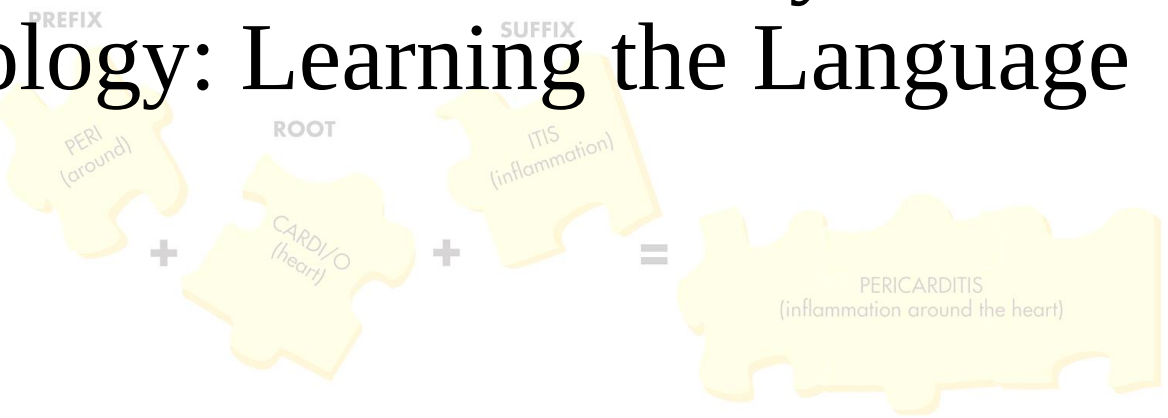
Chapter 1

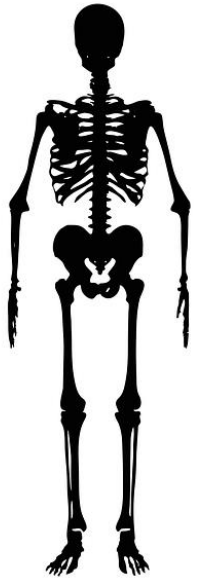
Introduction to Anatomy and Physiology: Learning the Language



Anatomy

The human body is complex and amazing; to truly understand it you must know how it is put together.

- **Anatomy:** The study of the internal and external structures of the human body.
  - Anatomy is a Greek word meaning “to cut apart.”
  - Specialties within the field of anatomy include Microscopic Anatomy and Macroscopic (Gross) Anatomy.



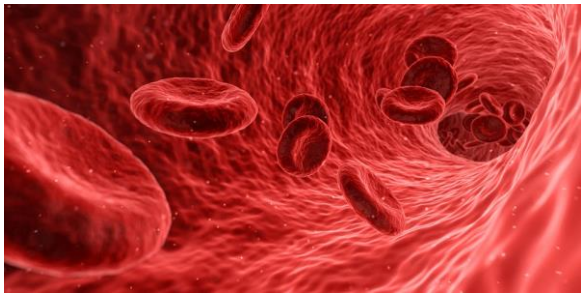
Anatomy

- **Microscopic Anatomy** is the study of structures that can only be seen and studied with magnification aids such as a microscope
  - A specialized field of anatomy
  - The study of cellular structures is called cytology
  - The study of tissue samples is called histology

- **Macroscopic Anatomy** is the study of the structures of the body visible to the naked (or unaided) eye
  - Also called gross anatomy
  - The study of the skeletal system
  - Looking at an X-ray (radiology)

Physiology

- **Physiology** focuses on the function and vital processes of the various structures making up the human body
  - Closely related to anatomy because it is the study of how an anatomical structure actually functions
  - Deals with all the vital processes of life and is more complex, with more sub-specialties, such as:
    - Human physiology
    - Animal physiology
    - Cellular physiology
    - Neurophysiology



Medical Terminology

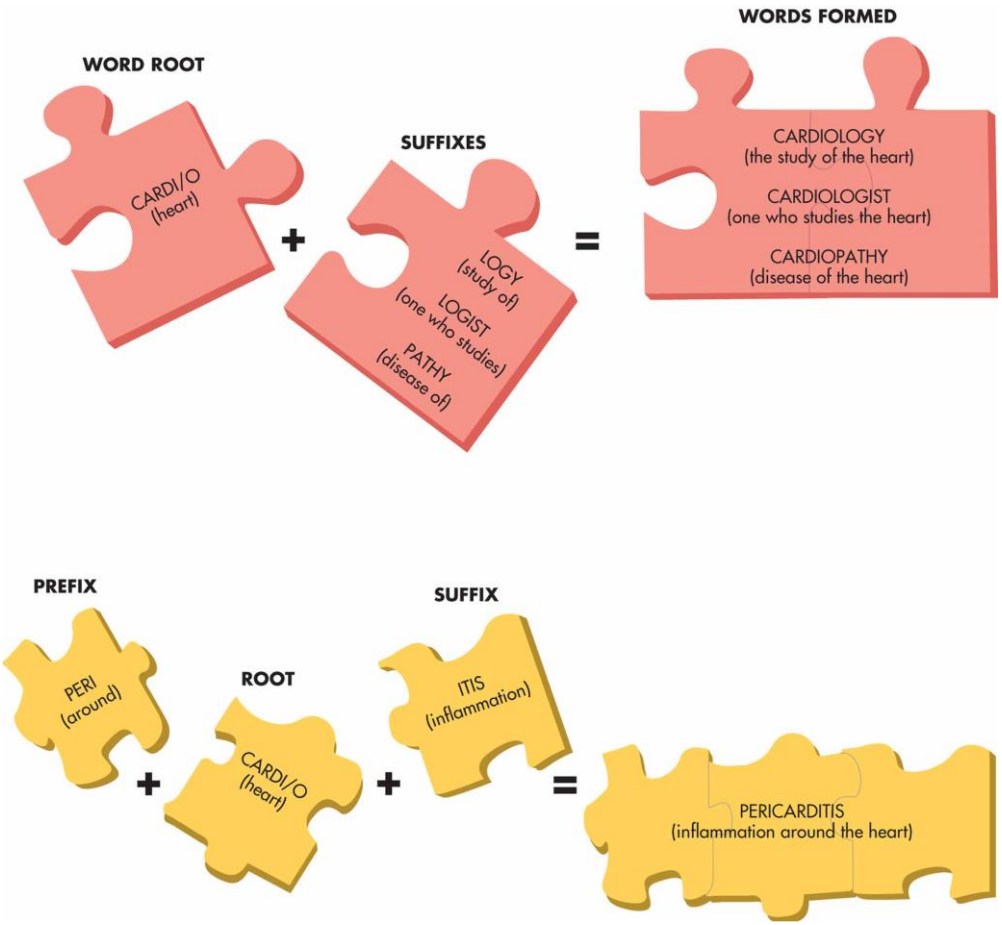
- The language of anatomy and physiology is primarily based on medical terminology.
- Learning medical terminology is easier if you understand the root terms, prefixes, and suffixes that can be put together to form a large variety of terms.

- Each medical term has a basic structure upon which to build, called a word root.
- Prefixes and suffixes are added to root words and can change or alter the meaning.

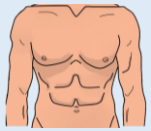
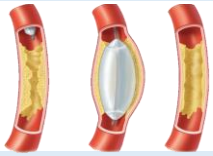
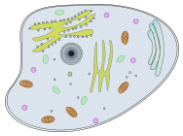
Medical Terminology

How prefixes and suffices can be combined with a word root to form many medical terms:

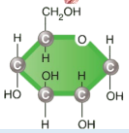
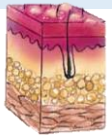
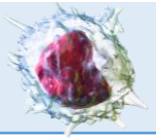
- Cardiology
- Cardiologist
- Cardiopathy
- Pericarditis



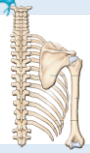
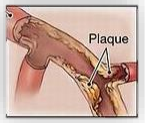
Word Root

Word Root/ Combining Form	Meaning	Visual
abdomin/o	abdomen	
angi/o	vessel	
arthr/o	joint	
cardi/o	heart	
cyan/o	blue	
cyt/o	cell	

Word Root

Word Root/ Combining Form	Meaning	Visual
derm/o	skin	
erythr/o	red	
gastr/o	stomach	
glyc/o	sugar	
hepat/o	liver	
hist/o	tissue	
leuk/o	white	

Word Root

Word Root/ Combining Form	Meaning	Visual
mamm/o	breast	
nephr/o	kidney	
neur/o	nerve	
oste/o	bone	
phag/o	to swallow	
path/o	disease	
rhin/o	nose	

Common Prefixes

Prefix	Meaning	Prefix	Meaning
a, an	without	**epi**	upon or over
acro	extremities	**hyper**	above normal
brady	slow	**hypo**	below normal
dia	through	**macro**	large
dys	difficult	**micro**	small
electro	electric	**peri**	around
endo	within	**tachy**	fast

Common Suffixes

Suffix	Meaning	Suffix	Meaning
algia	pain	**sis, osis**	disease/condition of
cyte	cell	**otomy**	cutting into
ectomy	surgical removal of	**ostomy**	surgically opening
gram	a recording	**megaly**	enlargement of
graphy	process of recording	**pathy**	disease
ist	one who specializes	**phobia**	fear of
itis	inflammation of	**plasty**	surgical repair
logist	one who studies	**penia**	decrease or lack of
logy	study of	**scope**	instrument to view/examine

Learning Hint

- When using prefixes, put the part in the order you say the definition.
  - **Slow** heart rate is **brady**cardia, not cardiabrady.

- If a suffix begins with a vowel, drop the vowel in the combining form
- The medical definition indicates the last part of the term first, especially when suffixes are used.
  - Inflammation of the **stomach** is **gastr**itis not itisgast and one who studies the stomach is a gastrologist, not an ologistgastro.

Peinguin Prof - Medical Terminology

Common Medical Abbreviations

- Extensively used in the medical profession
- Useful in simplifying long, complicated terms for diseases, diagnostic procedures, and therapies during charting
- You will learn more abbreviations with each chapter

TABLE 1–4 *Common Medical Abbreviations*

ABBREVIATION	MEANING
A&P	anatomy and physiology
ACLS	advanced cardiac life support
BP	blood pressure
CA	cancer
CAD	coronary artery disease
CBC	complete blood count
CPR	cardiopulmonary resuscitation
CXR	chest x-ray
GI	gastrointestinal
ICU	intensive care unit
IV	intravenous
NPO	Latin *nil per os,* which means "nothing by mouth"
p.r.n.	whenever needed
SOB	shortness of breath
STAT	Latin *statim,* which means "immediately"
*ER/ED	emergency room/emergency department

Find the Meaning

Word	Meaning
Nephrologist	
Cytomegaly	
Dermatisis	
Appendectomy	
Gastrectomy	
Osteoporosis	
Electrocardiogram	
Carditis	
Neurologist	

Systems of Measurement

United States Customary System (USCS)

- Based on the British Imperial System – AKA the English System
- Different designations for length, weight, and volume
  - Volume: ounces, pints, quarts, gallons, pounds
  - Distances: inches, feet, yards, miles
  - Weight: pounds, ounces, tons
- Used in the US and Myanmar
- No common base & no relationship between each unit

Système International (SI)

- AKA the Metric System
- **The Metric System** is the mathematical language of anatomy and physiology.
- Used everywhere else, especially in science, healthcare, and pharmaceuticals companies
- Based on the power of 10

Language of Disease

- **Disease** is a condition in which the body fails to function normally.
- The body works to make things function smoothly and maintain a balance known as homeostasis.
  - Eating habits, smoking, inherited traits, trauma, cancer, environmental factors, and aging can alter this balance.

Signs & Symptoms of Disease

- **Signs** are definitive, objective, obvious indicators of an illness.
  - Vital signs
    - Temperature
    - Pulse
    - Respiration
    - Blood pressure
  - Fever
  - Cough
- **Symptoms** are signs or indicators of an illness. Symptoms are more subjective and difficult to measure consistently.
  - Pain – tolerance to pain varies in different people

Syndrome: A set of signs and symptoms that commonly occur with a specific disease process

Vital Signs

- **Vital signs** are common measurable indicators that help us assess the health of a patient.
  - Pulse/heart rate
  - Blood pressure
  - Body temp
  - Respiratory rate

Diagnosis & Prognosis

- **Diagnosis** is the identification of a disease as determined by the patient's signs and symptoms
- Diagnosis translates from the Greek as "know through or completely."

- **Prognosis** is the prediction of the outcome of a disease.

Etiology: the cause of the disease

Amazing Facts:
Bizarre Signs and Symptoms

- There are some strange signs and symptoms that are indications of disease
  - Generalized itching – Hodgkin's disease
  - Fruity smelling breath – Diabetes
  - Absence of moons on fingernails – Kidney disease
  - Sweating at night – Tuberculosis
  - A hunger for clay or starchy paste – Iron deficiency
  - Spoon shaped fingernails – Iron deficiency
  - Magenta colored tongue – Riboflavin deficiency
  - Hairy tongue – Results from improper usage of antibiotics

Homeostasis

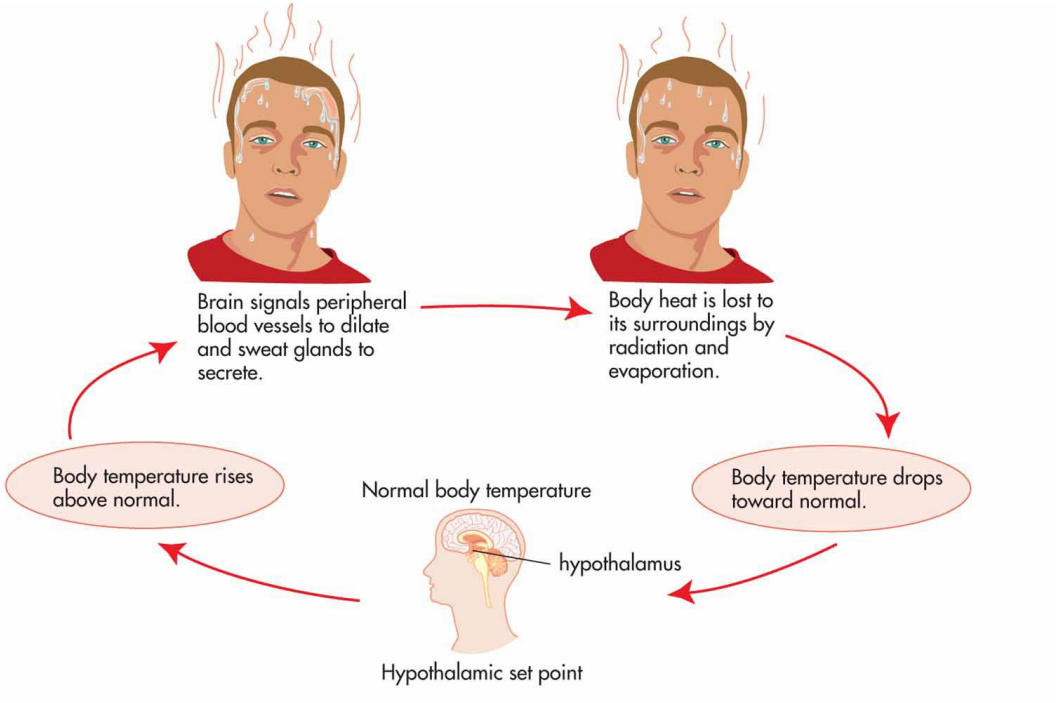
- **Homeostasis** is the physiological process that monitors and maintains a stable internal environment or equilibrium.

- Survival depends on our ability to maintain homeostasis.

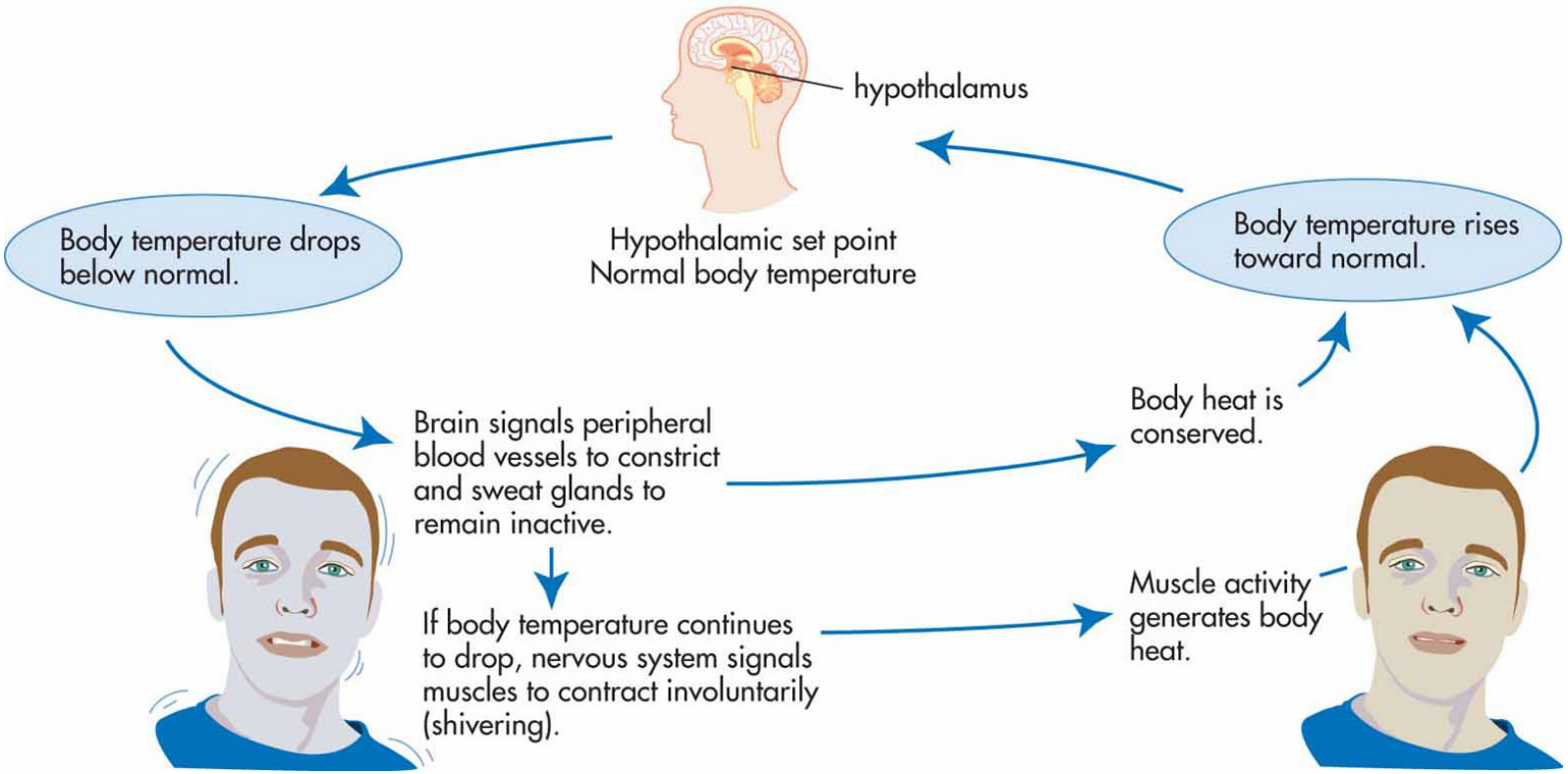
- Homeostatic regulation refers to the adjustments made in the human organism to maintain a stable internal environment.
  - The thermostat in your home is an example of a homeostatic control.

Negative Feedback

- **Negative Feedback** is when the feedback opposes the stimulus
- The hypothalamus in the brain uses a negative feedback loop to control body temperature and maintain homeostasis.



Negative Feedback Loop



Positive Feedback

- **Positive Feedback** increases the magnitude of a change
- This kind of a process is also known as a vicious cycle.
- This is not a way to regulate your body because it increases a change away from a set point.
- Often harmful if the cycle cannot be broken.
- An example is the recurrent contraction of the uterus during childbirth.