The Cellular Respiration Story

Use these terms to fill in the blanks. The terms can obviously used more than once.

NADH	$FADH_2$	FAD+
electrons	matrix	mitochondrion
hydrogen ions (H^+)	protons	Rotenone
electron transport system(ETS)	inner mitochondrial membrane	NAD+
intermembrane space	oxygen (O_2)	gradient
ATP synthase	channel	P
enzyme	ADP	ATP

_____ and _____ are energy carriers that also carry _____ and _____, which are equivalent to _____, to the _____, which is composed of a series of proteins located in the inner mitochondrial membrane. The proteins serve as a series of electron carriers that accept the _____ from the _____ and _____ and pass them along from one to another. The movement of the _____ through the _____ provides the energy needed to pump _____ (or protons) supplied by the _____ and _____ or from the _____ (the center of the mitochondrion) through the _____ into _____ (the space between the inner and outer membranes of the mitochondrion). This results in a higher concentration of _____ in the _____ than in the _____. When the _____ reach the last electron carrier, they are picked by an _____ atom (which is typically represented as $\frac{1}{2}O_2$), which acts as the final electron acceptor and combines with two _____ to form H_2O. This last step also contributes to the difference in the _____ concentration on either side of the inner mitochondrial membrane. Besides the proteins that make up the _____, there are also _____ molecules in the inner mitochondrial membrane. These proteins serve as both a _____ that allows the _____ to pass through and as the _____ (i.e. a protein that serves as a catalyst and speeds up a reaction) that catalyzes the manufacture of _____ from _____ and _____. The energy used to form the bond between the _____ and _____ to form _____ is provided by the movement of the _____ through the _____ along the _____ formed because of the difference in concentration of hydrogen ions on either side of the inner mitochondrial membrane. This process forms the majority of the ___ produced by cellular respiration. To provide a large surface area for this to take place in the small volume of the mitochondrion, the _____ is highly folded and projects into the _____ in finger-like projections called _____. When the _____ and the _____ release their hydrogen ions and electrons the become _____ and _____ again. The _____ and _____ are free to return and pick up more hydrogen ions and electrons. So too, as _____ molecules are used to provide energy to other reactions, they are broken down into _____ and _____ which can be assembled into _____ again. The movement of the hydrogen ions, NADH, $FADH_2$, O_2, H_2O, ADP, etc. occurs concurrently (i.e. there is a constant and continuous level of activity). If an inhibitor, such as _____, were to block one of the electron transport proteins, the whole process would stop and no _____ would be produced in the _____. This could also happen if the _____ molecules were blocked or if the inner mitochondrial membrane were torn or become very permeable to hydrogen ions and reduced the number passing through the ATP synthase or made the _____ disappear.

Print Form