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Original Research Article **Pulmonary Medicine**

Identification of Origin and End of Life on Earth

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Abstract

This work is about searching the origins of life. So, different natural biochemical cycles-their precursors and end products were analysed. Ratios of interaction between different elemental atoms forming those precursors and end products were created and used to find out the possible precursor molecule of DNA. Efforts were also made to identify the length of time period of remaining ice house phase using a method developed to calculate areas above and below curves on graphs.

Keywords: Origins of DNA, Life on Earth.

INTRODUCTION

Earth came into existence, 4.5 billion year's ago [1]. Evidence of earliest life forms was observed to be 3.6 billion years ago [1]. These happened in Pre-Cambrian stage. Earliest life forms - bacteria, whose evidences were found and dated to 2.4 billion years ago [1]. It is a simple form of life known as prokaryotes, which gave rise to complex forms of life known eukaryotes and later on their derivatives.

Its physical form is upheld by complex maze of biochemical reactions. Efforts have been made to understand the precursor and end products of those cycles and thereby identify the earliest molecule to trigger life on earth.

To be more precise, this work is about finding the molecule that arrived earlier than Deoxyribose Nucleic acid and Ribose Nucleic acid in early life cells.

Effort has also been made to identify number of years; the life on earth can last.

AIM-

1. To identify earliest possible molecule to have arrived earlier than Deoxy Ribose Nucleic Acid.
2. To identify the number of years life will last on earth.

MATERIALS AND METHODS-

To identify earliest molecule to start life on earth-

Main elements responsible for major naturally occurring biochemical reactions in body are Carbon, Hydrogen, Nitrogen, Oxygen and Phosphorous.

Carbon: In order to form a molecule, it can acquire- (a) 4 electrons or may not react- acquire (b) 0 electrons or lose (c) 4 electrons. In this work Interaction scores have allotted according to interaction habits.

(1) Interaction score for acquiring 4 is 4
(2) Interaction score for offering no reaction is 0 that is 1
(3) Interaction score for losing 4 is 4

(a) So for a natural catabolic biochemical reaction, when, number of carbon atoms in a precursor complex molecule is multiplied by a factor 4/9 derived from its Interaction score gives in number of atoms of Carbon in the by product molecule.

(b) For a natural anabolic biochemical reaction, number of carbon atoms in a precursor complex molecule is multiplied by a factor 9/4 derived from its Interaction score gives in number of atoms of Carbon in the natural by product molecule.

Hydrogen: In order to form a molecule, it can acquire- (a) 1 electron or may not react- acquire (b) 0

electrons or lose (c) 1 electron. In this work Interaction scores have allotted according to interaction habits.

(1) Interaction score for acquiring 1 is 1
(2) Interaction score for offering no reaction is 0 that is 1
(3) Interaction score for losing 1 is 1

(a) So for a natural catabolic biochemical reaction, when, number of Hydrogen atoms in a precursor complex molecule is multiplied by a factor 1/3 derived from its interaction score gives in number of atoms of Hydrogen in the product molecule.

(b) For a natural anabolic biochemical reaction, number of Hydrogen atoms in a precursor complex molecule is multiplied by a factor 3/1 derived from its Interaction score gives in number of atoms of Hydrogen in the product molecule.

Nitrogen: In order to form a molecule, it can acquire- (a) 3 electrons or may not react- acquire (b) 0 electrons or lose (c) 3 electrons. In this work Interaction scores have allotted according to interaction habits.

(1) Interaction score for acquiring 3 is 3
(2) Interaction score for offering no reaction is 0 that is 1
(3) Interaction score for losing 3 is 3

(a)So for a natural catabolic biochemical reaction, when, number of Nitrogen atoms in a precursor complex molecule is multiplied by a factor 3/7 derived from its Interaction score gives in number of atoms of Nitrogen in the by-product molecule.

(b) For a natural anabolic biochemical reaction, when, number of Nitrogen atoms in a precursor complex molecule is multiplied by a factor 7/3 derived from its Interaction score gives in number of atoms of Nitrogen in the by-product molecule.

Oxygen: In order to form a molecule, it can acquire- (a) 2 electrons or may not react- acquire (b) 0 electrons or lose (c) 2 electrons. In this work Interaction scores have allotted according to interaction habits.

(1) Interaction score for acquiring 2 is 2
(2) Interaction score for offering no reaction is 0 that is 1
(3) Interaction score for losing 2 is 2

(a)So for a natural catabolic biochemical reaction, when, number of Oxygen atoms in a precursor complex molecule is multiplied by a factor 2/5 derived from its Interaction score gives in number of atoms of Oxygen in the by product molecule.

(b) For a natural anabolic biochemical reaction, when, number of Oxygen atoms in a precursor complex molecule is multiplied by a factor 5/2 derived from its Interaction score gives in number of atoms of Oxygen in the by product molecule.

Phosphorus: In order to form a molecule, it can acquire- (a) 3 electrons or may not react- acquire (b) 0 electrons or lose (c) 3 electrons. In this work Interaction scores have allotted according to interaction habits.

(1) Interaction score for acquiring 3 is 3
(2) Interaction score for offering no reaction is 0 that is 1
(3) Interaction score for losing 3 is 3

(a)So for a natural catabolic biochemical reaction, when, number of Phosphorus atoms in a precursor complex molecule is multiplied by a factor 3/7 derived from its Interaction score gives in number of atoms of Phosphorus in the by-product molecule.

(b) For a natural anabolic biochemical reaction, when, number of Phosphorus atoms in a precursor complex molecule is multiplied by a factor 7/3 derived from its Interaction score gives in number of atoms of Phosphorus in the by-product molecule.

Main energy providing reactions happening in a Cell are (1) Glycolysis, (2) Citric acid cycle and (3) Hexose monophosphate Shunt reactions.

The efficiency of the ratio derived from INTERACTION SCORES for an individual atom Carbon is used in above mentioned examples of energy reaction to identify its robustness to know the number of atoms of Carbon in the by product complex molecule.

S. No:	Name of the Reaction	Precursor Molecule	No of C Atoms X Ratio	By Product Molecule
1	GLYCOLYSIS	Glucose-6 CARBON	6 X 4/9=2.67≈3	3 CARBON Pyruvate a derivative of Pyruvic Acid
2	CITRIC ACID	Acetyl CoA-2 CARBON	2X9/4=4.5≈4	4 CARBON Oxaloacetate
3	HMP SHUNT	Glucose 6 Phosphate-6 CARBON	6 X 4/9=2.67≈3 2.67 x 9/4 =6	6 CARBON-Fructose 6 Phosphate

** In Amphibolic reactions the number of atoms of an element remains more or less the same in the by product molecule as in the precursor molecule.
So, robustness of interaction score ratios are established.

This technique will be used to identify the molecule which occurred earlier than DNA and RNA.

To identify the number of year's life will last on earth
A temperature graph of CO_2 COALITION (https://co2coalition.org/wp-content/uploads/2021/09/113-Zachos.jpg) is used in this work.

A mathematical approach was developed and used to calculate the area under and above the curve of a graph.

Firstly the Y co-ordinates of individual elevations and depressions in graph are added and divided by a sum of number elevations + number of depressions. This gives average Y co-ordinate of elevations and depressions on curve. The result is multiplied by half of the total X Co-ordinate reading for that stretch of graph and a correction factor 4. The result obtained is the total area of a figure with those symmetrical elevations and depressions on either side (that is above and bottom). Half of that area gives the "area under the curve" in a graph. Next, total area spanning the curve on the graph is calculated by highest Y Co-ordinate in the graph "times" the total X-Co-ordinate spanning the phase within the graph. From the resultant sum (Total area spanning the curve on the graph), the area under the graph is deducted to obtain the area above the curve within the graph is calculated. It corresponds to the area of ice house phase in the "TEMPERATURE GRAPH OF CO_2 COALITION". This area when divided by the value on Y-co-ordinate (^{0}C-Temperature) will give the value on X-co-ordinate (million years)

This is used to identify the number of years present Icehouse will last on Earth using a temperature graph from the prestigious CO_2 COALITION.

REVIEW OF LITERATURE

The presence of life on earth was detected 3.6 billion years ago. Earliest forms of cellular life forms that are Prokaryotes came into being in Archaean phase, followed by Eukaryotes in Hadean. That is how the life forms kept on evolving. Homo sapiens is one of those products of evolutionary life. So, to be precise cells kept multiplying and took different forms. So, the DNA was chosen for the study. To find out it's possible precursors in natural biochemical pathway leading to the generation of DNA (C_{15} H_{31} N_3 O_{13} P_2).

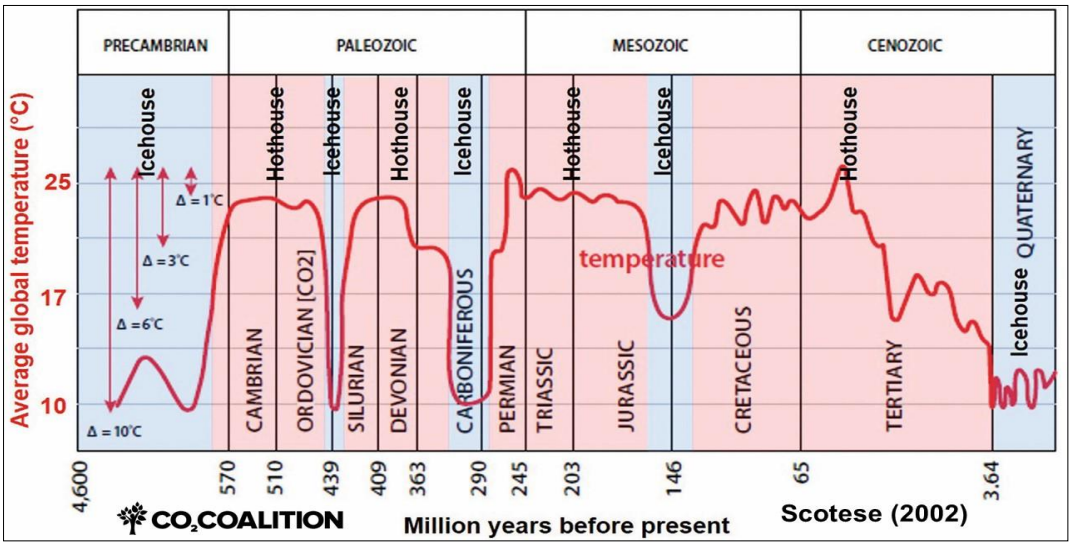
This burst of life is thought happen in presence of ample amount of atmospheric Oxygen. This brings down the temperature. So, in ice houses the temperature is low with high atmospheric oxygen levels. It is opined that Cyanobacteria contributed a lot to atmospheric Oxygen in pre-cambrian phase as well as in later phases too. But, phases with excess atmospheric CO_2 are linked to hot house phases, where the survival of various life forms is narrow. In this work the time period of present ice house phase is calculated using the TEMPERATURE GRAPH OF CO_2 COALITION.

OBSERVATIONS-
PART-1
FORMULA OF DNA
C_{15} H_{31} N_3 O_{13} P_2

Molecule that possibly occurred earlier than DNA is identified resulting from a naturally occurring anabolic pathway-
C=15 X 4/9 =6.67≈7
H = 31 X 1/3 =10.33≈10
N= 3 X 3/7 =1.28≈1
O= 13 X 2/5 =5.2≈5
P = 2 X 3/7 = 0.86≈1
C_7 H_{10} N O_5 P

It could also be an intermediary product in case of amphibolic pathway and could help in forming DNA.

PART-2



https://co2coalition.org/wp-content/uploads/2021/09/113-Zachos.jpg

Ice house phase is above graph and hot house below the graph. Four ice houses beginning from pre-cambrian phase till Mesozoic phase. Therefore, the average ice house area is ≈10990.52 as calculated from previous four ice houses. Present ice house had started in tertiary phase and has extended into quaternary phase. The area under the curve in tertiary phase and quaternary phase is deducted from the sum of 10990.52 is 10553.45(10990.52-437). This is the calculated remaining ice house area (above the curve of the graph), which is in future. Remaining present icehouse area is 10553.45. This divided by the maximum Y Co-ordinate axis value of 25 (from 25^0C). The result is 422.138, is the total X-Co-ordinate value in million years or 0.422 billion years.

DISCUSSION

C_7 H_{10} N O_5 P is possibly an intermediary product of a natural biochemical pathway for the generation of C_{15} H_{31} N_3 O_{13} P_2. More studies need to be conducted for confirming this.

The remaining ice house phase is expected to continue for another 422.138 million years. This is a matter of grave concern. So the sources of Oxygen generation have to be preserved.

CONCLUSION

C_7 H_{10} N O_5 P could be a possible predecessor of DNA if the pathway is purely an anabolic pathway. It could, as well be an intermediary product too, if the pathway is amphibolic.

The life on earth will last for approximately 422.138 million of years or 0.422 billion years.

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