

# Lecture 9:

## Protein Architecture V: Evolution, Function & Classification

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### Definitions

**Biochemical evolution:** study of how proteins (and other molecules) and biochemical pathways have changed through time.

**Homologous proteins:** those derived from a common ancestor; share a significant degree of sequence similarity

- i). **paralogs** - homologs present within a species;
- ii). **orthologs:** -homologs that are present in different species

**Divergent evolution:** Proteins derived from common ancestors



## Insertion of gaps helps alignments



36 matches

## Conservative substitutions

Replacing one amino acid by another similar in size & charge

e.g., asp -> glu can you name other conservative changes?



Rule of thumb: (assuming a 100 residue protein)

>25% identity: homologous sequence

<15% identity: probably not homologous