

<p><b>Biology:</b>  <b>Animal Organ Systems Reference</b>  Version 0.1  Zack T. Smith  © 2007  All rights reserved  <a href="http://firmitas.org/">http://firmitas.org/</a></p>	<p><b>Human organ systems</b></p> <ol style="list-style-type: none"> <li>1. Circulatory</li> <li>2. Digestive</li> <li>3. Endocrine = hormones</li> <li>4. Integumentary = skin</li> <li>5. Lymphatic = defensive</li> <li>6. Muscular</li> <li>7. Nervous</li> <li>8. Reproductive = testes and ovaries</li> <li>9. Respiratory</li> <li>10. Skeletal</li> <li>11. Urinary</li> </ol>	<p><b>Bone</b> = living self-repairing connective tissue.  Bones consist of calcium in a collagen matrix.  Osteoblasts = build bones from cartilage  Osteoclasts = cells that break bones down  Osteoporosis → more breakdown than building.  <u>Exercise stimulates osteoblasts.</u>  Two kinds:</p> <ol style="list-style-type: none"> <li>1. Cortical or compact bone, has Haversian canals containing blood vessels.</li> <li>2. Spongy bone, contains marrow.</li> </ol> <p>Roles of bone:</p> <ul style="list-style-type: none"> <li>• Support</li> <li>• Locomotion</li> <li>• Protection</li> <li>• Blood cell production</li> <li>• Self-repair</li> <li>• Calcium storage, retrieved by osteoclasts</li> </ul> <p>Broken bones are healed when cartilage fills in the gaps and that is then replaced with bone.</p>
<p><u>Animals consist of:</u>  Organ systems  Organs  Tissues  Cells</p> <p><u>4 kinds of tissues:</u>  Muscle  Nervous  Epithelial  Connective</p> <p><u>3 kinds of skeletons:</u>  Exoskeleton (molt)  Endoskeleton  Hydrostatic</p> <p><u>Roles of skeletons:</u>  Support  Locomotion  Protection</p> <p><i>Organisms with exoskeletons:</i>  Lobsters, clams, insects, crabs, mollusks.</p> <p><i>Organisms with hydrostatic skeletons:</i>  Annelids  Cnidarians  Flatworms  Nematodes</p> <p><i>Note:</i>  Hydrostatic skeleton organisms move using rhythmic squishing called peristalsis.</p>	<p><b>Skin</b></p> <p><u>Roles of skin</u>  Protection against light, makes melanin  Protection against germs, kills some on contact  Temperature &amp; hydration regulation  Creation of Vitamin D  Sensation of heats, touch, pain  Self-repair of injuries  Nutrient storage  Stretches to suit needs of animal</p> <p><u>Layers of Skin</u>  Epidermis (1<sup>st</sup> degree burn) has 2 major layers and 3 smaller ones.</p> <ul style="list-style-type: none"> <li>• Stratum corneum: Dead cells</li> <li>• Stratum basale: has melanocytes that make melanin to protect against UV <ul style="list-style-type: none"> <li>○ UV causes moles &amp; melanoma</li> </ul> </li> <li>• Other substrata have <ul style="list-style-type: none"> <li>○ Langerhans cells = phagocytes?</li> <li>○ Keratinocytes = make keratin</li> </ul> </li> </ul> <p>Dermis (2<sup>nd</sup> degree burn) has</p> <ul style="list-style-type: none"> <li>• Mostly dense nest of Collagen</li> <li>• Elastin</li> <li>• Sensory Nerves</li> <li>• Oil glands</li> <li>• Hair follicles that make hair i.e. keratin</li> </ul> <p>Subcutaneous (3<sup>rd</sup> degree burn) has</p> <ul style="list-style-type: none"> <li>• Adipose tissue i.e. fat bags</li> <li>• Nerves</li> </ul> <p>Other suborgans of the skin include:</p> <ul style="list-style-type: none"> <li>• Sweat glands</li> <li>• Papillae = bind epidermis &amp; dermis</li> </ul>	<p><b>Human skeleton</b> has 206 bones  Parts: <i>bones, joints, cartilage, ligaments, tendons</i>  Axial part of skeleton: skull, spine, ribs, sternum.  Appendicular is everything else.  Spine has from top to bottom these 33 vertebrae, separated by cartilage shock-absorbing discs:</p> <ul style="list-style-type: none"> <li>• 7 cervical vertebrae</li> <li>• 12 thoracic</li> <li>• 5 lumbar</li> <li>• 5 sacral (fused)</li> <li>• 4 coccygeal region (fused)</li> </ul> <p>Joint types:</p> <ul style="list-style-type: none"> <li>• Ball and socket</li> <li>• Hinge</li> <li>• Pivot</li> </ul> <p><b>Human muscular system</b> has 600 muscles  Each muscle is special-purpose.  They work by <i>contraction</i> and <i>relaxation</i>.  3 types, each look and work differently:</p> <ul style="list-style-type: none"> <li>• Cardiac: heart, involuntary <ul style="list-style-type: none"> <li>○ Branched, 1 nucleus</li> </ul> </li> <li>• Smooth: internal organs, involuntary <ul style="list-style-type: none"> <li>○ Unbranched, 1 nucleus</li> </ul> </li> <li>• Skeletal: body movement, voluntary <ul style="list-style-type: none"> <li>○ Unbranched, multinucleate</li> </ul> </li> </ul> <p>Organization:</p> <ul style="list-style-type: none"> <li>• Muscle <ul style="list-style-type: none"> <li>○ Bundle <ul style="list-style-type: none"> <li>• Fiber <ul style="list-style-type: none"> <li>• Myofibril <ul style="list-style-type: none"> <li>○ Sarcomere=unit o' contract</li> <li>○ Actin, Myosin filaments</li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul> <p><i>Sliding filament model of contraction.</i>  ATP makes actin pull on stationary myosin.</p>