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| Advanced BLAST Searches |  | Week 4 - Thursday  **Activity A (DeCypher server)**  **Activity B (synthetic)** |
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| Overview Recognize that the added sensitivity provided by Position specific scoring matrices over standard substitution matrices and iterative searching protocols can lead to enhanced identification of sequences that are distantly related to a query. Learning Objectives  * What is a multiple sequence alignment? * Position specific scoring matrix (PSSM) * LOGO representation * Iterative BLAST  Activity & Description (A) Students will use the Decypher server to conduct a BLAST and then an Iterated BLAST search using queries that are provided.  Student groups will compare the sensitivity of the two types of searches. Evaluate what happens in an iterated analysis if the multiple sequence alignment becomes “contaminated”. Track the change in E value for the relationship between a query and a hit identified after several iterations but well before convergence. Discuss which E value is the most useful representation of the relationship? Activity & Description (B) Students will brainstorm and try strategies for validating a low scoring hit from PSI-BLAST analysis.  Using a low scoring sequence hit from PSI-BLAST analysis, test various computational methods for further evaluating the relationship of that sequence hit to the query. Conduct the tests and evaluate the utility of each type of follow-up analysis. Feedback & Discussion  1. Project completed analysis from volunteering groups. Discuss the components of an iterated search that make it more powerful. Discuss red flags. Have students create a flow chart for effective use of iterated-BLAST analysis. 2. Discuss results of validation strategies and then modify the flow chart from A to incorporate validation tests from B that were useful in confirming the relationship between a query and a weak hit. | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Logistics  |  |  |  | | --- | --- | --- | |  | A | B | | Group Size | 2 | 2 | | Group Formulation | Any | Any | | Group Structure | -- | -- | | Seating/Computers | 2 | 2 | | Challenge/Room | 5 | 5 | | Presentation | Proj. | Proj. |  Student Assessment  |  | | --- | |  |  Workshop Assessment  |  | | --- | |  | |   Links: |