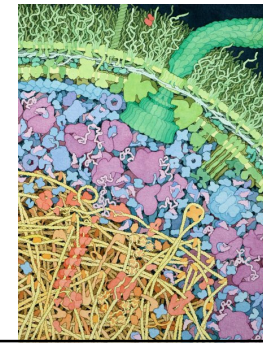
- What is life?
- What is necessary for life to begin?
- What happens then?

- Why did Dr Parker say that all life was the same?
- Some biochemistry

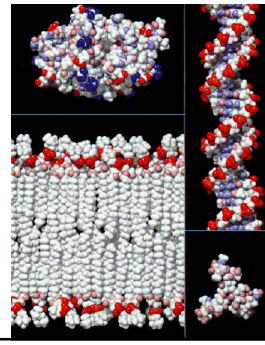
What's in a cell?

- Membrane
- Genetic material
- Machinery



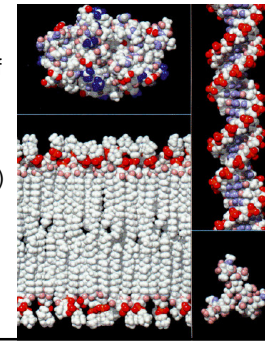
Life's important molecules

- Proteins: enzymes (machines), actin filaments (skeleton, transport)
- DNA (information/blueprint to build proteins)
- Lipids (build membranes)



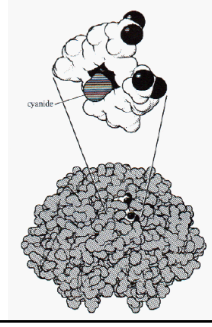
Life's important molecules

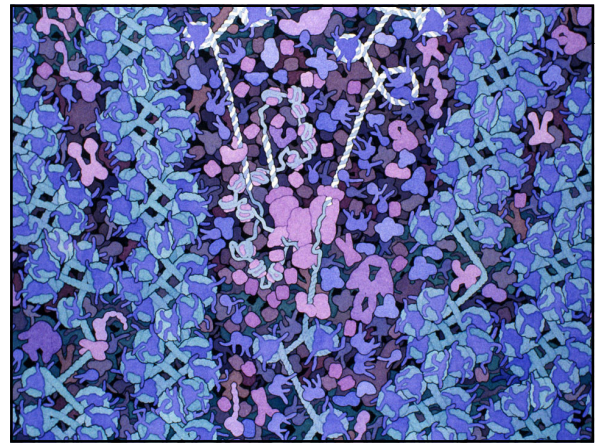
- Proteins, DNA, Lipids are mostly made up of Hydrogen (H, white), Carbon (C, pink), Oxygen (O, red), Nitrogen (N, light blue)



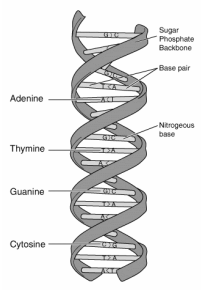
How enzymes work

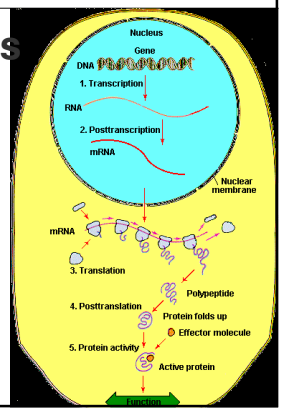
- Enzymes are proteins
- Proteins are long chains of amino acids
- Crumpled up and shaped in a particular way
- Often with a particular 'reactive center' or 'binding site'





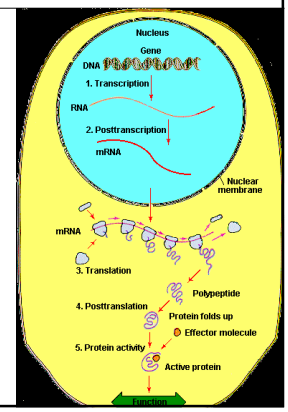
How DNA works





RNA

- Looks almost like DNA
- Can form machines (like proteins)
- Can encode information (like DNA)
- Is necessary in many places (mRNA, tRNA, ribosome)



Origin of life

RNA-world?

- Chemicals → RNA → cells → proteins → DNA?

- DNA vs proteins first: chicken and egg
- What made the first RNA?
- How do scientists study this?