

Evolution:

→ Successive, gradual and inheritable change
 → organism $\xrightarrow[\text{Adaptation}]{\text{Interaction}}$ living in constantly changing environs

Mutations Recombinations
 Populations → evolve.

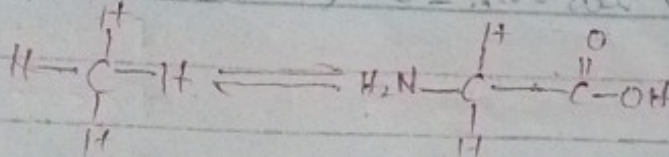
I: Life → Origin: → Oceans (Hydrothermal vent)

- ↳ Abiogenesis → from non living
- ↳ Cosmozoan → from different planet
- ↳ Special creation
- ↳ Biochemical evolution.

« first life was heterotrophic
 ↓
 autotrophic

Earlier environment → reducing.

↳ CH₄, CO₂, SO₂, NO₂, ... Water Vapour.

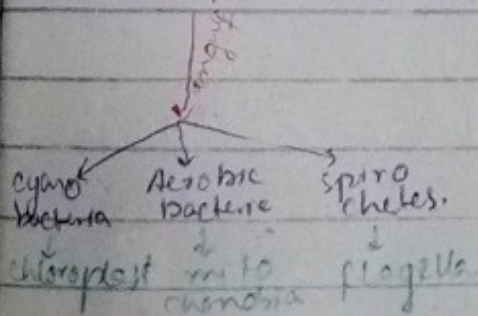


II: Simple → Complex.

Prokaryote → Eukaryote
 3.5 billion years ago 1.5 billion years.

Endosymbiont

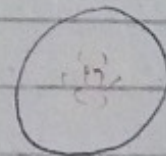
→ large heterotrophic, anaerobic & non motile



Evidences:

- circular DNA
- 70S ribosome
- Binary fission

Membrane invagination



evidences:

- mesosome
- endomembranal system
- inner membrane → prokaryote
- Outer membrane → Eukaryote

abs.

@isamiqamar

Mechanism

Lamarckism:

i: Use and Disuse of Organs:

Use: stronger & develop. (giraffe's neck)

Disuse: Weaker & Deteriorate (snake's limbs)

ii: Acquired character Inheritance:

→ Adaptations → inheritable.

A. Wiseman

Darwinism:

→ HMS Beagle

5 years voyage

World tour

→ Biography

Galapagos Islands.

→ 13 finches
↳ beaks.

→ Giant tortoises.

Over Production:

Resources → limited

Population → Unlimited

Competitions:

struggle for existence

(Intra), (Inter), (Extra)

Variations:

characters.

Useful

Beneficial

→ +ve.

Useless

Harmful

-ve

Survival of fittest:

H. Spencer

↳ Useful character → competition win

Natural Selection:

↳ fittest → survive

Speciation:

↳ survive → reproductive potential ↑

Neo Darwinism:

modern explanation

New discipline

Population economics:

Resources $2+2+2+2=8$

Population $2 \times 2 \times 2 \times 2 = 16$

Population genetics:

↳ variations.

Paleontology:

↳ fossil

Cell biology & biochemistry

Evidences:

Biogeography:

- Distribution of organisms → different environment
- Kangaroo → Australia
- Kiwi → New Zealand
- Penguins → Arctic
- Armadillo → America

Fossils:

- ↳ Remain extinct.
- Sedimentary rocks.
 - ↳ carbon dating
 - ↳ Chronological order → time wise order
 - ↳ visual records.
- Fishes → ^{Dipnoi} amphibians
- Reptiles → ^{various} mammals, ^{archaeopteryx} birds

Comparative Anatomy:

Homology

Same

Structure

Different

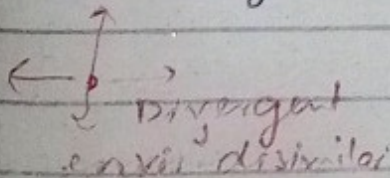
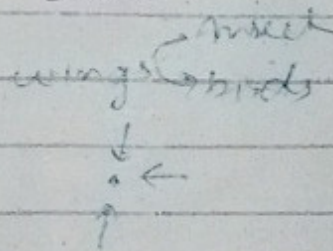
Function

Analogy

Different

Same.

- ↳ pentadactyl symmetry.
- ↳ man → grasping
- ↳ cat → paw
- ↳ whale → swim
- ↳ Bat → fly



@isamiqamar

Vestigial Organ:

Functionally absent organ.

- man → appendix (90 structures)
- ↳ ear muscles
- ↳ nictitating membrane
- ↳ tail bone

whole
↳ hind limbs.
Pythons