

BB497 Basic Nucleic Acid and Protein Sequence Analysis

1 credit course, Thursdays at 4pm, ALS 4000

Learner Outcomes

As a result of taking this course the students will:

- Be able to use web-based software to study genes from DNA to RNA to Proteins.
- Choose appropriate methods and research questions for investigations into protein sequence, structure and function.
- Appropriately use web-based software tools to answer specific biological questions.
- Be able to choose appropriate databases, and navigate through databases to retrieve desired sequences/data
- Be able to write about the application of sequence analysis to study biological sequences.

Pre-requisites and Co-requisites:

Co-requisite: BB493

Professor:

David Hendrix

Teaching Assistant:

None.

Text:

Web-based usage manuals for appropriate software and databases

Independent literature searches and resulting publications on proteins/genes of interest

Supplementary material handed to students

Grading:

10% - term paper outline

90% - term paper

Your grade in this course will be determined based your term paper outline and on the term paper itself. It is important that your papers discuss **sequence analysis** of some kind. The paper will be graded on thoroughness, accuracy, and overall quality. Term papers should use proper spelling, grammar, and references cited.

Students will select a gene, gene family, protein, or noncoding RNA from the human genome or other genome and write about sequence, structure, function and/or evolution. For example, a protein that has an important function, or disease associated allelic variant may be of interest. Proteins with important functional domains, or part of a family of proteins could be investigated.

Possible topics that could be discussed in the term paper:

Evolutionary conservation, or lack of conservation

Functional protein domains

Protein secondary or tertiary structure

Disease-associated variants or SNPs and how they affect the translated protein's function

Papers should be at least 5 pages, 12-point font. One-inch margins and double spacing should be used.

Papers will be due by the end of Finals week.

Schedule:

Week 1: Sequence databases, Databases for disease-associated alleles,

Week 2: Genes, SNPs, Annotations and Genome Browsers

Week 3: Transcription, Splicing, Splice variants

Week 4: Open Reading Frame (ORF) Detection

Week 5: Outlines Due, Peer Review

Week 6: BLAST

Week 7: Multiple Sequence Alignment, Phylogeny

Week 8: Domains, Motifs

Week 9: Protein secondary structure prediction

Week 10: Dead Week, Review

Learner Expectations:

1. Attend lectures (exams will be based on subjects covered in lecture)
2. Attend office hours if there is difficulty in understanding concepts or problems.
3. Talking, eating, chewing gum noisily, using cell phones and other distracting activities are inconsiderate to fellow students and the lecturer; be considerate.

Statement Regarding Students with Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098 (tracy.bentley@oregonstate.edu).

Statement of Expectations for Student conduct: The Student Conduct & Community Standards office has generated a set of standards & expectations for student behavior. This information is at <http://oregonstate.edu/admin/stucon/index.htm>

Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations. Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as an intentional act of deception in one of the following areas:

cheating – use or attempted use of unauthorized materials, information or study aids

fabrication – falsification or invention of any information

assisting – helping another commit an act of academic dishonesty

tampering – altering or interfering with evaluation instruments and documents

plagiarism – representing the words or ideas of another person as one's own

Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action.

“The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.”