RNA's Role in early life

- Most organisms today store their genetic code in form of DNA
- DNA replication needs enzymes
- Enzymes were not present in the prebiotic world → DNA not the means of inheritance

- In some conditions: single-strand RNA can replicate without enzymes

→ probable former means of inheritance

- RNA can act as enzyme = ribozyme

Protobionts

- When clay dries out and is heated → up to 200 amino acids can spontaneously join together as polypeptide chains
- These chains can form proteinoid microspheres
- In combination with other forming polymers → chemistry can be maintained which is different from the surroundings
- Coacervate (microscopic sphere) can form from lipids in water (selectively permeable) → form spontaneously due to hydrophobic forces between water and lipid molecules
- Protobionts = significant step to the formation of cells

Where did all the oxygen come from?

- 4 billion years ago there was no oxygen in the atmosphere → early life forms were anaerobic cells

The endosymbiotic theory

- First eukaryotic cells were formed when larger prokaryotic cells ingested, but did not digest, smaller prokaryotic cells.
- Supported by the fact that cells have organelles
- Supported by the fact that mitochondria and chloroplasts have characteristics which make them seem like independent prokaryotes (ex: double membrane, own naked DNA)

D.2. Species and speciation

Allele frequency and gene pools

- Gene pool = all the genetic information present in the reproducing members of a population at a given time
- Allele frequency = measure of the proportion of a specific variation of a gee in a population

Evolution and alleles

- Gene pools are relatively stable over time, but are affected by natural selection an mutations
- Allele frequency is also affected by migration
- → any changes of the gene pool and allele frequencies are a kind of evolution