

Concept Inorganic ions are charged particles which don't contain covalent bonds and they are very important in allowing many processes to occur. Sodium, phosphorus and hydrogen as well as others have many uses in organisms which allow them to survive.

Notes In respiration ATP is hydrolysed into ADP and P_i . This P_i in glycolysis phosphorylates glucose ~~and~~ ^{which} ~~causes~~ ^{allows} it to increase its reactivity. In the Krebs cycle NAD and FAD are ~~oxidised~~ ^{reduced}. The hydrogen released splits into H^+ and e^- . This H^+ actively transports out of the matrix into the intermembrane space. This creates a H^+ concentration gradient. H^+ then diffuses back into the matrix and this repeated flow of H^+ causes ATP synthase to turn ~~slowly~~ ^{smashing} ADP and P_i together to form ATP. This is very important within organisms as ATP is required for many processes to occur which will be referred to.

Notes ATP is required to allow the Na^+/K^+ pump to actively transport $3Na^+$ out and $2K^+$ into the axon. The axon membrane is more permeable to K^+ which causes K^+ to enter and a resting potential of $-70mV$ is reached with the inside of the neurone being more negative than outside. Na^+ channels and late voltage gated Na^+ channels open and allow Na^+ to enter depolarising the neurone. This stimulates an action potential at $\pm 40mV$. When this is reached K^+ channels open and K^+ begins to re-enter the neurone. This causes repolarisation and later hyperpolarisation to occur returning the neurone to resting potential. The wave of depolarisation which occurs allows a passage ~~for~~ ^{of} nerve impulses and this ~~allows~~ ^{allows} coordination of responses to occur within organisms. This is important as organisms need to be able to respond to stimuli.

In the pacinian corpuscle, when pressure is applied, the lamellae deforms causing the neurone to stretch. This causes stretch mediated Na^+ channels to open and Na^+ enters the neurone ~~causing~~ ^{causing} depolarisation. An action potential is stimulated if the threshold is reached. Already covered.

Notes ~~When an action potential~~ In synapses and the neuromuscular junction (NMJ) Ca^{2+} ~~is~~ ^{is} used which eventually leads to depolarisation of the post-synaptic membrane. When the action potential reaches the pre-synaptic membrane Ca^{2+} channels open and Ca^{2+} facilitates diffusion into the membrane. Ca^{2+} causes vesicles containing neurotransmitters to move and fuse to the pre-synaptic membrane. Exocytosis then occurs allowing the neurotransmitter to diffuse across synaptic cleft and bind to complementary receptors of post-synaptic membrane. ~~It then~~ Na^+ channels open and Na^+ enters depolarising

* by Na^+/K^+ pump

membrane and stimulating an action potential if threshold reached.

≠ Muscular contraction also involves Ca^{2+} . The action potential from a NMJ reaches via T-tubules and stimulates Ca^{2+} channels in endoplasmic reticulum to ~~diffuse~~ ^{release} Ca^{2+} by diffusion (facilitated).

Ca^{2+} binds to troponin which causes tropomyosin to uncover the myosin binding site. This allows myosin to bind to the binding site and form a cross bridge. The sliding filament theory can then occur.

Ca^{2+} also activates ATPase hydrolysing ATP in ADP + P_i and releasing energy causing myosin cross bridge to break and everything to return to original positions. Muscle contraction is important for organisms for movement as well as ventilation, vasodilation and constriction.

// Ions also allow transport to occur. Na^+ is actively transport out of epithelium in co-transport ~~ATP~~. This creates a concentration gradient. Na^+ can then diffuse from lumen to epithelium.

• with glucose or amino acids across co-transport protein. Glucose/AAs can then diffuse into blood where they can be usefully used in respiration or other processes in organisms. Active transport requires ATP.

ATP binds to carrier proteins and splits into ADP + P_i . P_i then binds to carrier protein and causes it to change shape and release molecules on the other side. This is useful in organisms to move molecules from low to high concentrations. Why? relevance.

B-✓✓
R-✓✓✓
QWC-✓✓

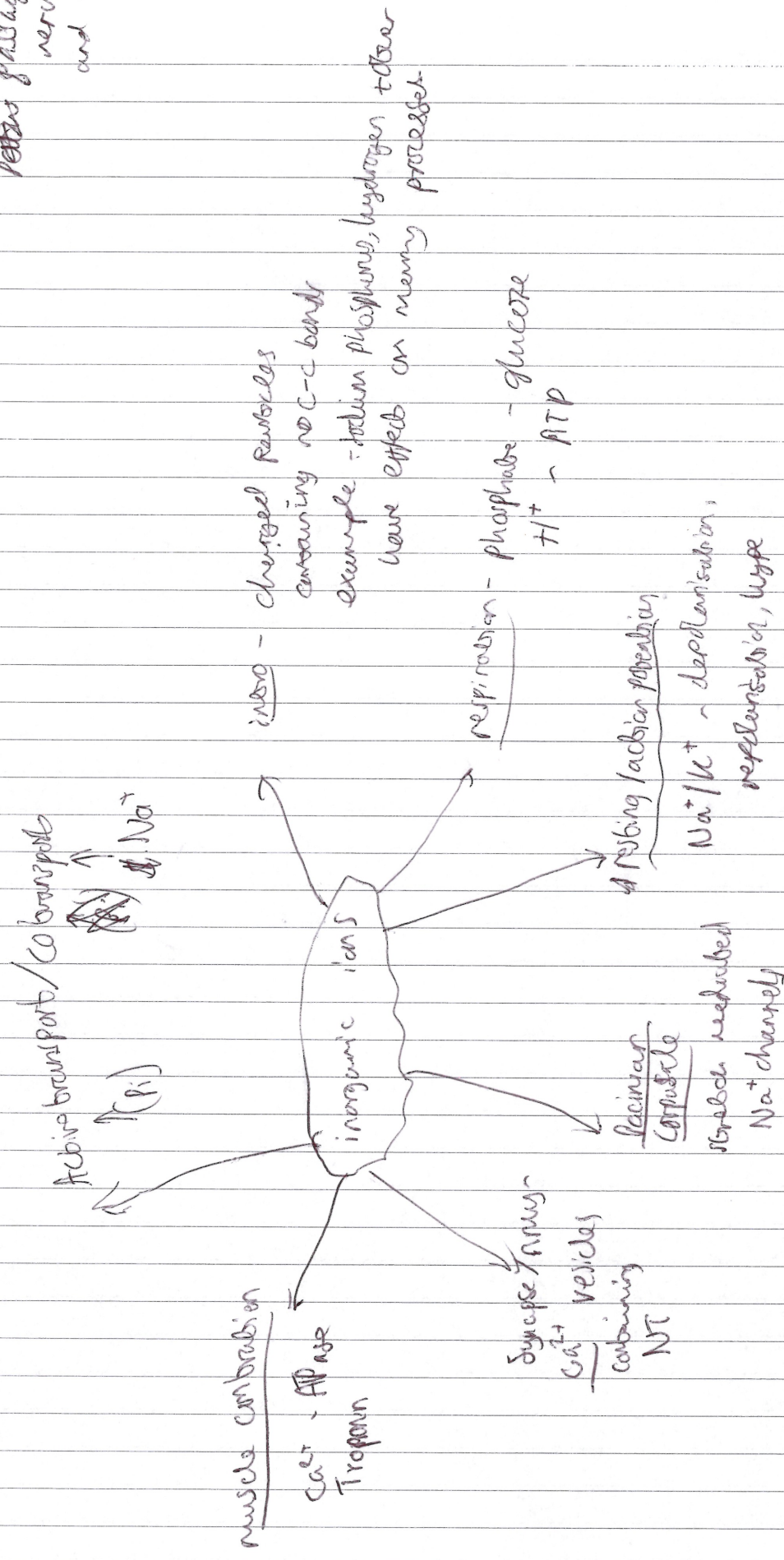
Topics
Det-✓✓
M-✓✓
NS-✓✓
Resp ✓✓

Bejard.

(22)

Great essay!

wave of depolarisation
 release package of
 nerve impulse
 and coordinate



ions - charged particles
 containing no C-C bonds
 example - sodium phosphate, hydrogen ions
 have effects on many processes

Resting / action potential
 Na⁺/K⁺ - depolarisation,
 repolarisation, hyper

ion channels
 stroke, reabsorbed
 Na⁺ channels

