1. The abundance of oxygen in atmospheric air is approximately:

1. 80%
2. 50%
3. 20%
4. 10%
5. <1%
6. The partial pressure of oxygen (PO2) of air in the alveoli is \_\_\_\_\_\_\_\_\_\_ the PO2 of air in the atmosphere, and \_\_\_\_\_\_\_\_\_\_\_\_ the PO2 of blood in the left ventricle.
7. Greater than, greater than
8. Less than, equal to
9. Less than, greater than
10. Equal to, less than
11. Equal to, equal

3. Imagine that you breathe normal room air, and then you switch to breathing 100% oxygen. Which of the following is NOT likely to be true?

1. The amount of oxygen dissolved in arterial blood will rise.
2. The PO2 in the alveoli will increase.
3. The PO2 in the alveoli will be less than the PO2 in the inhaled air.
4. The PO2 in the alveoli will equilibrate with the PO2 in the pulmonary capillaries.
5. The amount of oxygen bound to hemoglobin in arterial blood will rise.

4. Which of the following is NOT a true statement:

1. In some animals, some offspring derived from fertilized eggs and some from unfertilized.
2. Some animals can switch between sexual and asexual reproduction.
3. In some animals, sexual reproduction produces offspring that are identical to the parents.
4. Sexual reproduction is likely to be more advantageous when the environment is variable.

5. Testosterone is secreted by

1. Spermatocytes
2. Sertoli cells.
3. Leydig cells
4. Hypothalamus
5. Anterior pituitary

6. In the female reproductive system, the main target of GnRH is:

1. The hypothalamus
2. The follicle
3. The pituitary
4. The ovum
5. The uterus

7. In a woman with a 38 day menstrual cycle, ovulation takes place on approximately:

1. Day 0
2. Day 14
3. Day 20
4. Day 24
5. All of the above.

8. Which of the following is NOT true?

1. Myelin increases the speed of neural conduction.
2. Myelin has the same basic effect as increasing axon diameter.
3. Myelin is produced by glial cells.
4. Myelin increases the strength of action potentials.
5. All of the above are true.

9. A neurotransmitter that opened potassium channels in the post-synaptic membrane would

1. Cause depolarization
2. Make the cell interior more positive
3. Be inhibitory
4. Have the same effect as one that opened sodium channels

10. In the process of hearing, cells called hair cells vibrate and, in response, release neurotransmitter. This is an example of:

1. sensory adaptation
2. projection
3. neural conduction
4. transduction
5. sensory filtering

Indicate whether the following are true for

1. White muscle
2. Red muscle
3. Both red and white muscle
4. Neither red nor white muscle

11.\_\_\_B\_\_\_ contains sarcomeres C

12.\_\_\_A\_\_\_ predominates in muscles that control posture A

Indicate whether the following are true for

1. Actin
2. Myosin
3. Both actin and myosin
4. Neither actin nor myosin

13. \_\_\_A\_\_\_ thin filament A

14. \_\_\_C\_\_\_ gets shorter during muscle contraction D

BIO 1150-01 Notes From Lectures for Exam 3

Respiration

* The role of gas exchange in bio-energenetics
  + Gas exchange occurs in a variety of different ways
* Gas exchange can occur in many different creatures in different locations of the body
* A particular kind of animal can have more than one gas exchange location
* Humans have internal lungs
  + This provides surface area and helps resist desiccation
* Ventilation
  + Puts the external medium in contact with the respiratory exchange system
* Neg. and Pos. Pressure Breathing
  + Ventilation for Mammals: (Negative Pressure Breathing)
    - Air flows from high pressure to low pressure
    - The air pressure in the lungs changes by the gas laws:
      * V1 \* P1 = V2 \* P2
      * P2 = (V1 \* P1) / V2
    - Muscles in between the lungs: interior costal
  + Ventilation for Frogs: (Positive Pressure Breathing)
    - Air first flows into the neck sack or throat (Neg breath first)
    - Next the air is pushed into the lungs (positive breath flowing)
* Gas Exchange:
  + Gas is exchanged by diffusion (This is for all gas exchange in the resp. sys.
  + Gas Exchange always needs a driving force and a pathway
  + Driving Force: partial Pressure Gradient (PPG)
    - This is an exchange between the blood and gas
  + Partial Pressure Gradient of Gas A (PPGGA)
    - PPGGA = total pressure \* fractional contribution of gas A
    - Gas in the air (Not solely of oxygen.)
      * Nitrogen: 78%
      * Oxygen: 21%
      * Argon: 1% + CO2
    - Unit measurement: mmHg
  + Air that enters the lungs: used air + water vapor (Air that is inhaled)
  + When breathing dry air, we humidify ourselves, so we don’t dry ourselves out
  + Tissues use O2 taken from the blood traveling in the body
    - The blood that travels back to the heart is O2 depleted
  + PPG has the potential to equilibrate gas exchange across the body
  + Insects: Have tracheal systems,
    - Gas-filled tubes reach near the cellular level
  + Mammals:
    - Gas is exchanged into liquid (blood)
  + O2 is poorly soluble
  + EQUILRIUM: Partial Pressure in water and air are the same!!
    - Air Water
      * PO2 = 100mmHg PO2 = 100mmHg
      * O2 content: 130ml O2 content: 3 ml

per liter of air per liter of water

* + This is the same saturation with blood plasma!
    - Lung Air Blood Plasma
      * PO2 = same as Air PO2 = same as Water
      * Dissolved O2: Dissolved O2:

same as Air same as Water

* Transport of Oxygen in Blood
  + Dissolved oxygen in plasma 3ml liter of 100mmHg
  + Max cordian output: 25 liter/min
  + Max Metabolic Rate: 3000 ml O2/min
* The amount of dissolved oxygen in blood, your body can’t keep up the metabolic demand
  + Solution: We use Reb Blood Cells
    - Can provide supplemental means of carrying oxygen
  + Hemoglobin:
    - Complex molecule
    - Includes iron molecule where oxygen bins in the water
  + Oxygen Dissociation comes from hemoglobin

Nervous System

* Devisions of the Nervous System:
  + Central Nervous System (CNS)
    - Brain & Spinal Cord
    - Receives, stores & transfers info (Integration)
  + Peripheral Nervous System (PNS)
    - Nerves that lay outside the CNS
    - Cranial Nerves originate from the Brain

Spinal Nerves originate from the Spinal Cord

* + Cells are Directional:
    - Two Sides:
      * Sensory Side (S)
      * Motor Side (M)
        + Motor Side Parts:

Somatic: voluntary control

Automatic: nonvoluntary control

* + Neurons: generate electric signals for communication and to keep your body moving
  + Glial Cells (GC): protect + support neurons in both the CNS and PNS
  + Sensory: respond to stiluli, transmit info within CNS
  + Motor: transmit AP’s from CNS to peripheral tissue
  + Interneurons: transmit info within CNS
  + Neuron Cell image in pp (look at!)
  + GC: do not conduct electric signals (examples in pp)
    - Astrocytes: barrier between blood vessels and brain neurons
    - Schwann Cells: produce myelin
  + Neurons have a lot of diversity
* Neurons from Complex Networks
  + Each neuron can receive input from other neurons through connected pathways by electric signals. Vis-Versa they can send signals just the same. This is the fundamental mechanism of the nervous system
  + Hodgkins and Huxley
    - Experiment with giant squids and learned of the large axons, research applied to mammal cells.
  + As the ions move down there concentration gradient, they carry change as they travel. The voltage or electrical potential difference develops across the membrane.
  + The Na+/K+ pump
    - Used to transport Na an K through there respected channels.
    - From resting membrane potential: K(potassium) moves out of the cell creating a neg voltage in the cell. As P goes out, Na goes in.
    - If Vm reaches the resting threshold, the gates open allowing the channels open and letting Na to pass through or P depending on the gate type.
  + AP
    - They are short lived
    - They are created by changing membrane permeability to ions

Reproductive System

* Simplest form is asexual reproduction
  + It can occur in many kinds organisms
    - Cutting roots of a plant
    - Budding yeast
    - Etc.
* Reproduction can reproduce asexual by regeneration and dividing in half
* Other ways are parthenogenesis (gamete development without fertilization)
  + Lapdo diploid
* Sexual reproduction
  + Can come with an evolutionary cost
* Some animals can switch from sexual to asexual reproduction
  + Labb Rouhana studied the flat worms(example that goes from sexual to asexual reproduction)
* Sexual Reproduction: Offspring are variable (each offspring is different)
* Pro Sex: high genetic diverse offspring, faculties adaptation
* Pro Asex: parent send fulls genetic code
* Con: Sex: Loss of 50 % of parental genetic, costs of courtship
* Con Asex: lack of genetic divercity. Limit ability to adapt
* Female: define as the anatomical system associated with producing the large gametes
* Male and female are not necessarily associate with a set pattern for sex chromosomes
* Animals can produce both male and female gametes: hermaphroditism
* Human Reproductive Physiology
  + How do hormones control reproductive function?
  + The Testes: (male primary sex organ)
    - Produce sperm (2nd-ary sex organs)
    - Secrete testosterone (2nd-ary sexual characteristics)
  + Seminiferous tubules: the production of sperm in males
    - Inside is the Lumen: create mature sperm
    - Sperm maturation requires testosterone
      * Within the lumen cells create testosterone
      * There are other cells: Sertoli Cells (nurse cells) that produce androgen (male steroid)
  + Sperm production produced by hormones
    - Testosterone is concentrated in the testes by androgen binding protein
    - Need a high enough level of testosterone to produce sperm from the leydig cells
    - The binding protein is what holds the leydics cells to create a high enough level of testosterones to produce sperm
    - They are called LH & FSH = gonado – tropins
    - Hypothalamus called the gonadotrap in releasing hormones
    - There is a balancing t keep everything from over producing or not drawing when there is nothing there.
  + Ovaries
    - Site of the eggs mature within follicles and sex steroids
    - Also has 2nd-ary sex organs and 2nd-ary characteristics
    - The eggs are housed in the ovaries as they mature and develop
    - Mature eggs are only produced from the start of puberty till about 40 or so.
    - At birth the female ovary contains all the eggs it will ever have in its whole life.
    - Ovum maturation starts, but does not finish, before birth.
    - Each cycle after puberty, one (usually) egg and follicle further develop to ovulation.
    - This development s associated with hormones (first 3 listed are in men)
      * GnRH stimulates LH and FSH
      * LH stimulates ovulation
      * FSH stimulates follicle maturation
      * Estrogen stimulates uterine development
      * Progesterone stimulates uterine maturation
  + Pituitary- Ovarian Axis
  + LH and FSH cycle with the changes in the follicle (This is a 28 day scale)
    - Follicular phase of Ovulation cycle Follicular phase
    - Ovarian phase of Ovulation cycle Luteal Phase
    - LH surge triggers ovulation
  + Estrogen and Progesterone cycle along with changes in the uterus
    - The Menses and Proliferative phase change as Estrogen goes up,
    - Then as the Secretory phase starts and rises Progesterone rises and falls with it
    - The rise and decline of steroids triggers this cycle
  + Cycle Length
    - Menstrual phase lasts a few days
    - Follicular phase is of variable length
    - Luteal phase is about 2 weeks long
    - Menstruation occurs about 2 weeks after ovulation
    - For female humans: normally 28 days but can last longer
  + Fertility: When an a woman be pregnant?
    - Egg lives for about 24 hours after ovulation
    - Sperm can live for up to 72 hours inside the woman
    - A woman is fertile (impregnatable) from about 3 days before ovulation until 1 day after.

Notes from Review Session:

Sample Question Answers: (I added my own info bits from what was talked about in the review)

1. C
2. B See pp for details and images to look at
3. E: the hb can only hold so much O2, in just normal air, the hb is already holding the max amount of O2

EPO is used to increase the creation of red blood cells to increase hb = hold more O2 in blood (hb = hemoglobin)

1. C just have to know. Miosis prevents C from happening
2. C Testosterone is a steroid, only C, B, D secrete steroids
3. C RH is a releasing hormone to activate the Anterior Pituitary GnRH stimulate LH and SH
4. D Always subtract 14 days of the menstrual cycle.

Estrogen exerts neg feedback on hemophiliac pituitary during production.

Once ovulation occurs the corpis ludium goes through a two-week set of stages

corpis ludium produces the progesterone.

1. D AP’s have a characteristic strength. They are only a set lvl of strength. Cant really be changed. Myelin can only help the speed of AP’s.
2. C Potassium is more concentrated inside the cell. If channels are open t allow K+ to move (cell interior is normally neg inside) K will more likely more inside to the more gen. produces a neg internal voltage. AP is a resolt of closing K channels and Let Na in to charge them back up
3. D changing one form of signal to another form of signal
4. C two forms of
5. B red is the more aerobic muscles
6. A actin is thin where as Myrin is thick
7. D

Exam Setup: is more like the second exam! So, diagrams might pop up

On the exam, the material on the exam is going to be only what we went over in class.

Sensory System from active learning

We don’t have to reconstruct the anatomy of the recolocia.

If asked about sensory system: It will just be about main concepts of the materials

Process of muscle contraction: key thing: the myosin head and actin filaments need to interact with each other.

Neurotransmitters If ions cross cell membranes they carry a charge with them and that influences the charge around them. Ion movement is always driven by a driving force and go down a pathway. The pathways are the ion channels the diffusion pathways the gradient to allow certain things to move across the membrane. If the Na or K are attached to they are allowed to pass the gradients if not, the gates are closed.

Information about the Sodium Potassium Pump: has cons: pumps more pos. out and leave more gen in. Having a less pos. charge.

Depolarization: a shift to a more positive internal voltage.

Negative pressure breathing vs Positive pressure breathing

(The human breathing and frog breathing pp slides)

Know and understand ATP production

Don’t worry about studying extra sensory material