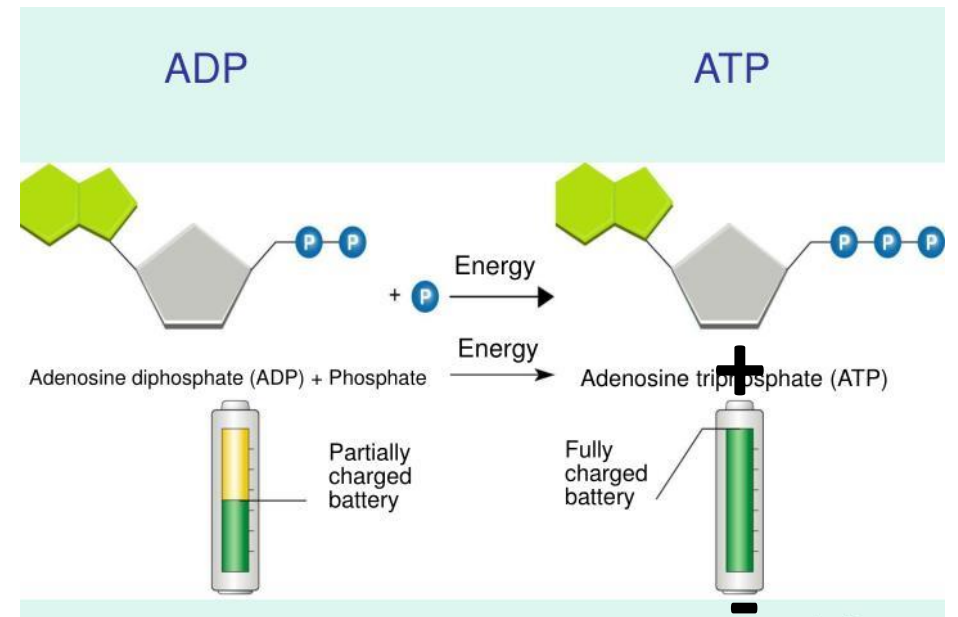
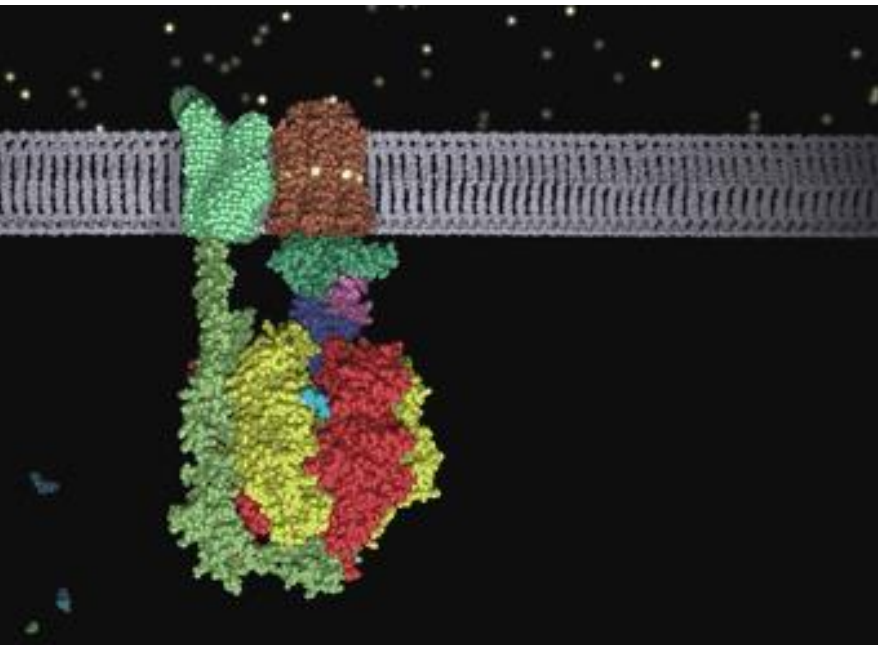
nanometer=
1 billionth of a meter
10⁻⁹ Meters
Capillary pore= 6 nm
AVERAGE ATOMIC SIZE= H2O=0.3 nm
Hydrogen atom=0.1 nm=100pm=1A

MITOCHONDRIA MAKE THE UNIVERSAL BIOLOGIC BATTERY ADENOSINE TRIPHOSPHATE...

An ATP Molecule



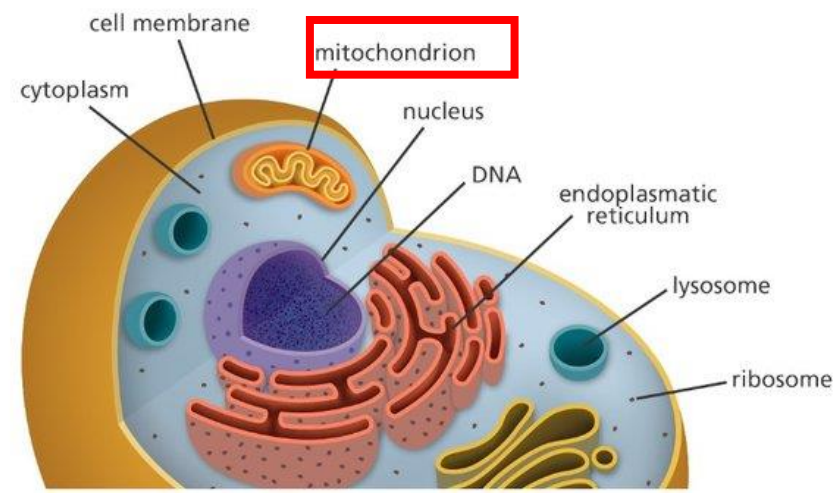
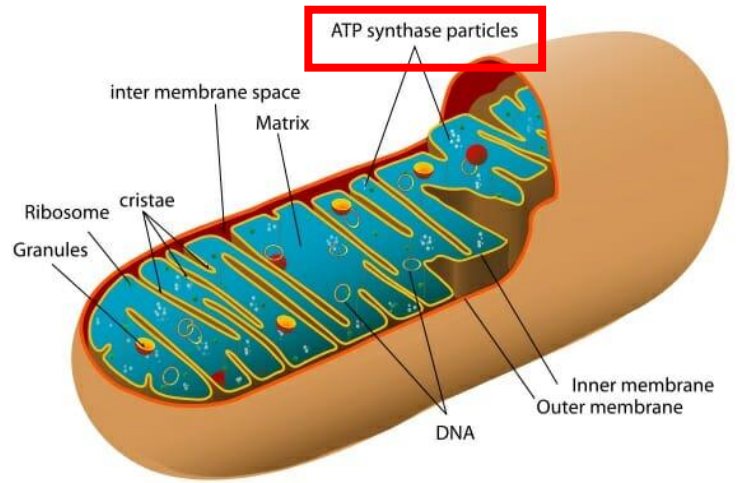
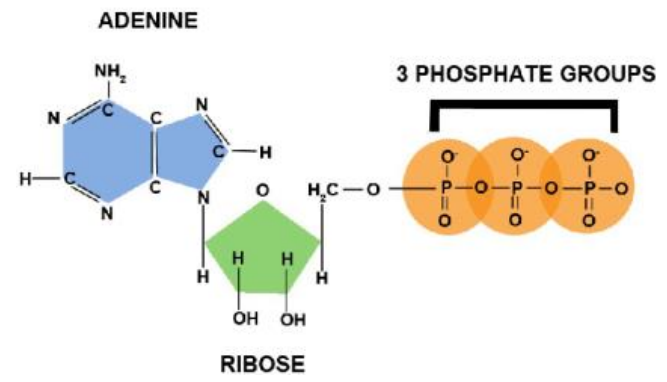
ATP SYNTHASE



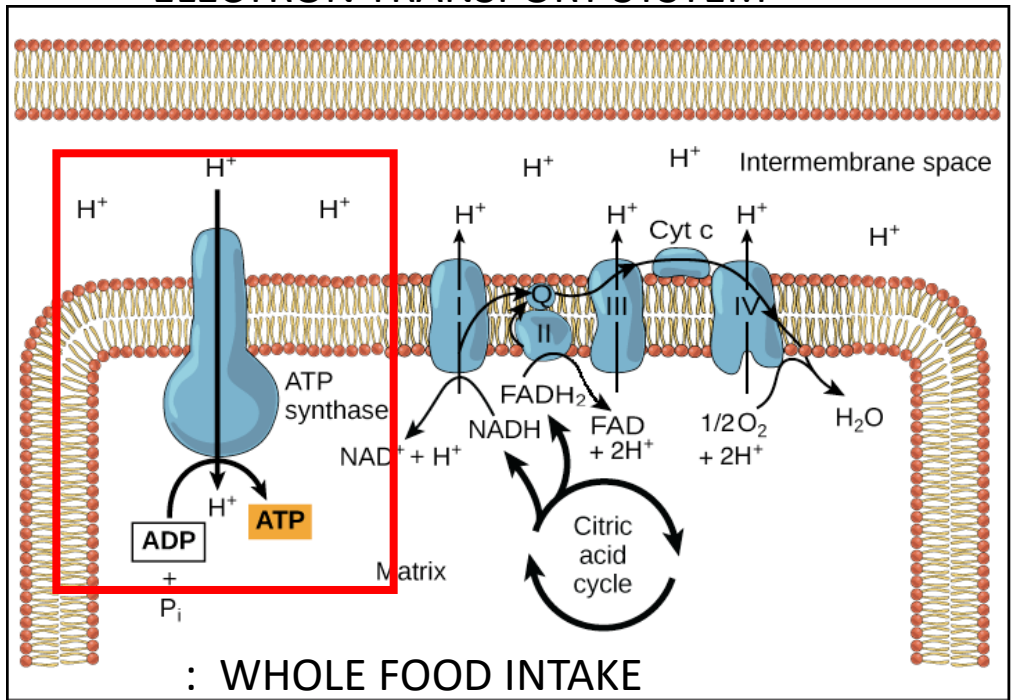
MITOCHONDRIA

~1000 OR MORE/HUMAN CELL MAKE...

An ATP Molecule



ELECTRON TRANSPORT SYSTEM

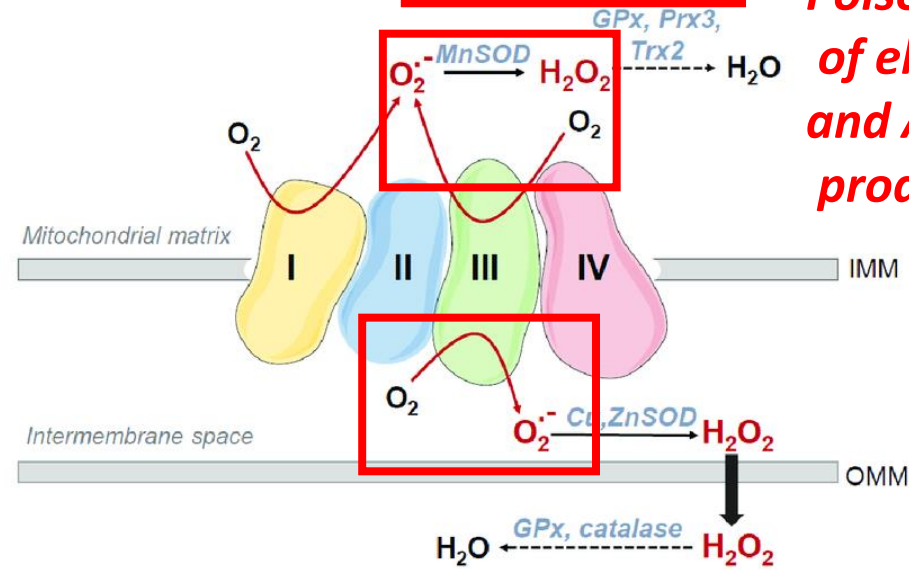


: WHOLE FOOD INTAKE



ROS, REACTIVE OXYGEN SPECIES

Poisons the machinery of electron transport and ATP energy production falls

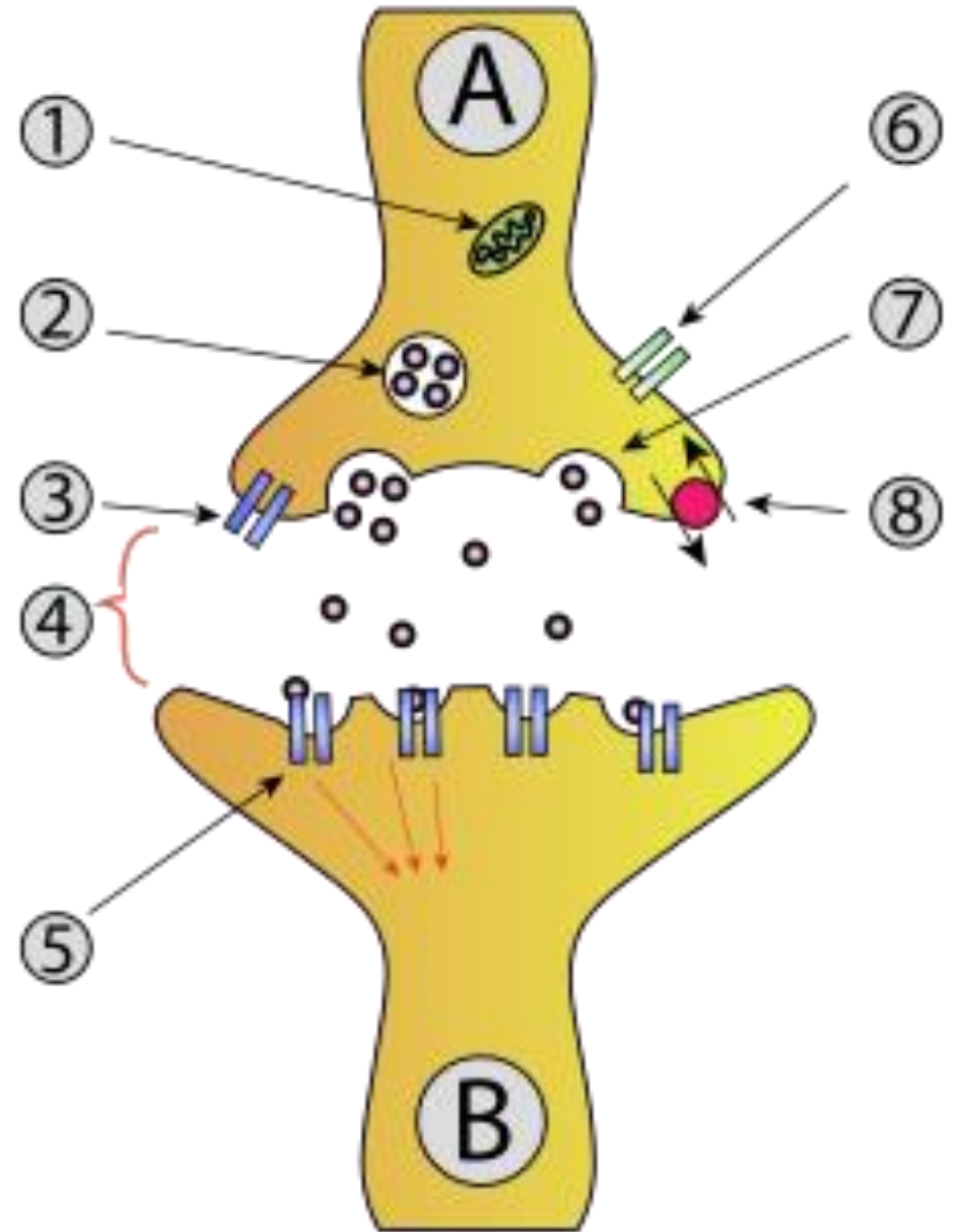


OVER-FEEDING

SYNAPTIC VESICLES

1. NEED ATP AND ATP SYNTHASE TO LOAD UP NEUROTRANSMITTERS

2. CRYO EM SHOWS DETAILS OF ATP IN SYNAPTIC VESICLE MEMBRANES





A HEALTHY MICROBIOME REQUIRES BEING FED FIBER, SOLUBLE AND INSOLUBLE

ULTRA PROCESSED INGREDIENTS HAVE FIBER REMOVED AND HAVE EXCESS SUGAR AND FAT

THIS COMBINATION CAUSES OVERGROWTH OF HARMFUL SPECIES WHICH DIGEST THE MUCUS BARRIERS.

