

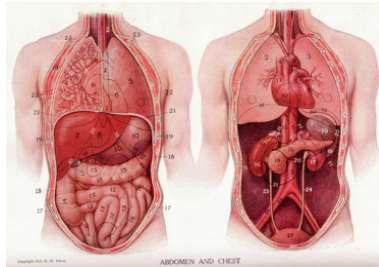
How the Body Works: Part 2: “body parts”

US275 Scientific Ethics
John R. Hoffman
Arcadia University



The body is made up of smaller and smaller structures

- Organ Systems
- Organs
 - Tissues
 - Cells
 - Molecules

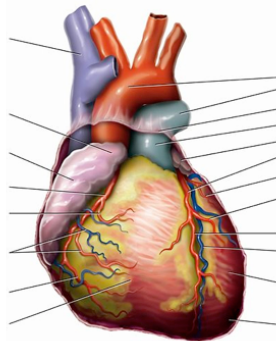


Abdomen
The Home and School Reference Work, 1917

2

Organ are specialized structures in the body that perform a specific task

- “body parts”
- usually part of a larger system of organs

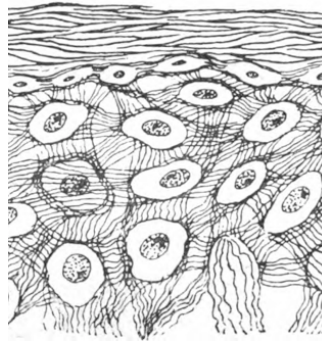


Anatomy Heart
Ties van Brussel, 2010

3

Cells are the microscopic units that make up all living organisms

- Cells
 - basic unit of the body
- Tissues
 - grouping of cells with related structure or function

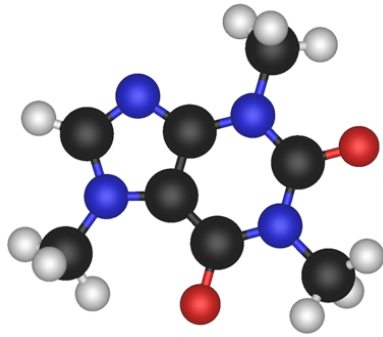


Fine fibrils of the Epithelial Cells (after Kromayer)
N.P.Walker. An Introduction to Dermatology, 1905

4

Biological molecules are chemicals that are used to power and build the body.

- Nucleic Acids
 - DNA & RNA
- Fats and lipids
 - cholesterol
- Carbohydrates
 - sugars
- Proteins



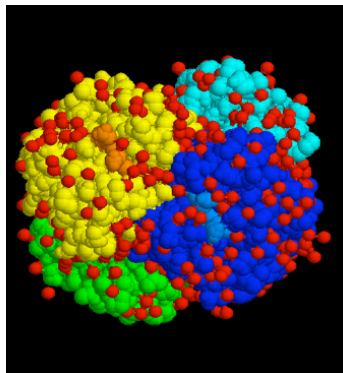
A 3D visualization of a caffeine molecule.
Black spheres represent carbon atoms, gray hydrogen, red oxygen, and blue nitrogen.

5

Michael Ströck, 2005, Wikimedia Commons

Proteins

- molecular chains of amino acids
 - filaments
 - globular
- specific functions

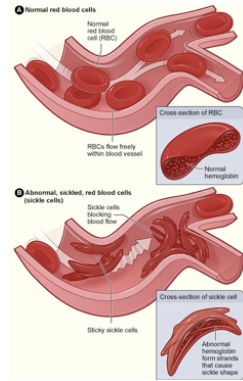


Hemoglobin
Wikimedia Commons

6

In sickle cell anemia, a genetic mutation causes a defect in the hemoglobin protein.

- 1 out of 145 amino acids changed
- normal red blood cells
 - “donuts” without holes
- sickle cells
 - stiff and sticky
 - can block blood flow



7 Normal Red Blood Cells and Sickle Cells
NIH, National Heart Lung and Blood Institute

Protein enzymes

- chemical reactions in the body occur step-by-step
- reactions controlled by protein enzymes



Ford Assembly Line, 1913
Wikimedia Commons

8

Parkinson's disease is associated with the death of special neurons.

- *substantia nigra*
 - “black substance”
 - cells produce dopamine
- Loss of these cells results in
 - decrease in dopamine in brain
 - causes symptoms of Parkinson's disease



9 Section of the midbrain showing the substantia nigra of an unaffected person (left) compared with a patient with Parkinson's disease.

The cells of the skin are replaced continually over a person's lifetime.

- skin cells are produced to replace dead or damaged cells.
 - dead skin cells are sloughed from the surface
 - skin cells are damaged in scrapes or cuts.



A comparative picture of untreated 7-days-healed road rash in the form of a scar one year later. Fresh wound is on the right, and scar is on the left.
Wikimedia Commons, 2007

10

Disruption of the normal rate of production of cells can result in abnormalities.

- hyperplasia
 - increase in number of cells
 - may be part of normal process
- neoplasia
 - genetically abnormal cells proliferating
 - cancers and tumors

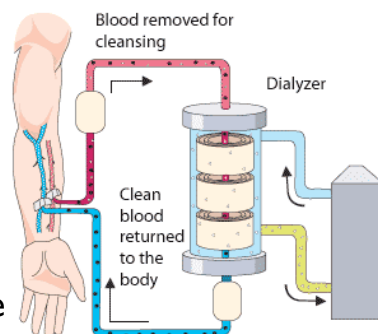


Basal cell carcinoma
Sand et al., 2010,
Head & face medicine 6:(S7)

11

Kidney Dialysis

- Organ failure
 - damage to the cells, tissues or organ
 - disrupt normal functioning of the structure.



http://www.dialysesousse.com/?page_id=126&lang=en

12

Assignment

No assignment for this topic.

Take time to read through the information on the SEER Anatomy & Physiology module.



Readings

Anatomy & Physiology. SEER Training Modules, National Cancer Institute.

<http://training.seer.cancer.gov/anatomy/>



Earth Could Not Answer

Adelaide Hanscom & Blanche Cumming, 1905 - 1912

Any Questions?

Email me at:
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<http://www.vipitbullkenels.com/images/animated-question-mark.gif>