**Part 1**: Acetyl Choline binds to ligand gated sodium channels (nicotine receptors) on the skeletal muscle membrane (motor end plate).

Next, this produces a massive EPSP. This triggers an action potential across the entire sarcolemma (plasma membrane) that travels down the T tubules and it triggers the release of calcium from terminal cisternae of the sarcoplasmic reticulum.

Calcium binds to troponin.
Troponin is attached to tropomyosin. That shape change in troponin causes displacement in tropomyosin.

This reveals binding sites on actin. Myosin heads attach to those binding sites & pull the actin towards the midline, shortening the sarcomere.

Contraction is terminated when calcium is pumped to the sarcoplasmic reticulum.

ATP is required in 2 places for 3 reasons: has to bind to myosin heads, it is split to ADP, it cocks the head so it can bind to another.

**Part 3**: During contraction the sarcomere shortens. The I band shortens, the H zone gets shorter & disappears. The A band doesn’t change. During lengthening of muscle, sarcomere and I band lengthen, H zone lengthens, and A band doesn’t change.

**Essay 2:** **Hormones**

Posterior pituitary:

**Oxytocin**- necessary for all human bonding. Milk ejection. Smooth muscle contraction at child birth.

**Antidiuretic hormone-** stimulates reabsorption by collecting ducts of the kidney. Stimulates vasopressin effect by increasing blood pressure.

Anterior pituitary:

**Growth hormone**- stimulates whole body growth. Potent on cartilage.

**Prolactin**- Stimulates milk synthesis. Suppresses menstrual cycle and ovulation.

**Follicle stimulating hormone**- stimulates ovarian follicle development in women. In men, stimulates Sertoli cells in testes.

**Luteinizing hormone**- stimulates ovulation and stimulates corpus luteum to make progesterone. In men, stimulates Leydig cells to make testosterone.

**Thyroid stimulating hormone**- stimulates thyroid gland to produce its thyroxine (T4 and T3).

**Melanocyte stimulating hormone**- stimulates melanin synthesis.

**Adrenocorticotropic hormone**- stimulates adrenal cortex to release cortisol & cortisone.