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| Dynamic Programming |  | Week 3 - Thursday  **Activity A (concepts)**  **Activity B (web tools)** |
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| Overview Become familiar with methods for determining an optimal global or local alignment between two sequences. Learning Objectives  * Dynamic Programming (DP); * Local and Global Alignments * Web implementations of DP based alignments  Activity & Description (A) Determine the best possible alignment between each residue in one sequence and all possible alternative residues in a second sequence.  Students will introduced to the approach and will then use paper and pencil to practice making optimal global alignments using the Needleman-Wunsch algorithm and local alignments using variations on this algorithm. Work will be done on handouts with pre-printed sequence matrices. Scores will be a simple +1, -1 and -4. The second exercise will require students to use the traceback process to generate an alignment from a set of existing DP matrices. Activity & Description (B)Use Portal based Lalign to compare the effects of different gap costs and scoring matrices in the generating a local alignment. Student groups will be provided with pairs of aa sequences to use in this exercise. Each group will hypothesize what changes in parameters will allow a local alignment tool to conduct a global alignment. The hypothesis will be tested using portal Lalign. In a follow-up exercise groups will compare two different scoring matrices (PAM 10 and PAM 250) and speculate which would be best for detecting a relationship between evolutionarily distant sequences. Their ideas will be tested on a series of sequences (provided) that are highly or more distantly related. Feedback & Discussion A – Individual students will volunteer to have their work projected via ELMO and to describe the process they used to generate a scoring matrix or an alignment.  B –Student data will be collected in a white board meta-tables and the class will discuss the effects of changing the gap & scoring table on the. | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Logistics  |  |  |  | | --- | --- | --- | |  | A | B | | Group Size | 1 | 3 | | Group Formulation | -- | Any | | Group Structure | -- | Jigsaw | | Seating/Computers | P&P | 3 | | Challenge/Room | 1 | single | | Presentation | Proj. | Proj. |  Student Assessment  |  | | --- | |  |  Workshop Assessment  |  | | --- | |  | |   Links: |