

Laboratory Manual
for
Elements of *In silico* Biology

TOPIC DETAILS:

1. Biological Databases and Literature Search.
 - Types of Databases
 - Function of Databases
 - Literature Survey
2. Genome Annotation, Sequence Analysis and Gene finding.
 - Complete Genome Availability
 - Genome Annotation and Comparison with syntenic relation.
 - Sequence comparison Pair wise Alignment.
 - Gene Prediction
3. Multiple Sequence Alignment and Phylogeny of genes and their proteins.
 - Sequence comparison with multiple genes from different genomes.
 - Alignment Phylogenetic Tree preparation using different methods.
 - Signature Motif and domain identification
4. Gene Expression analysis based on Regulatory Elements and Signature of data.
 - Retrieval of upstream region of identified genes and *Cis*-acting elements and Gene expression analysis using Massively Parallel Signature Sequence.
5. Protein functional elucidation based on motif/Domain Analysis.
 - Trans-acting factor analysis of hypothetical protein and functional studies based on domain and motif study.
6. Molecular Modeling, Simulations and Docking.
 - Homology modeling and Structure refinement.
 - Ligand Designing and Docking.
7. System biology approaches for pathway modeling.
 - Metabolic flux analysis based on reaction of biological pathway.