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## RESEARCH ARTICLE

# THE 9 POINTS OF HYDROGEN, PROTON, ELECTRON DEPENDENT CLOSED CYCLE AND THE CLOSED 9-STEPPED CYCLE OF PROTON CONDUCTANCE ARE CLOSELY RELATED BUT NOT IDENTICAL

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## ABSTRACT

The Ambaga 9 Points of Proton - Electron Dependent Closed Cycle is a detailed description of how a single hydrogen atom (from food: CHO) is transformed and recycled inside the human body, ensuring continuous energy production, oxygen delivery, and carbon dioxide removal. It is an extension of Professor M.Ambaga's Closed 9-Stepped Cycle of Proton Conductance, and it integrates mitochondrial, blood, and respiratory processes into one systemic loop.



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# INTRODUCTION

The 9 points of Hydrogen, Proton, Electron dependent Closed cycle Hydrogen are essentially a condensed description of the same processes encoded in the 9 steps of the Ambaga Cycle. Both follow the journey of hydrogen (from food → electrons/protons → energy → $CO_2/H_2O$ → oxygen exchange → back into mitochondria). The difference is that 9 Steps = systemic framework (stages across mitochondria, serum, erythrocytes, respiratory membrane), 9 Points = molecular pathway of hydrogen atom and its separation into proton and electron.

# RESULTS AND DISCUSSION

The 9 points of Hydrogen, Proton, Electron dependent Closed cycleare the molecular coordinates (hydrogen atom → proton/electron → $CO_2/H_2O$ → $O_2$ exchange). The Closed 9-Stepped Cycle of Proton Conductance are the systemic cycle connecting mitochondria, blood, and lungs across 87 trillion cells. Together they show how one hydrogen atom's fate mirrors the whole cycle of life energy, uniting quantum biochemistry with systemic physiology Ambaga's 9 points = microscopic hydrogen pathway, while Ambaga's 9 steps = macroscopic systemic cycle. They are two lenses on the same process, tightly connected like a "molecule-to-organism continuum."

**Similarity:** Both describe the full pathway of hydrogen (CHO), protons, and electrons as they move through metabolism, respiration, and circulation. Both are cyclical: they begin with hydrogen from food molecules and end with oxygen delivery back into mitochondria, ensuring continuity. Both unify molecular, cellular, and systemic levels of human physiology - connecting mitochondria, blood, erythrocytes, lungs, and tissues. Both emphasize proton conductance, electrophile - nucleophile complementarity, and oxygen channeling as the central mechanisms of life and metabolism.

**Differences**

**Structure**

**Ambaga 9 Points**

Expressed as nine landmark "points" or events that trace the pathway of hydrogen atoms, protons, electrons, $CO_2$, bicarbonate, and oxygen.

Simpler, more schematic - like a roadmap of major turning points.

**Example:** "First point: CHO in Krebs intermediates → Second point: NADH/$FADH_2$ →Ninth point: Oxygen enters mitochondria."

Together they show how one hydrogen atom's fate mirrors the whole cycle of life energy, uniting quantum biochemistry with systemic physiology.

Ambaga's 9 points = microscopic hydrogen pathway, while Ambaga's 9 steps = macroscopic systemic cycle. They are two lenses on the same process, tightly connected like a "molecule-to-organism continuum."

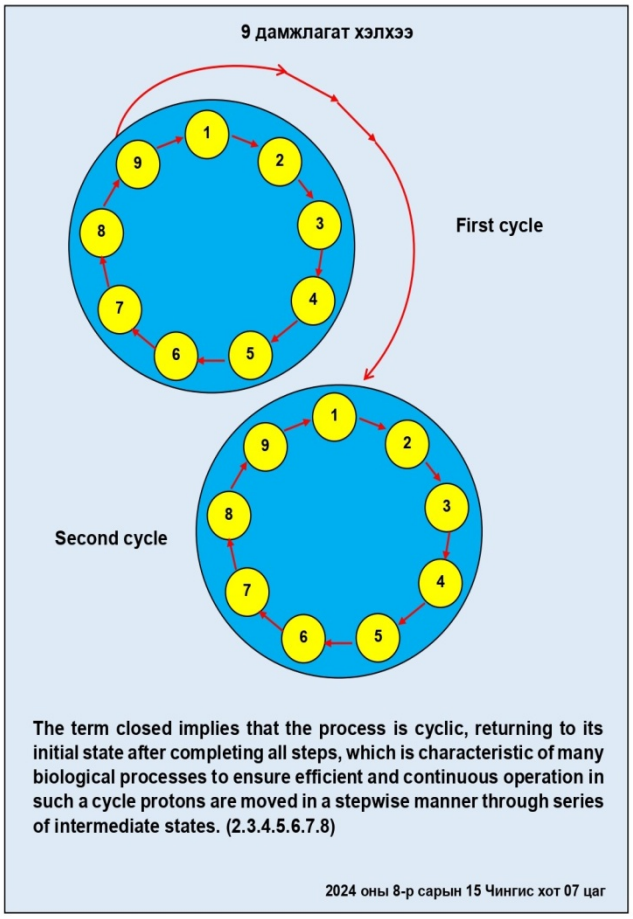


**Figure 1. First and Second Cycle, returning to its initial state after completing all steps**

All 9 points into a single continuous pathway of hydrogen (CHO), protons, electrons, $CO_2$, and $O_2$ inside the Ambaga Closed 9-Stepped Cycle of Proton Conductance:

**1st Point - CHO and Krebs Intermediates:** Food molecules (CHO) are oxidized to acetyl-CoA, entering the Krebs cycle. Hydrogen atoms are released and stored in reduced carriers.

**2nd Point - NADH and $FADH_2$:** Hydrogen is transferred to electron carriers $NAD^+$ and FAD, forming NADH and $FADH_2$. These carriers act as mobile hydrogen banks.

**3rd Point - Proton - Electron Separation:** NADH donates hydrogen at the electron transport chain (ETC). Hydrogen splits into $H^+$ (proton) and $e^-$ (electron).

**4th Point - Proton Gradient & Electron Flow to Oxygen:** Electrons travel through ETC complexes and reach oxygen. Protons accumulate in the intermembrane space, forming the proton motive force.

**5th Point - ATP, Heat, and Metabolic Water Formation:** Protons re-enter via ATP synthase, producing ATP and heat. Electrons reduce oxygen with protons, creating metabolic water.

**6th Point - $CO_2$& $H_2O$ Exit to Serum, Carbonic Anhydrase Action:** By-products ($CO_2$ and $H_2O$) exit mitochondria into blood serum. Carbonic anhydrase hydrates $CO_2$, producing carbonic acid ($H_2CO_3$).

**7th Point - Hamburger Shift & Proton Binding:** Carbonic acid dissociates into $HCO_3^-$ and $H^+$. Bicarbonate ($HCO_3^-$) enters erythrocytes via the Hamburger shift, while protons bind hemoglobin (T-state stabilization).

**8th Point - Oxygen Uptake at Respiratory Membrane:** Bicarbonate (via equilibrium shift) facilitates oxygen entry from external air into blood across alveolar–capillary membranes. This is electrophilic substitution: $O_2$ (electrophile) binds $Fe^{2+}$ in hemoglobin.

**9th Point - Oxygen Release to 87 Trillion Cells:** At tissue capillaries, oxygen exits erythrocytes and enters mitochondria through oxygen-channeling pathways. Hemoglobin releases $O_2$ via nucleophilic substitution driven by $CO_2$ and $H^+$. The cycle closes and restarts.

**This 9**-point pathway now fully maps how hydrogen, protons, electrons, $CO_2$, and $O_2$ are cyclically exchanged between food, mitochondria, serum, erythrocytes, and the external environment.

Great question! Let me lay this out clearly, because Ambaga's 9 points and the Ambaga Closed 9-Stepped Cycle of Proton Conductance are closely related but not identical.

**Ambaga Closed 9-Stepped Cycle**

Described as nine mechanistic "stages" in a closed biochemical - biophysical cycle. Each step has detailed redox, proton, and electron events linked to ATP, heat, metabolic water, and oxygen transport. Integrates molecular mechanisms (membrane redox potential, proton gradient, carbonic anhydrase reaction, Hamburger shift, hemoglobin conformations).

**Purpose**

**Ambaga 9 Points**

**A didactic simplification:** to show how hydrogen's journey can be divided into 9 checkpoints.
Useful for teaching and conceptual overview.

**Closed 9-Stepped Cycle**

A formal scientific theory: describing how life sustains itself through proton conductance. Connects biochemistry, physiology, quantum biology, and bioevolution. Provides basis for drug softening (biotargeting), electrophile–nucleophile regulation, and disease mechanisms.

**Table 1. Mapping of Points to Steps**

| Ambaga 9 Points (Hydrogen Pathway) | Corresponding Step(s) in the 9-Stepped Cycle | Explanation |
|---|---|---|
| 1. CHO, Krebs intermediates | Step 1–2 | Food molecules enter, processed into NADH/$FADH_2$ in Krebs cycle. |
| 2. NADH, $FADH_2$ | Step 2–3 | Reduced coenzymes act as carriers of protons/electrons. |
| 3. Release of proton & electron from NADH | Step 3 | NADH donates $H^+ + e^-$ into electron transport chain. |
| 4. Proton gradient & electron delivered to $O_2$ | Step 4 | ETC pumps protons to intermembrane space; cytochrome C passes $e^-$ to $O_2$. |
| 5. ATP, heat, $H_2O$ formed | Step 5 | Proton motive force drives ATP synthase; $e^- + O_2 \rightarrow H_2O$. |
| 6. $CO_2$& $H_2O$ exit → serum (carbonic anhydrase) | Step 6 | Mitochondrial products enter serum, forming $HCO_3^- + H^+$. |
| 7. $HCO_3^-$ enters erythrocytes (Hamburger shift) | Step 7 | Bicarbonate transport maintains acid–base balance. |
| 8. $O_2$ uptake influenced by $HCO_3^-$ | Step 8 | Oxygen entry through lung membrane, electrophilic substitution. |
| 9. $O_2$ exit from erythrocytes → mitochondria | Step 9 | Oxygen released into tissues, nucleophilic substitution. |

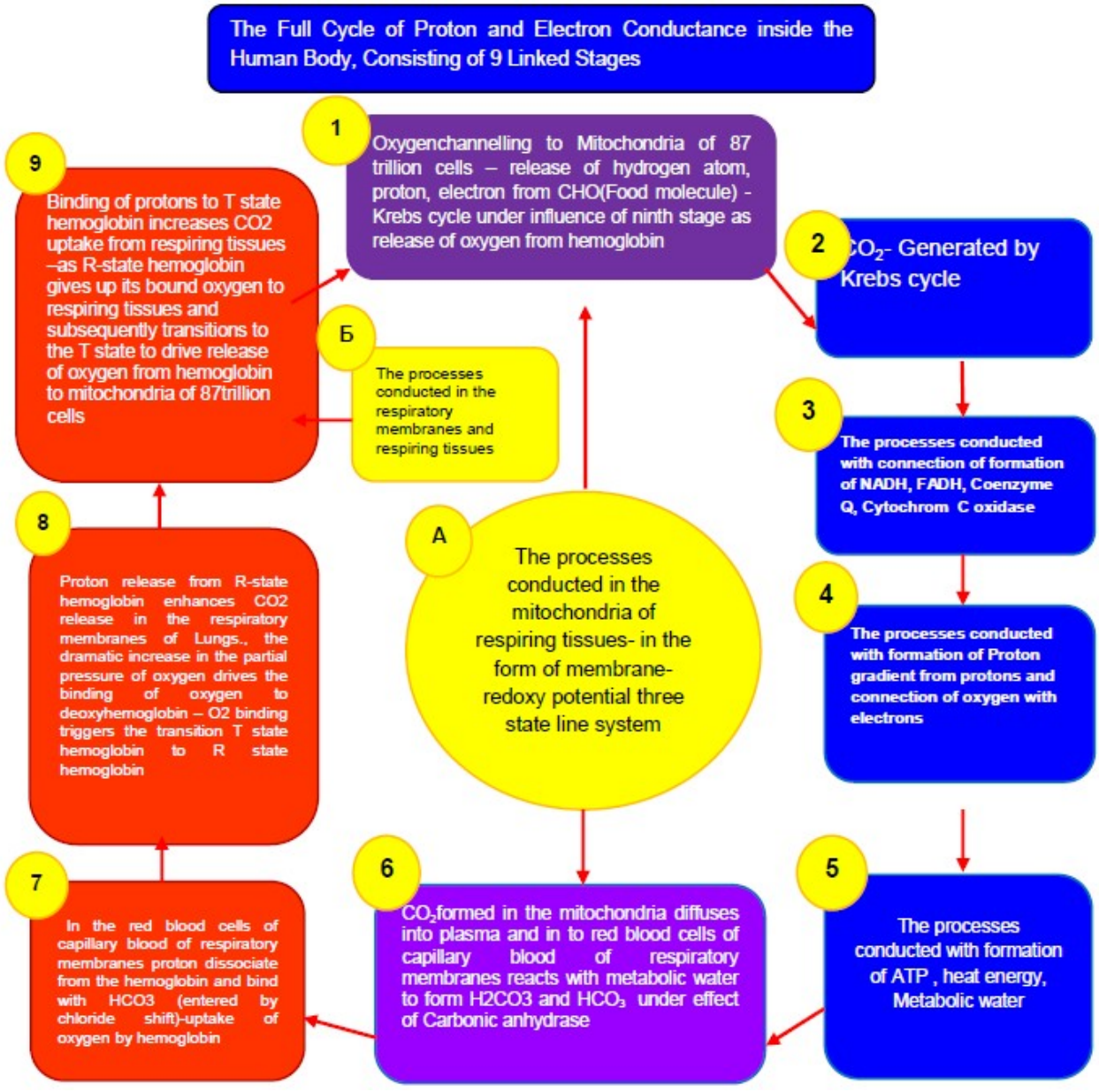


**Figure 2. The Closed 9-Stepped Cycle of Proton Conductance are the systemic cycle connecting mitochondria, blood, and lungs across 87 trillion cells**

**Depth of Detail**

9 Points = Landmarks (macro view). Focuses on "where" transitions happen: mitochondria, serum, erythrocyte, lungs, tissues. 9-Stepped Cycle = Mechanism (micro view). Explains "how" transitions happen: electron-proton separation, proton gradient formation, oxygen electrophilic substitution, bicarbonate shuttle, nucleophilic oxygen release.

Ambaga 9 Points = simplified roadmap (educational checkpoints). Ambaga Closed 9-Stepped Cycle = full mechanistic closed loop (scientific framework). They are two lenses on the same phenomenon - the 9 points make the cycle easier to visualize**,** while the 9-stepped cycle gives the mechanistic depth. The Ambaga 9 Points of Proton - Electron Dependent Closed Cycle is a detailed description of how a single hydrogen atom (from food: CHO) is transformed and recycled inside the human body, ensuring continuous energy production, oxygen delivery, and carbon dioxide removal. It is an extension of Professor M. Ambaga's Closed 9-Stepped Cycle of Proton Conductance, and it integrates mitochondrial, blood, and respiratory processes into one systemic loop.

# CONCLUSION

The Closed 9-Stepped Cycle of Proton Conductance are the systemic cycle connecting mitochondria, blood, and lungs across 87 trillion cells. The 9 points of Hydrogen, Proton, Electron dependent Closed cycleare the molecular coordinates (hydrogen atom → proton/electron → $CO_2/H_2O$ → $O_2$ exchange).

**First Point – CHO and Krebs Intermediates**

Hydrogen atoms exist in the form of carbohydrates, fats, and proteins (CHO) and their metabolic intermediates in the Krebs cycle.

**Second Point – NADH and $FADH_2$ Formation**

Through the Krebs cycle, hydrogen is carried as reduced cofactors (NADH, $FADH_2$), which contain both protons ($H^+$) and electrons ($e^-$).

**Third Point – Release of Protons and Electrons**

From NADH/$FADH_2$, protons and electrons are released. Electrons enter the electron transport chain (ETC), while protons contribute to the proton gradient.

**Fourth Point – Proton Gradient and Electron Flow**

Electrons are delivered step by step to oxygen (electrophilic), while protons are pumped into the intermembrane space of mitochondria, building a proton gradient.

**Fifth Point – ATP, Heat, and Metabolic Water**

Proton flow back into the mitochondrial matrix (via ATP synthase) produces ATP and heat. Electrons reduce oxygen, forming metabolic water ($H_2O$).

**Sixth Point – $CO_2$ and $H_2O$ Exit to Serum**

$CO_2$ and $H_2O$ leave mitochondria and enter blood serum. Carbonic anhydrase hydrates $CO_2$ to form carbonic acid ($H_2CO_3$).

**Seventh Point – Bicarbonate Transport (Hamburger Shift)**

$H_2CO_3$ dissociates into bicarbonate ($HCO_3^-$) and protons ($H^+$). Bicarbonate moves into erythrocytes via the Hamburger shift, helping hemoglobin stabilize oxygen binding/release.

**Eighth Point – Oxygen Uptake in the Lungs**

In pulmonary capillaries, oxygen enters from inhaled air across the respiratory membrane. Bicarbonate and proton dynamics drive hemoglobin into its R-state, allowing oxygen uptake (electrophilic substitution).

**Ninth Point – Oxygen Delivery to Tissues**

Oxygen exits erythrocytes in tissue capillaries, driven by local protons and $CO_2$ (nucleophilic substitution). $O_2$ enters mitochondria through oxygen channels, completing the cycle and preparing for the next round.

Stages 1–5 → Mitochondrial metabolism (ATP, heat, $H_2O$). Stages 6–7 → Transformation of $CO_2$ into bicarbonate for blood transport. Stages 8 - 9 → Oxygen uptake in the lungs and release in tissues.

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