

<p><b>Horses</b>  <i>Equus ferus caballus</i>  Wild horse (extinct) <i>Equus ferus</i>  Przewalski's horse <i>Equus ferus przewalskii</i></p> <p>Odd-toed ungulates (1 toe per foot)  Other odd-toed ungulates:  Zebras, asses, rhinos, tapirs</p> <p>Foal, Yearling, Colt, Filly, Stallion, Mare, Gelding, Pony</p> <p>Hands (know how to convert to inches: 1 hand = 4 inches)</p> <p><u>Horse adaptations:</u>  Eating and digesting grass  Little starch tolerance  Incisors on top and bottom jaws  Space between molars and incisors (bit fits)  10 gallons of saliva per day  Hypsodont molars (high-crowned, grow continuously)  <ul style="list-style-type: none"> <li>- Plant phytoliths abrade teeth, silica-based</li> <li>- Teeth floated (filed down) if not abraded by grass</li> </ul> </p> <p><u>Horse digestion:</u>  Acidic stomach (starts protein digestion)  Enzymes in small intestine (for sucrose, amylose, etc)  Cannot directly digest cellulose (fiber)  Post-gastric fermentation  <ul style="list-style-type: none"> <li>- Hindgut = cecum and large intestine</li> <li>- Cellulose-digesting microbes</li> <li>- VFAs/SCFAs releases, absorbed for energy by horse</li> <li>- No MCP (microbial crude protein)</li> </ul> </p> <p>Body condition scoring (1 = skinny, 9 = obese)  Nuchal (cresty neck) scoring (1= none, 5 = fatty crest)</p> <p>Working/race horses have less fiber in diet  Pet/easy-keeping horses have more fiber in diet</p> <p><u>Equine Metabolic Syndrome:</u>  Due to high-starch diets  Adiposity (esp. neck)  Insulin resistance/diabetes  Inflammation  Laminitis/founder</p>	<p><b>Chickens</b>  <i>Gallus gallus domesticus</i>  Domesticated 6000 BCE in SE Asia  From wild junglefowl <i>Gallus gallus</i>:  Omnivorous  Smaller than chickens  Only breed/lay eggs once per year</p> <p>Many breeds of chickens:  Broiler – white feathers, large breast  Bantam – 1 pound  Rhode Island Red – 6 pounds  Brahma – 12 pounds</p> <p>Chicken is most common meat eaten today in USA (100 lbs per year per person)</p> <p>Lower FCR means less chicken feed per egg or pound of meat produced</p> <p>Chickens, hens, roosters/ cocks, capons, pullets, cockerels</p> <p><u>Chicken digestion:</u>  No teeth – keratin beak  Crop, proventriculus, gizzard (with grit)  Sm intestine – enzymes from pancreas and liver  Lg intestine – water/electrolyte absorption  2 ceca – some microbial digestion  Cloaca – feces, egg/sperm, uric acid</p> <p><u>Egg-Laying:</u>  One (left) functional oviduct  Ovary -- releases ovum and yolk  Infundibulum – entry to oviduct  Magnum – albumin added  Isthmus – membranes added  Uterus – shell gland, calcium shell  Cloaca – egg is laid</p> <p>Modern breeds lay 300 eggs per year  Heritage breeds lay every other day</p>
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Equine Gastric Ulceration Syndrome:

Stomach acid constantly produced  
Erodes stomach wall if no/inrequent food  
Associated with fasting/intermittent feeding

Tx: more water, more fiber, more frequent feeding

Colic:

Gastrointestinal problems  
Blockages, gas buildup, twisted intestines  
May be due to rapid diet change  
Horse restless, lip curl, laying down, sweating...

Tx: mild, walk horse

Severe, surgery, analgesics, antibiotics, diet change

**Pigs**

*Sus scrofa domestica*

Wild boar *Sus scrofa*

Domestic pigs smaller than wild boars

Pigs and humans have similar diets, nutrient reqts,  
anatomy, physiology

Pigs are human-like test subjects for:

Neonate nutrition  
Role of colostrum  
Nutritional diseases

Pig digestion:

Monogastric – simple stomach, small hindgut

In mouth:

Salivary amylase - amylose (starch) digestion in mouth  
Mastication, peristalsis down esophagus

In stomach:

Cardiac and pyloric regions  
Hydrochloric acid – protein digestion  
Pepsinogen converted to pepsin – protein digestion

In small intestine:

80% of total GI tract length  
Amino acid absorption in microvilli (brush border)  
Trypsin, chymotrypsin enzymes:

- digest protein
- produced by pancreas

Pancreatic enzymes also include lipases, etc.

Bile from liver – lipid digestion

In large intestine (colon):

Water and electrolytes absorbed  
Some microbial fermentation (up to 20% energy reqts)

Protein reqts:

Chicks – 20%  
Adult nonlaying – 15%  
Layers – 20%

Know how to use Pearson Square

Chickens have higher energy reqts than  
dogs or cats

Rickets:

Soft bones, soft eggshells  
Caused by:  
Deficiency of calcium, Vitamin D, or  
phosphorus  
Mycotoxins

Tx: vitamin supplements or new feed

Cage Layer Fatigue:

Brittle bones, loss of leg movement  
Caused by calcium deficiency  
Layers need 3.5% Ca

Tx: calcium, allow hens to walk

Fatty Liver Disease/Syndrome:

Excess fat in liver  
Liver hemorrhage  
Caused by excess diet energy

Tx: lower energy in diet, exercise, high-  
cellulose diet

Hyperuricemia:

High levels of uric acid  
Due to high protein diets  
Visceral gout – internal organs  
Articular gout – legs, feet

Tx: lower protein in diet

**Giant Panda**

Specialized herbivore (eats bamboo  
shoots and leaves), evolved from carnivore  
Pseudothumb – radial sesamoid wrist  
bone used for stripping bamboo

Low fiber shoots digested easily but high  
fiber leaves require gut bacteria to digest

<p><u>Post-Weaning Diarrhea in pigs:</u></p> <ul style="list-style-type: none"> <li>70% of piglets</li> <li>Too early weaning from milk</li> <li>Underdeveloped GI tract</li> <li>Insufficient enzyme production</li> <li>Die from dehydration</li> </ul> <p>Tx: pre-digested food or enzyme supplements</p> <p><u>Parakeratosis in pigs:</u></p> <ul style="list-style-type: none"> <li>Skin disease from mineral deficiencies</li> </ul>	<p><b>Rabbits</b></p> <ul style="list-style-type: none"> <li>Cecotrophic (eat cecotropes – cecum pellets containing microbes)</li> <li>MCP from eating and digesting pellets</li> <li>Coprophagy – eating feces</li> </ul> <p><b>Leatherback Sea turtle</b></p> <ul style="list-style-type: none"> <li>Largest sea turtle</li> <li>Eat their weight in jellyfish per day</li> <li>Jellyfish = 95% water but 20-50% protein on a DM basis</li> </ul> <p><b>Spiders</b></p> <ul style="list-style-type: none"> <li>Carnivores that digest prey outside their body (Extra Oral Digestion – EOD)</li> </ul> <p><b>Wood-eating Catfishes</b></p> <ul style="list-style-type: none"> <li>Eat wood but don't digest it</li> <li>Digest detritus and periphyton</li> </ul> <p><b>Tubeworms</b></p> <ul style="list-style-type: none"> <li>No mouth or digestive tract</li> <li>Have intracellular bacteria that convert sulfur compounds from deep sea hydrothermal vents into nutrients</li> </ul>
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