Biologist discovers mad++ : could this lead to bodily energy super production?

Dr. Your Name, research scientist for Glucose Products, Inc., has discovered a super electron-carrier, Magnesium Adenine Dinucleotide ++ , while researching possible benefits of aerobic respiration at the labs of Glucose Productions Inc. in Minnesota last week.

“ Understanding glycolosis and the effects of sugar producing energy on people at different ages and stages in the life cycle was our goal. But in my studies I happened across the existence of this electron carrier that is really a super electron carrier, if you will,” Dr. Your Name said in explanation of his find.

In his discovery, Dr. Your Name found a new electron carrier present in the Krebs cycle and the electron transfer chain. He named it magnesium adenine dinucleotide or MAD++ because of the magnesium found to be in its makeup and the presence of two protons giving the molecule a double positive charge.

This substance was found to be able to accept two hydrogen electrons at a time due to the double positive charge of its makeup. Thus MAD++ can carry two electrons to the oxygen molecules at a time. Thereby releasing two hydrogen protons at one time to travel along the proton gradient and produce ATP.

Dr. Your Name explains the enormous possibilities this could result in. “ With these capabilities the cell could produce energy much quicker than with NAD+ and FAD alone! Can you imagine the possibilities if we can help the body produce this protein more readily? The cells would work at energy efficiency levels at twice the rate they work now!”

To fully understand how important MAD++ is to aerobic respiration, the steps to aerobic respiration must be understood. Aerobic respiration is essentially the release of energy from an organic substance such as glucose in the presence of oxygen.

Glucose and oxygen pass electrons back and forth to produce carbon dioxide, water, and energy trapped in the form of Adenosine Tri-Phosphate or ATP. The process of aerobic respiration includes, glycolysis, the Krebs Cycle, and the electron transport chain.

During glycolosis, glucose is broken down into two molecules of pyruvate (C3), with the help of proteins found in the cytoplasm, NAD+ and the transfer of hydrogen electrons. This begins with the activation of the glucose by 2 ATP molecules which each give a phosphate molecule to the glucose leaving 2 ADP molecules.

The glucose then splits into two three-carbon compounds. Finally, the NAD+ molecules accept the transferred hydrogen electrons and phosphates are added to each compound and then released to combine with the remaining 2 ADP molecules to create two more ATP molecules. The two carbon compounds left are pyruvates which move into the Krebs Cycle.

The Krebs cycle can best be explained as a set of reactions that break down the pyruvate molecules into more NADH and also some FADH molecules and even more energy-rich ATP. This is initiated once the NAD+ molecule creates acetyl Coenzyme A which is a catalyst for the citric acid cycle or Krebs Cycle. Krebs cycle is a series of reactions occurring when NAD+ and FAD attract and receive hydrogen electrons from the pyruvate molecules.

The result is the production of a cycle of acid formations until more NADH and FADH molecules are produced and carbon dioxide is given off as a waste product. The cycle goes through twice, one time for each pyruvate compound. The three carbon atoms from each pyruvate combines with oxygen molecules to leave as carbon dioxide. At four stages a pair of electrons from the hydrogen atoms in pyruvate combines with NAD+ to form NADH and one proton or H+.

At one step, a pair of electrons is removed from succinic acid and reduces FAD to FADH2. As a result, 8 NADH electron carrying molecules and 2 FADH molecules are produced during two turns of the Krebs Cycle.

This is important because these molecules are energy rich in that they are carrying electrons and giving off protons that will move in and out of the inner cell membrane during the last step in aerobic respiration: the electron transport chain.