

THE RESPIRATORY SYSTEM

THE FUNCTIONS:

- EXCHANGE O₂ AND CO₂ BETWEEN THE ATMOSPHERE & THE BLOOD

- EXCHANGE O₂ & CO₂ BETWEEN THE BLOOD & THE BODY'S CELLS

MAJOR ORGANS

LUNGS

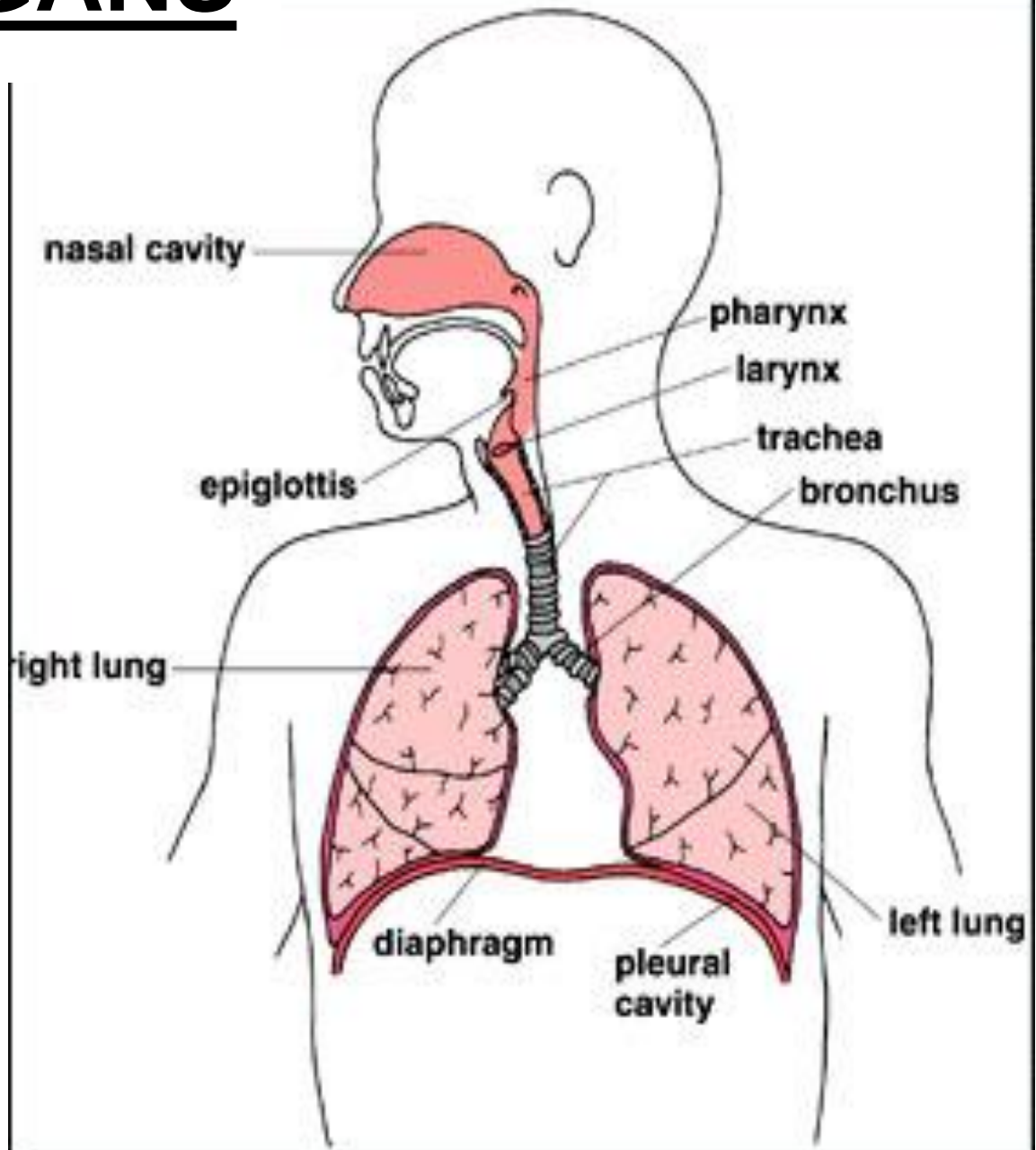
TRACHEA

DIAPHRAGM

BRONCHI

BRONCHIOLES

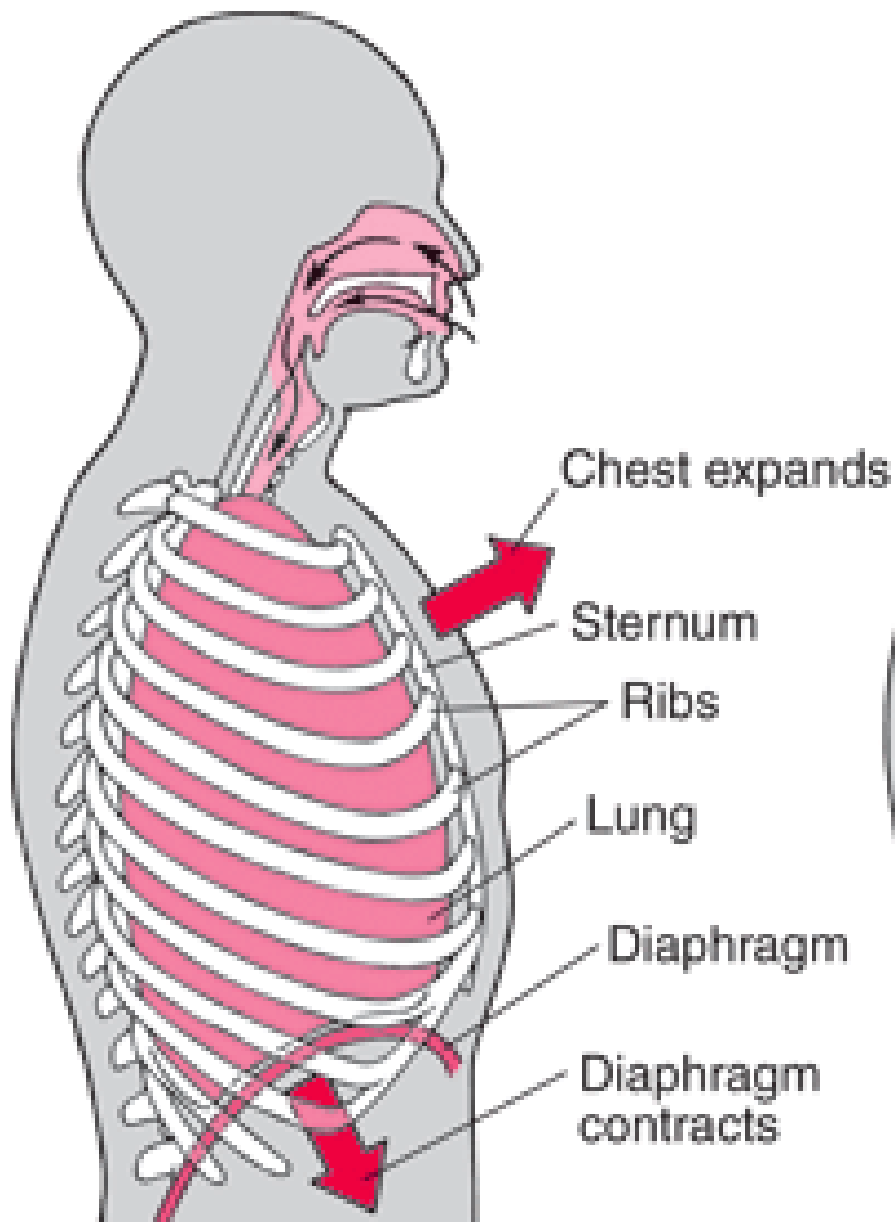
ALVEOLI



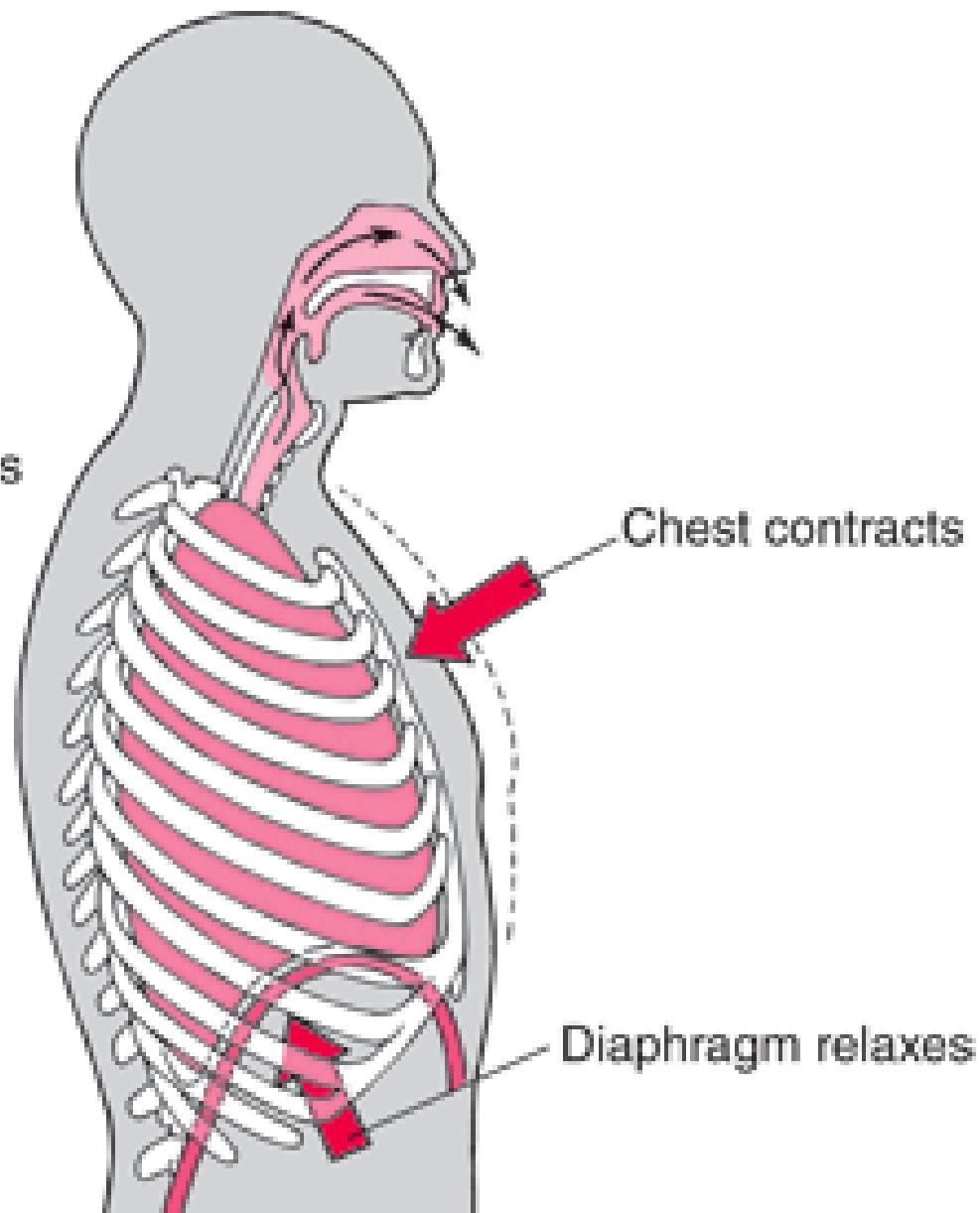
BREATHING:

THE MECHANICAL MOVEMENT OF AIR INTO AND OUT OF THE LUNGS

- CONTROLLED BY THE DIAPHRAGM
- WHEN DIAPHRAGM CONTRACTS, IT FLATTENS. THIS RESULTS IN MORE SPACE IN THE CHEST CAVITY: THE LUNGS FILL WITH AIR
- WHEN THE DIAPHRAGM RELAXES, IT ARCHES UPWARD. THIS PUSHES UP ON THE LUNGS AND CAUSES AIR TO RUSH OUT OF THE LUNGS



Inhalation



Exhalation

RESPIRATION: 2 TYPES

- EXTERNAL RESPIRATION:

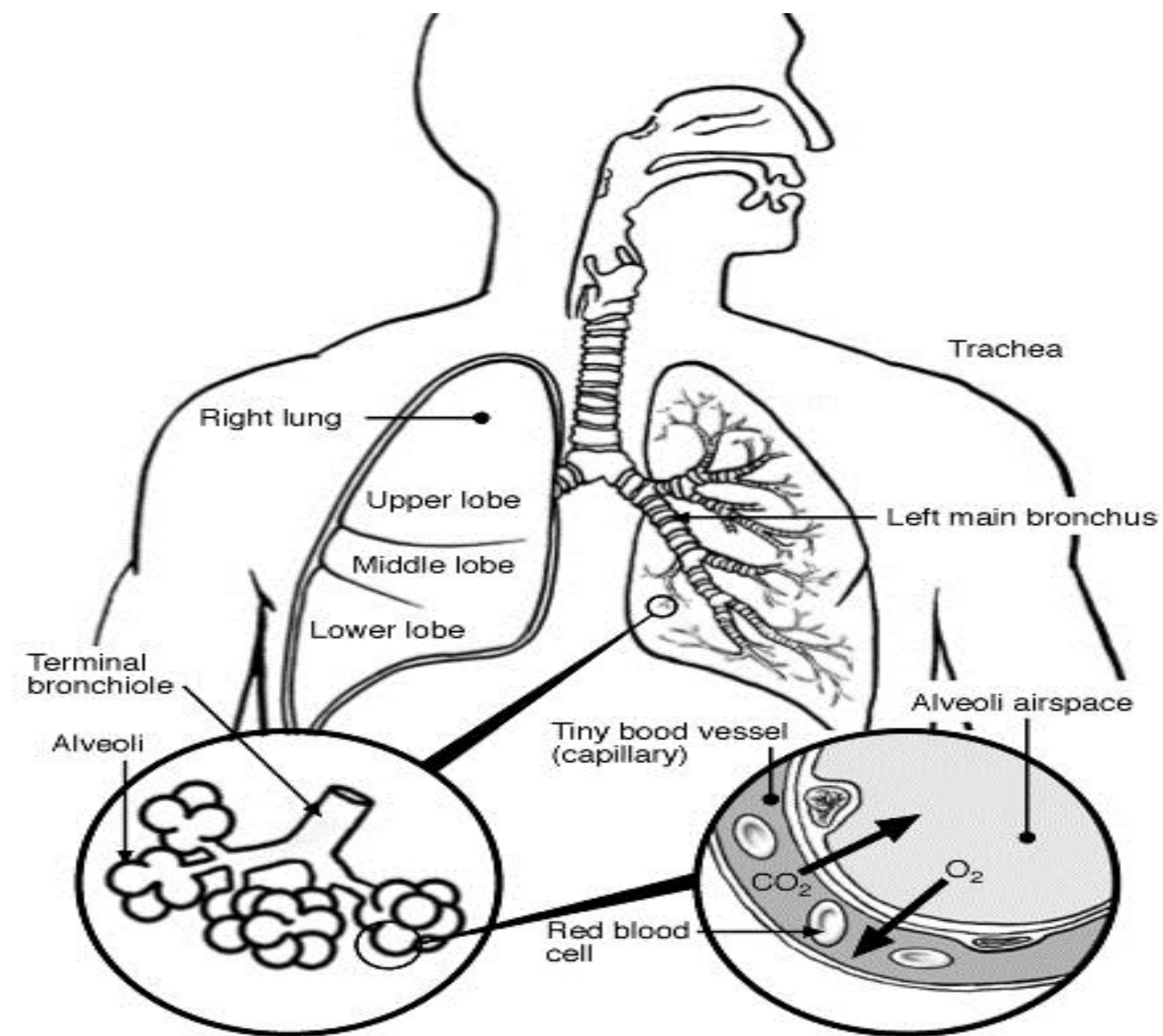
- GAS EXCHANGE BETWEEN THE ATMOSPHERE AND THE BLOOD
- OCCURS IN THE LUNGS (ALVEOLI)

- INTERNAL RESPIRATION:

- GAS EXCHANGE BETWEEN THE BLOOD AND THE BODY'S CELLS
- OCCURS WHERE THE CAPILLARIES MEET THE BODY CELLS

EXTERNAL RESPIRATION

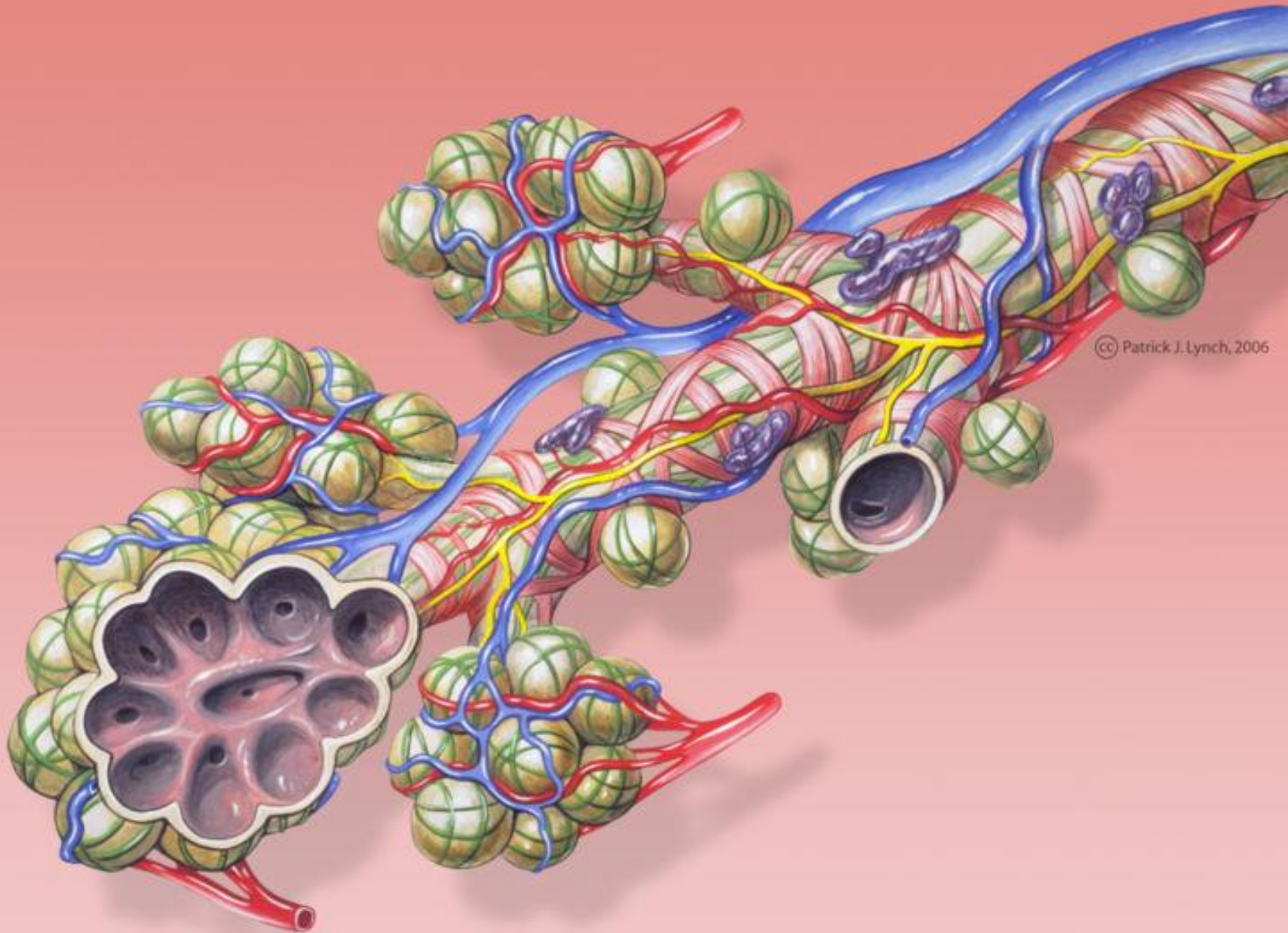
- AIR ENTERS THE BODY THROUGH THE MOUTH AND NASAL PASSAGES
- AIR TRAVELS THROUGH THE TRACHEA, WHICH THEN SPLITS INTO 2 BRONCHI
- EACH BRONCHI SPLITS UP FURTHER INTO BRONCHIOLES
- AT THE END OF THE BRONCHIOLES ARE TINY ALVEOLI
- THINK OF AN UP-SIDE-DOWN TREE: TRACHEA → TRUNK, ALVEOLI → LEAVES



The lungs contain millions of tiny alveoli

Oxygen (O_2) from air breathed in, goes into the red blood cells via alveoli. Carbon dioxide (CO_2) goes from the red blood cells into alveoli and breathed out

Lung showing alveoli

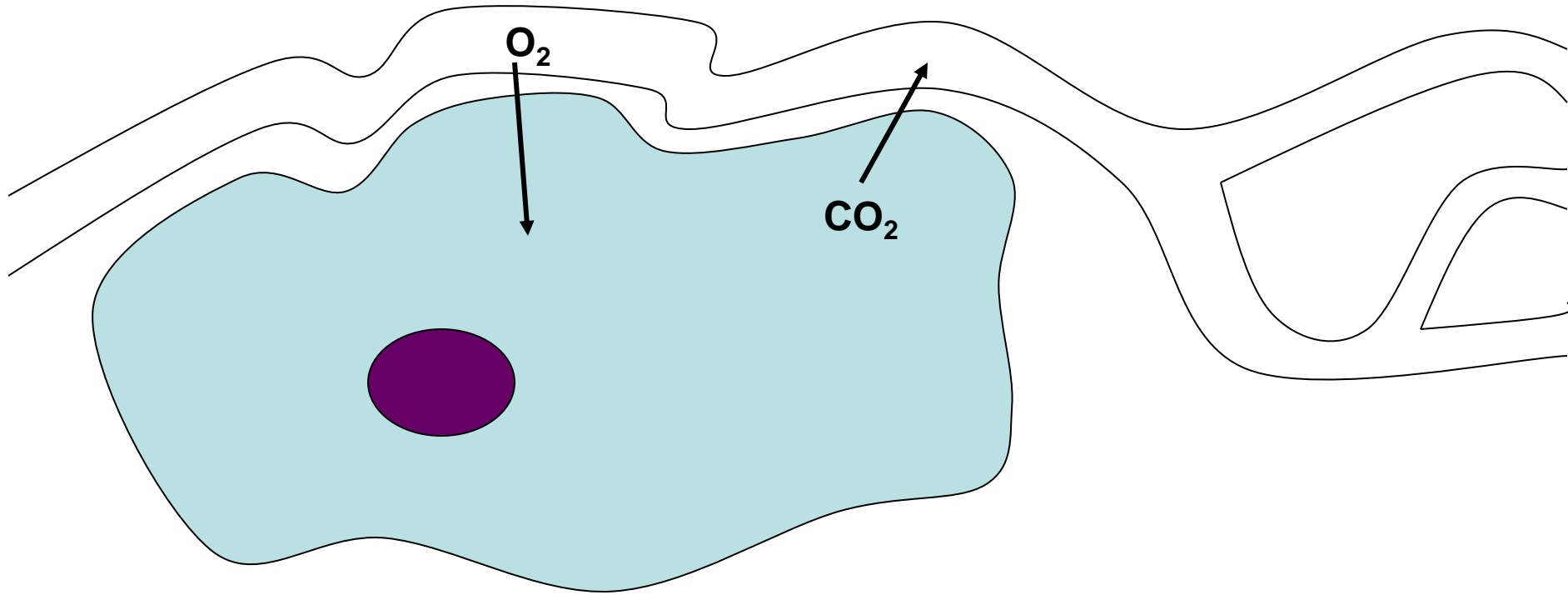


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INTERNAL RESPIRATION

- CAPILLARIES BUD UP NEXT TO THE BODY CELLS
- CAPILLARY WALLS AND CELL MEMBRANES ARE SO THIN, THAT O₂ AND CO₂ CAN SIMPLY PASS THROUGH
- O₂ MOVES FROM THE BLOOD STREAM INTO THE CELLS
- CO₂ MOVES FROM INSIDE THE CELLS INTO THE BLOOD STREAM

A CAPILLARY



A CELL

COMMON RESPIRATORY DISORDERS

- **ASTHMA:** Irritation causes bronchioles to constrict
- **BRONCHITIS:** Respiratory pathways become infected → coughing & mucus
- **EMPHYSEMA:** alveoli break down → reduced surface area
- **PNEUMONIA:** infection causes alveoli to collect mucus
- **TUBERCULOSIS:** Bacterial infection that decreases elasticity of alveolar capillaries
- **LUNG CANCER:** Uncontrolled cell growth in lung tissue

THE EXCRETORY SYSTEM

THE FUNCTIONS:

MAINTAINS HOMEOSTASIS IN THE BODY

- REMOVES TOXINS AND OTHER WASTES FROM THE BODY
- REGULATES AMOUNT OF FLUID & SALTS IN THE BODY
- MAINTAINS pH OF THE BLOOD

MAJOR ORGANS

LUNGS

SKIN

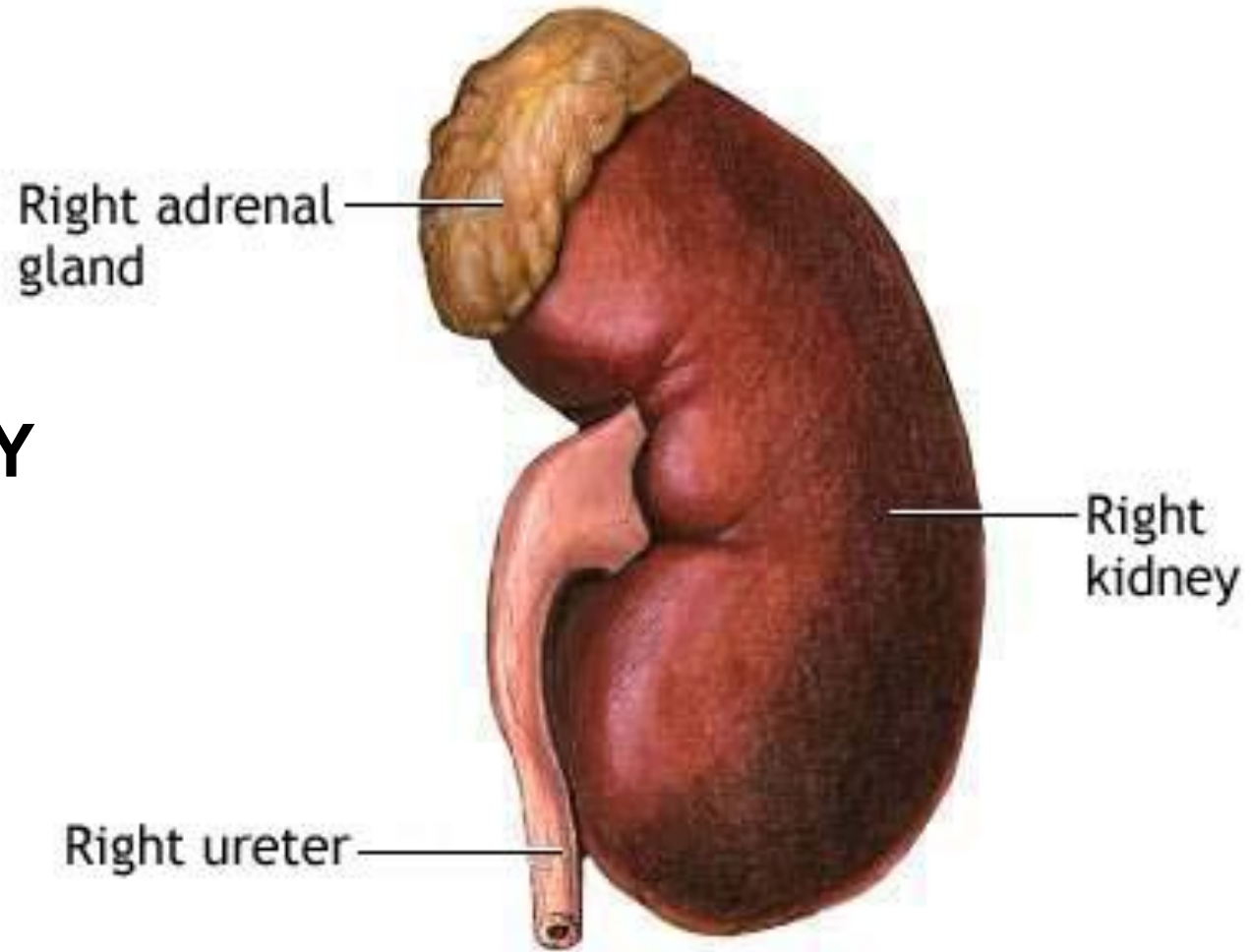
KIDNEYS

•RENAL ARTERY

•RENAL VEIN

•URETER

**•URINARY
BLADDER**



WHAT DOES EACH ORGAN EXCRETE?

LUNGS: •CARBON DIOXIDE

SKIN: •WATER & EXCESS SALTS

KIDNEYS: •UREA, WATER, EXCESS SALTS

REGULATION

- EXCRETION OCCURS IN ORDER TO MAINTAIN HOMEOSTASIS
- THE KIDNEYS REGULATE SEVERAL THINGS IN OUR BODIES
 - OSMOREGULATION: AMOUNT OF H₂O
 - REGULATE THE AMOUNT OF SALTS & OTHER IMPORTANT SUBSTANCES DISOLVED IN THE BLOOD
 - pH LEVEL OF THE BLOOD (which should be ~7.35)

URINARY SYSTEM

- EACH KIDNEY FILTERS ~180 L OF BLOOD EACH DAY
- ONLY ~1.5 L OF URINE IS EXCRETED EACH DAY
- THE MAJOR COMPONENTS OF URINE ARE: H₂O & UREA

Diagram of a kidney

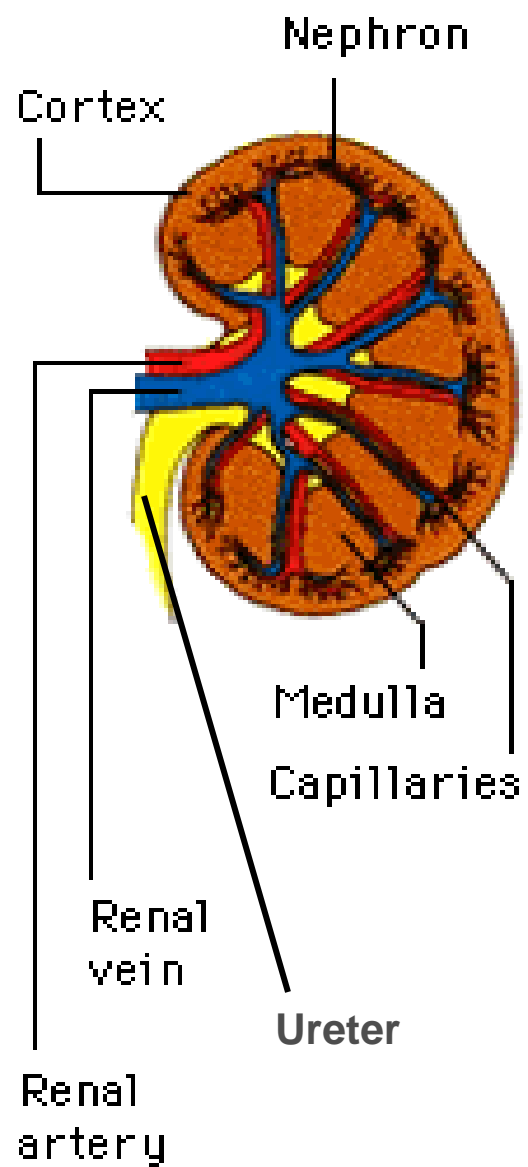
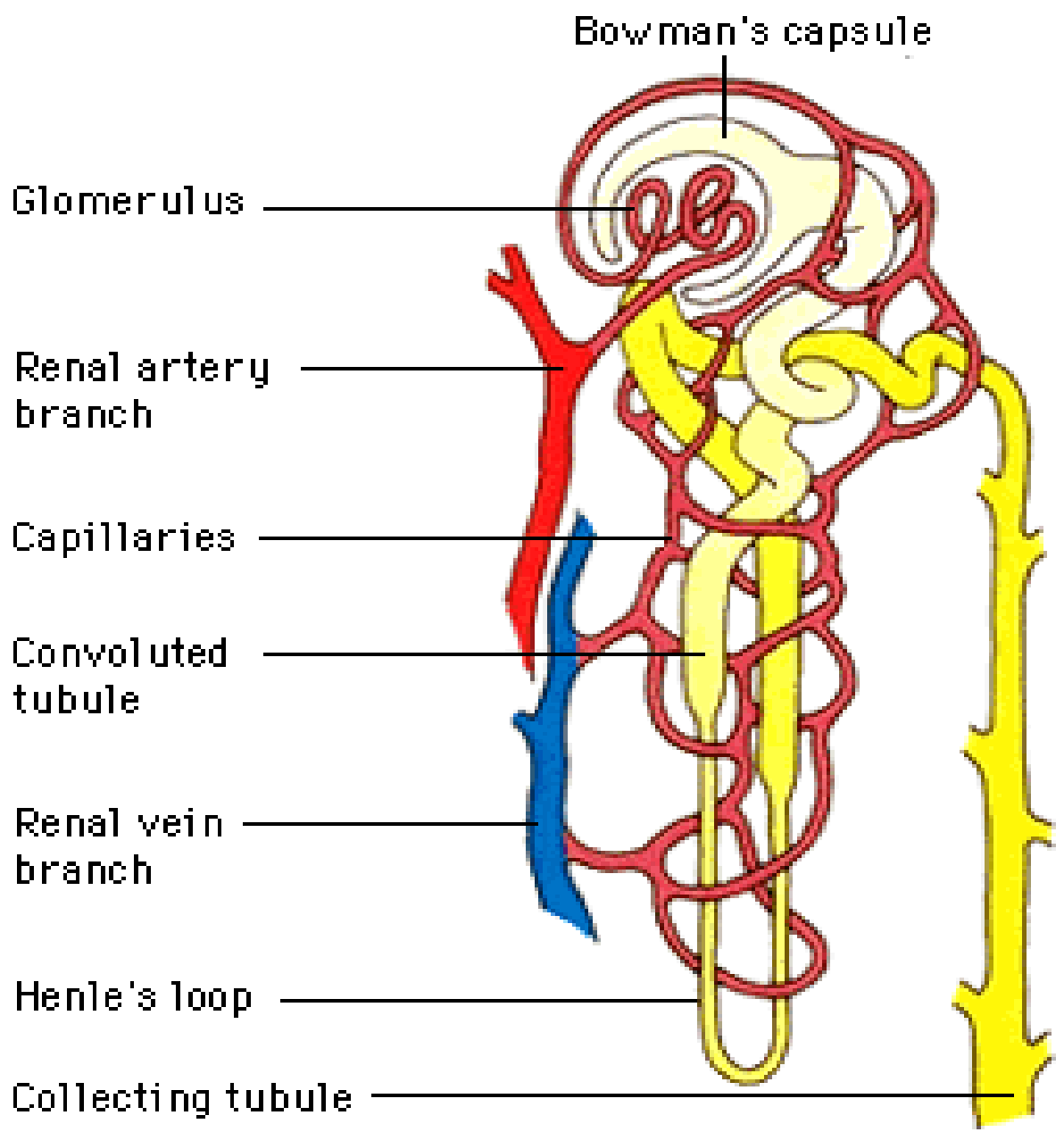


Diagram of a nephron



WATER LOSS

AVERAGE DAILY WATER LOSS IN mL

SOURCE	NORMAL TEMP	HIGH TEMP	RIGOROUS EXERCISE
KIDNEYS	1500	1400	750
SKIN	450	1800	5000
LUNGS	450	350	650

KIDNEY DIALYSIS

