Gene Annotation

An annotation is any feature that can be tied to genomic sequence, such as an exon, transcript, promoter, or transposable element. As biological knowledge increases, annotations of different types need to be added and modified, and links to other sources of information need to be incorporated, to allow biologists to easily access all of the available sequence analysis data and design appropriate experiments. The Apollo genome browser and editor offers biologists these capabilities. Apollo can display many different types of computational evidence, such as alignments and similarities based on BLAST searches (UNITS& ), and enables biologists to utilize computational evidence to create and edit gene models and other genomic features, e.g., using experimental evidence to refine exon‐intron structures predicted by gene prediction algorithms. This protocol describes simple ways to browse genome annotation data, as well as techniques for editing annotations and loading data from different sources.

Youtube tutorial <https://www.youtube.com/watch?v=oBIAInmgye0>

**Plant annotation:** <http://www.plantgdb.org/tutorial/annotatemodule/>

Also: <http://www.plantgdb.org/tutorial/annotatemodule/index.html>

## Student Activities

### [1. Introduction to Genome Projects](http://www.plantgdb.org/tutorial/annotatemodule/Annotation%20Activities/activity_one.htm)

### [2. Exploring an Organism Community Database](http://www.plantgdb.org/tutorial/annotatemodule/Annotation%20Activities/activity_two.htm)

### [3. Introduction to Spliced Allignment Annotation](http://www.plantgdb.org/tutorial/annotatemodule/Annotation%20Activities/activity_three.htm)

### [4. A Closer Look at the Annotation Process](http://www.plantgdb.org/tutorial/annotatemodule/Annotation%20Activities/activity_four.htm)

### [5. Practice Annotation](http://www.plantgdb.org/tutorial/annotatemodule/Annotation%20Activities/activity_five.htm)

### [6. Join the Annotation Community](http://www.plantgdb.org/tutorial/annotatemodule/activity71.html)

**For Teachers: Introduction & Learning Goals**

The student activities on this site are designed to introduce the process of gene annotation. Gene annotation is an excellent opportunity for students to apply their knowledge of molecular biology and contribute to the scientific community. Knowing how to annotate genes will also teach students about different models used to represent genes and can lead to a deeper understanding of bioinformatics and its role in genomics.

The following is a list of vocabulary and concepts that students will be exposed to during these activities.

|  |  |  |
| --- | --- | --- |
| *Ab initio* Gene Annotation | Acceptor Site  | Plant Genome Database  |
| Alternative Splicing  | Donor Site  | Genomic DNA  |
| Complementary DNA (cDNA)  | Expressed Sequence Tag (EST | Splice Alignment Gene Annotation  |
| Clone Pair | Reverse Transcriptase | GeneSeqer |
| Untranslated Region (UTR)  | mRNA Processing | Open Reading Frame  |
| Reading Frame  | mRNA transcript  | Splice Site  |
|   |  |  |

In order to develop a solid understanding of what is contained in the activities and where these activities might fit into the curriculum, it is recommended that teachers work through these activities on their own, before introducing them to their students.

Potential places in the curriculum to incorporate these activities include using gene annotation to follow a unit of study on Gene Regulation, Bioinformatics, or Biotechnology Applications. AP Biology teachers may find that these activities are appropriate for the end of the term, after students have completed the AP Biology Exam.

<http://www.bscs.org/> on-line curriculum to help teachers who are teaching out of their area of expertise (see elearning)

Video: <https://www.youtube.com/watch?v=_N3XrrB2u9k>

 18 minutes

Genomics Education Partnership: <http://www.gep.wustl.edu/>

 Has a curriculum, including for beginning students.

 Has it selected software programs for the partnership??

Barcode of Life: <http://www.barcodeoflife.org/>