Earth's changing biodiveristy: Hadean eon

KEY WORDS

Key word	Definition
Adhesion	Adhesion is the tendency of dissimilar particles or surfaces to cling to one another.
Archaean eon	Archean Eon 3,800Ma-2,500Ma: single celled prokaryote bacteria
Biomonomers	Simple carbon compounds that make up biopolymers, building blocks of life. Found the the primordial soup.
Biopolymers	Complex carbon compounds that are responsible for the basis of life on earth. 3 biopolimers in the Central Dogma of biology, all three are related: DNA, RNA and protein.
Building phase of the earth	Hadean Eon 4,500Ma-3,800Ma: formation of earth. The graviational pull of the material started to stick together forming the planets, the outer planets made of lighter frozen gases and inner ones with heavy iron cores resulted. During their forming states the planets that were hit would liquify them keeping them molten, some metorites that hit the planets would incorporate themselves into them. Our moon is the result of a large impact that caused a piece of the planet to break off.
Carbon	Element that is the basis of life. Carbon-based compounds due to the element's four way bonding properties.
Cenozoic	65MA-present - "Age of mammals" difersitfication of mammals. Appearance of birds. Insects and plants continue their co-evolutionary war. Link between floweing plants and polinators changes the appearace of the plant. Chordate fist appears and has a strong impact on marine environment.
Mesozoic	245-65MA - Organisms move on land and plants and animals increase in numbers and variety, global diversity recovers. End of Mesozoic another global catastrophe leads to the dissapearance of dinosaurs, marking the end of the age of reptiles and a lack of living diversity
Evaporation	A change from liquid to vapor form. In context: The heat from the earth's molten state caused water deposited by meteorites to evaporate. Once the earth began to cool the water in the atmosphere condensed falling and covering the earth in a blanket of water.
Geological time scale	Time scale created using the layers of sedimentary rocks in the earth, each layer representing/reflecting time periods in the history of the earth. Four eons were defined with a series of eras and periods wihtin them (hadean, archean, proterozoic, phanerzoic). Radioactive decay has allowed us to precisely date the strata (layers) in the earth.
Goldilocks zone	"Circumstellar habitable zone" the region around a star within which planetary-mass objects with sufficient atmospheric pressure can support liquid water at their surfaces.
Green house gases	A greenhouse gas is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range contributing ot the greenhouse effect. The greenhouse effect is defined as when the Earth's atmosphere becomes thick with gases and substances which trap the sun's radiation, making the Earth warmer.
Habitable zone	Zone in the solar system where life is able to survive. Water is in it's liquid form.
Hadean eon	Hadean Eon 4,500Ma-3,800Ma: formation of earth
Hydrogen bond	Weak bond between hydrogen. Exists in DNA to connect the two aniparallel strands of neucliotides.
Hydrophilic	Water loving. Tendancy a substance has to gavitate towards water.
Hydrophobic	Water hating, Tnedancy a substance has to repel/move away from water.

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Hydrothermal vents	Found in the depths of the ocean hydrothermal vents are areas where the earth's core releases gases and where Extremophile bacteria are found. This is also the location where biomonomers were found to exist due to the conditions present (high temperatures, water does not boil due to pressure). Existance of these biomonomers in these conditions have lead to speculations about life on other planets if water were present under the same conditions.
Interstellar ogranic compounds	Possibility earth was contaminated by a living organism already having a developped Central Dogma that arrived with a meteorite and landed in the organic soup.
Interstellar space dusts	End of Big Banf created a massive nebula of gases and dust contracting. Once a critical mass was reached a nuclear explosion ignited the sun. The graviational pull of the the rest of interstellar space dusts started to stick together forming the planets.
Late heavy bombardement	The Late Heavy Bombardment is a hypothetical elevated frequency of collisions that affected the inner Solar System thought to have occurred approximately 4.1 to 3.8 billion years ago. Violent period of planetary formation.
Liposome	Artificially-prepared spherical vesicle composed of a lamellar phase lipid bilayer. Liposomes should not be confused with micelles which have a monolayer.
Micelles	Spherical structure that lipids with polar heads and non polar tails take on if the right concentration ratio exists in water. This strucutre encapsulates water inside.
Miller-Urey experiment	This experiment recreates the atmosphere and conditions of the ancient earth. Primordial gases (methane, ammonia, hydrogen, carbondioxide[added later]) were combined in a glass container with water. The mixture was heated creating vapours then cooled condensing into liquid. Electrical sparks were added and the cycle was allowed to run for a few days. This experiment spontaneously created all organic building bocks (Amino acids, a variety of carbon compounds and some lipids) althought the neucliotide of RNA or DNA was not.
Nice model	
Nonpolar compound	A compound comprised of molecules linked through chemical bonds arranged in such a way that the distribution of charges are symmetrical
Paleozoic	Paleozoic 550-250mMA - Oceans populated by animals and first attempts by plants and animals to rise up from the oceans and move on land. Global catastrophe kills 90% of marine diversity.
Panspermia	Possibility that earth was contaminated by a living organism with a Central Dogma that arrived with a meteorite and landed in the prebiotic soup.
Periods	A division of time within an eon. Part of the geological time scale.
Polar compound	A compound in which the electric charge is not symmetrically distributed, so that there is a separation of charge or partial charge and formation of definite positive and negative poles
Prebiotic soup	Term used to describe the spontaneous appearance of biomonomers found in hydrothermal vents and during the Miller-Urey experiment. Biomonomers include amino acids, a variety of carbon compounds and some lipids.
Prokaryote	A microscopic single-celled organism that has neither a distinct nucleus with a membrane nor other specialized organelles. Prokaryotes include the bacteria.
Proteins first hypothesis	Theory that proteins were the first biopolymer because it was the only known enzymatic catalysts at the time. A specific protien that was able to duplicate other proteins which is a requirement to be the starting point for the central dogma that every living organism needs to survive.
Proterozoic eon	2,500Ma-500Ma: single celled eukaryotes

Key word	Definition
Protobionts	A protocell is a spherical collection of lipids proposed as a stepping-stone to the origin of life
Protocells	Start to a discovery of how life began through compartments. Man made cell type complexes consisting of vesticles with proteins in the membrane embedded by scientists to allowed the vesticle to exchange substances with the external environment so the substrante and the product can be generated for long periods of time. Protocells have been host to biosynthesis of DNA and RNA. RNA has also been translated into protien in artificial protocells. Although to be a true cell the protocell must be able to 1.self-maintain through metabolism and internal biochemical reactions, 2.self reproduce, 3.be able to change or evolve. Experiments have only shown two of the criteria to be met therefore the mystery of life is still unsolved through the exploration of compartments.
Reducing atmosphere	For the origin of life, it means there were reduced gasses, such as ammonia (NH3) and methane (CH4), in the atomsphere. So carbon, for example, existed in its most reduced form (CH4) not in an oxidized form (CO) or a fully oxidized form (CO2).
Reverse transcriptase	An enzyme used to generate complementary DNA (cDNA) from an RNA template, a process termed reverse transcription.
Ribozymes	An RNA molecule capable of catalyzing specific biochemical reactions, similar to the action of protein enzymes.
RNA world	Theory that looks at the mechanisms of RNA being the original biopolymer. RNA Autocatalytic abilities. Folded RNA strand is capable of duplicating linear RNA strands. Stitching amino acids together using pieces of RNA that had bound to the amino acids, first translation system. Role in central dogma reduces to making the better protein based catalyst by stiching monomers together using mRNA, tRNA and rRNA. To conserve the RNA sequence that was coding for a protein lead to DNA, a more stable neucliotide sequence.
Specific heat	The specific heat is the amount of heat per unit mass required to raise the temperature by one degree Celsius.
Spontaneous origins	The hypothetical process by which living organisms develop from nonliving matter.
Stabilizing phase of the earth	Phase in the Hadeon eon after large metiorites where stabilized into the gravitational pull of the sun resulted in less intense impacts by meteorites which would not liquify the planet therefore allowing the earth to cool and form a crust.
Surface tension	Tension on the surface of water due to the polarity of water molecules. The molecules tend to have a stronger pull down to other molecules when they are on the suface as opposed to under the surface. This pull creates tension between the molcules.
Surfactant	Compounds that lower the surface tension (or interfacial tension) between two liquids or between a liquid and a solid.
Vesticles	An amount of water encapsulated by a lipid bilayer of lipids with polar heads and non polar tails.
Volcanic outgassing	The release of gases either trapped in liquid rock (magma) or generated by the contact of the heated rock with underground water.
Eons	Largest division of the earth by the geological time scale. There are four eons hadeon, archeon, proterozoic and phanerozoic.

Key word	Definition
Phanerozoic eon	550Ma-present: multicellular life The shortest eon. Landmasses have broken apart and drifted, during this movement things have been transferred, mixed, modifed and isolated. Organisms and inorganic material have thus been found on land masses that are very far from one another. The eras in the Phanerozoic Eon: 1. Camrian explosion 550MA - Difersification of animal life in the oceans which fed on protists that populated the ancient seas. 2. Paleozoic 550-250mMA - Oceans populated by animals and first attempts by plants and animals to rise up from the oceans and move on land. Global catastrophe kills 90% of marine diversity. 3. Mesozoic 245-65MA - Organisms move on land and plants and animals increase in numbers and variety, global diversity recovers. End of Mesozoic another global catastrophe leads to the dissapearance of dinosaurs, marking the end of the age of reptiles and a lack of living diversity 4. Cenozoic 65MA-present - “Age of mammals” difersitfication of mammals. Appearance of birds. Insects and plants continue their co-evolutionary war. Link between floweing plants and polinators changes the appearace of the plant. Chordate fist appears and has a strong impact on marine environment.