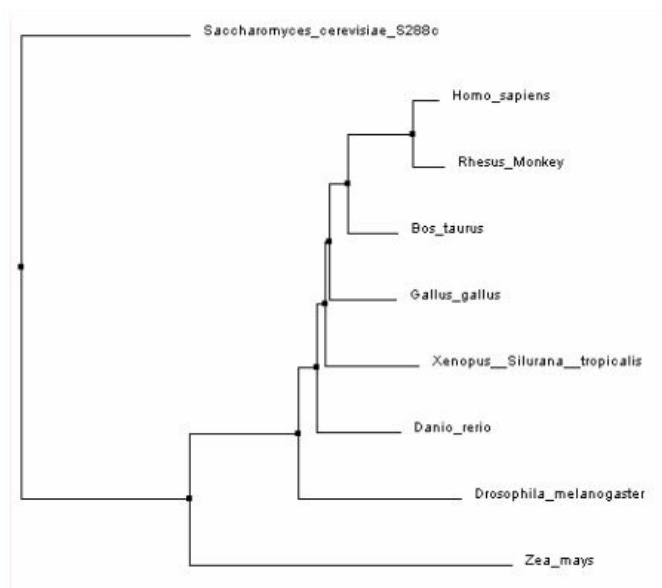


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Bioinformatics - Investigating Sequence Similarity (Version 4.0)

By Adam Kleinschmit, Benita Brink, Steven Roof, Carlos Christopher Goller, and Sabrina Robertson



Module Description:

The following modules are from a pre-print version of the "Sequence Similarity: An inquiry based and "under the hood" approach for incorporating molecular sequence alignment in introductory undergraduate biology courses" learning resource accepted for publication in [CourseSource](#), which is currently in press.

This laboratory module, leads introductory biology students in the exploration of a basic set of bioinformatics concepts and tools. The exercise utilizes simple paper models to help students understand matrices and algorithms prior to use of web-based computational tools. Students start the module by defining sequence similarity and then investigating how

similarity can be quantitatively compared between two similar length proteins using a BLOSUM scoring matrix. Students then consider finding local regions of similarity between a sequence query and subjects within a large database using BLAST. Lastly, students practice accessing FASTA formatted sequence information via NCBI databases as they collect sequences for a multiple sequence alignment in order to generate a phylogenetic tree.

Teaching Setting:

This laboratory module was designed for introductory biology students.

QUBES Citation:

Kleinschmit, A.J., Brink, B., Roof, S., Goller, C.C., Robertson, S. (2018). [Bioinformatics - Investigating Sequence Similarity. NIBLSE Incubator: Bioinformatics - Investigating Sequence Similarity](#), (Version 4.0). QUBES Educational Resources. [doi:10.25334/Q4VM1P](https://doi.org/10.25334/Q4VM1P)

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Related Materials and Opportunities:

This resource was created by members of the [Network for Integrating Bioinformatics into Life Sciences Education \(NIBLSE; pronounced "nibbles"\)](#). NIBLSE is a National Science Foundation (NSF) Research Coordination Network for Undergraduate Biology Education (RCN-UBE) with the long-term goal establishing bioinformatics as an essential component of undergraduate life sciences education.

This resource will be used in the upcoming [Spring 2019 NIBLSE Faculty Mentoring Network \(FMN\)](#), where FMN participants will be mentored and supported through learning, customizing and implementing high quality teaching resources and strategies. [More information about the modules can be found here](#). If you are interested in adopting inquiry-based bioinformatics education modules that provide introductory biology students with some core bioinformatics concepts and competencies, then you are encouraged to apply to the Spring 2019 NIBLSE FMN by December 10, 2018. Please visit <https://qubeshub.org/groups/niblse2019> for additional information and instructions on how to apply.

[Browse more NIBLSE resources here.](#)

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If you adopt and adapt this module, you are highly encouraged to share your adaptation back with the QUBES community using the QUBES Resources System for sharing Open Education Resources.

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QUBES is a community of math and biology educators who share resources and methods for preparing students to use quantitative approaches to tackle real, complex, biological problems.

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