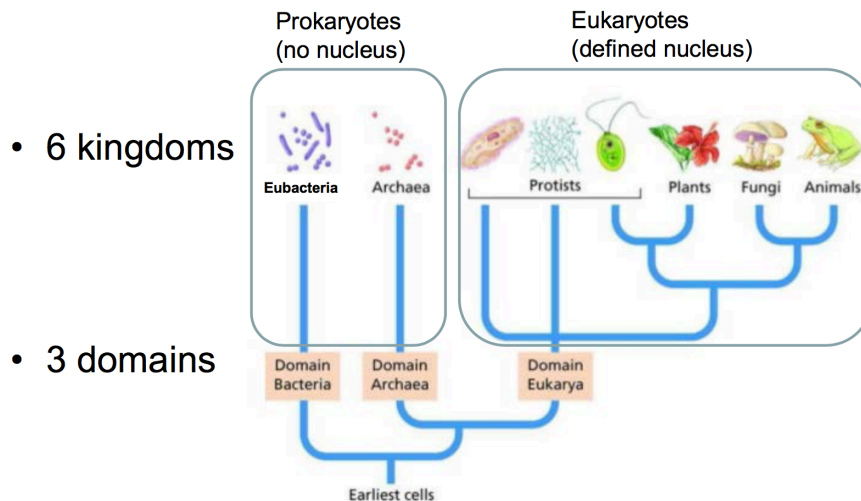


BIOL1997

MODULE 1: INFORMATION TRANSFER

PROPERTIES OF LIVING ORGANISMS

- Can reproduce
- Complex and organised
- Energy for growth and reproduction
- Tend towards homeostasis
- Change over time
- Adapt to environment
- Respond to Stimuli



MOLECULES OF LIFE

- Essential elements - C, H, N, O, P, S
 - Make up nucleic acids, proteins, fats/lipids, sugars/carbs
- Biopolymers
 - Carbon backbone
 - Carbon:
 - Stable and inert to hydrolysis and oxidation
 - Able to be bond with other elements
 - Kinetic control (time) rather than thermodynamic control
 - Favourable; targets for enzymatic control; change speed of reaction
 - Linear biopolymers
 - Defined beginning and end
 - Synthesised in one direction only
 - Molecule lost in dehydration reaction
 - Anabolic energy using reaction

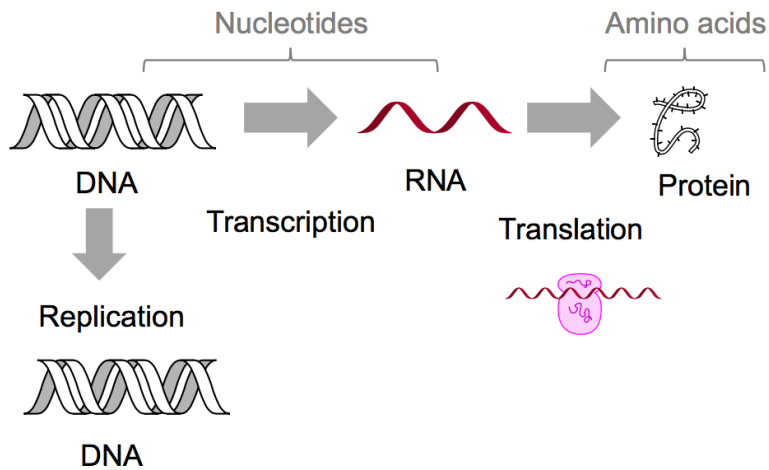
GENOME

Each cell uses subset of expressed genes.

- Bacterial genome
 - Circular chromosomes
- Eukaryotic

- Bigger, linear chromosomes
- Condensed into chromatin
- Packaged tightly by wrapping around histone proteins
- Humans
 - 6 billion base pairs
 - Encodes 20,000 proteins
 - Other species can have larger or smaller genomes
 - *Pans Japonica*
 - *E. Coli*

The "Central Dogma of Molecules"



- Genome (DNA)
- Transcriptome (RNA)
 - Makes microRNA, rRNA, mRNA, tRNA, small nuclear RNA
- Proteome (Protein)
 - Protein uses such as ion channels, receptors, antibodies, transcription factors

