

Train online at EMBL-EBI

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www.ebi.ac.uk/training

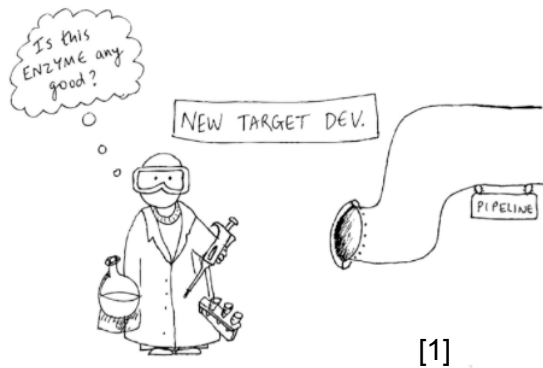
Train online (www.ebi.ac.uk/training/online)



- Launched in 2011
- 72 courses covering genomics through to chemical biology and literature
- Focus on EMBL-EBI resources
- CC by SA

Target audiences

Bench-based life scientists



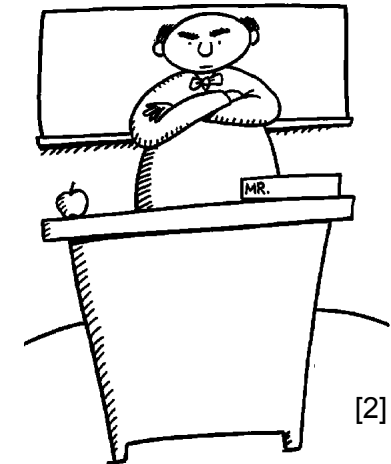
- What resource should I use to do....?
- How do I use it?

Bioinformaticians / developers



- What other resources are available?
- Recap on how to use resource x
- Programmatic access

Tutors



- What courses and resources can I direct my students to?
- Do you have exercises?

Credits:

[1] [Jenny Cham's blog](#)

[2] [Cliparts.co](#)

Types of courses / tutorials

Conceptual

What is metabolomics?

Metabolomics is the large-scale study of **small molecules**, commonly known as metabolites, within cells, biofluids, tissues or organisms. Collectively, these small molecules and their interactions within a biological system are known as the metabolome.

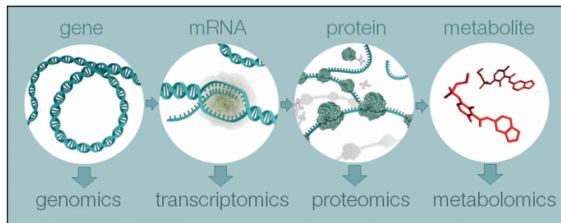


Figure 1 An overview of the four major "omics" fields, from genomics to **metabolomics**.

Quick tours

What is Ensembl?

Ensembl provides a genome browser that acts as a single point of access to annotated genomes, primarily for vertebrate species (Figure 1).

Information such as gene sequence, splice variants and further **annotation** can be retrieved at the genome, gene and protein level. This includes information on protein domains, genetic variation, **homology**, **syntenic** regions and regulatory elements. Coupled with analyses such as whole genome alignments and the effects of sequence variation on proteins, this powerful tool aims to describe a gene or genomic region in detail.

Ensembl imports genome sequences from consortia, which is consistent with many other bioinformatics projects. Each species in Ensembl has its own homepage, where you can find out who provided the genome sequence and which version of the genome assembly is represented. To see an example, visit the Ensembl home page for human.

"walkthroughs"

Exploring the UniProtKB results page

When you do a search within **UniProtKB**, you will see a page showing all your results (Figure 16).

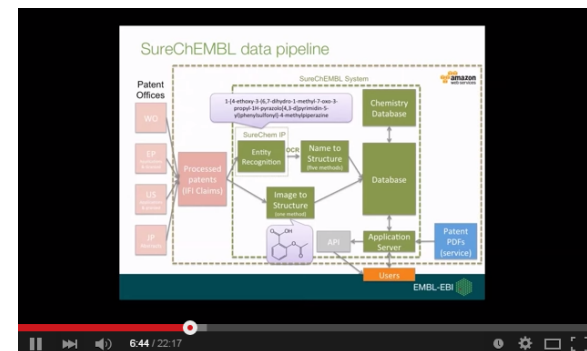
The screenshot shows the UniProtKB search results page for 'Insulin'. The page has a header with 'UniProtKB' and 'Insulin' search terms. Below the header is a table of results. The table has columns for 'Entry', 'Entry name', 'Protein name', 'Gene name', 'Organism', 'Length', and 'Annotation'. The first result is P05069 (INS_HUMAN) for Insulin-like growth factor 1 receptor. The table also includes a 'Filters' section on the left and 'Action buttons' at the top right.

Figure 16. The UniProtKB results page for insulin.

Videos



Webinars



Structure of courses / tutorials

Key features:

- No need to register
- Dip in and out
- Take entire course or just relevant sections
- Repeat courses multiple times

Course content

PDBe: Exploring a Protein Data Bank (PDB) entry
What information does a PDB entry contain?
How is the information structured?
<input type="checkbox"/> PDB entry overview
<input checked="" type="checkbox"/> 3D visualisation of a PDB entry
<input type="checkbox"/> Image gallery
Citation information
<input type="checkbox"/> Function and Biology
<input type="checkbox"/> Structure analysis
<input type="checkbox"/> Ligands and Environments
<input type="checkbox"/> Downloading data from a PDB entry page
Summary
Learn more
Get help and support on PDBe
Contributors

 [Print Course](#)

3D visualisation of a PDB entry

On the right hand side of a PDB entry page you will see the 'Quick links' menu, which provides links to each of the five sections and enables you to download the structure in several formats and view it in 3D (Figures 3 and 4).

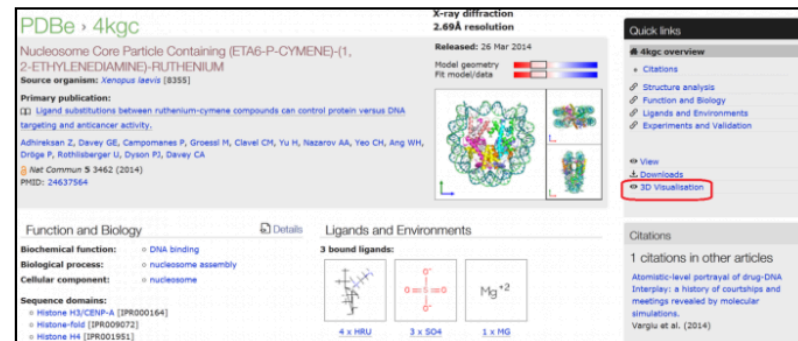


Figure 3 The 3D visualisation link (highlighted in red) helps you to interactively explore the contents of the PDB entry.

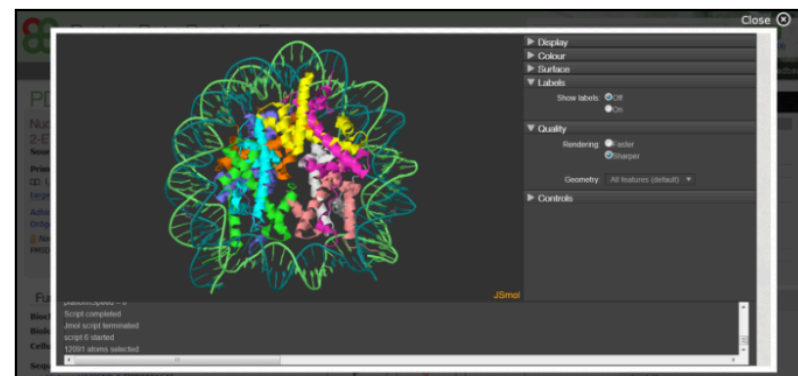


Figure 4 An interactive 3D view of the PDB entry 4kgc.

[PDB entry overview](#)

[Image gallery](#)

Content variety

Guided examples

Searching for the OSM gene

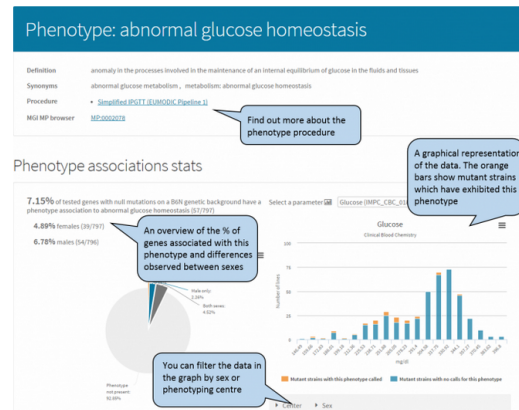


To search Ensembl, choose 'human' from the roll-down menu, and type 'OSM gene' into the search box.



1. Search for the human *OSM* gene as in the figure. (Alternatively use the search box at the top right of every Ensembl page).
2. Click 'Go'.
3. Click through to the gene tab. For a reminder of how to do this see the [How to search Ensembl](#) section.

Annotated screenshots



Exercises

Finding entries with 3D structures

Scenario

You were flipping through a past issue of Science and came across the following article:

The Protein Kinase Complement of the Human Genome

C. Manning^{1,2}, D. B. Whyte¹, R. Martinez¹, T. Hunter² and S. Sudarsanam^{1,3}

Author Affiliations

ABSTRACT

We have catalogued the protein kinase complement of the human genome (the "kinome") using public and proprietary genomic, complementary DNA, and expressed sequence tag (EST) sequences. This provides a starting point for comprehensive analysis of protein phosphorylation in normal and disease states, as well as a detailed view of the current state of human genome analysis through a focus on one large gene family. We identify 518 putative protein kinase genes, of which 71 have pseudogenes. Chromosomal mapping revealed several small clusters of kinase genes and revealed that 244 kinases map to disease loci or cancer amplicons.

Exercise

You want to find all human protein kinases in UniProt that have a 3D structure associated with them. How would you do this?

Short videos

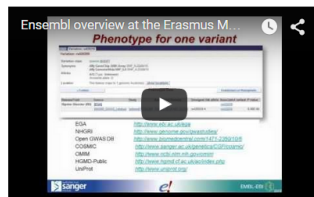
Exploring sources of biological data

A wealth of biological data can be viewed, downloaded and compared such as:

- genes
- conserved sequences across species
- sequence variation
- sequences implicated in [gene regulation](#)

Ensembl brings together information from multiple resources, using the genome as a base for this annotation.

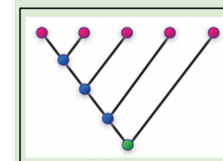
Tired of reading? Check out what we had to say about Ensembl at Erasmus MCI



Quizzes

Question 2 of 10

What are the types of nodes indicated with coloured spots in the tree below?

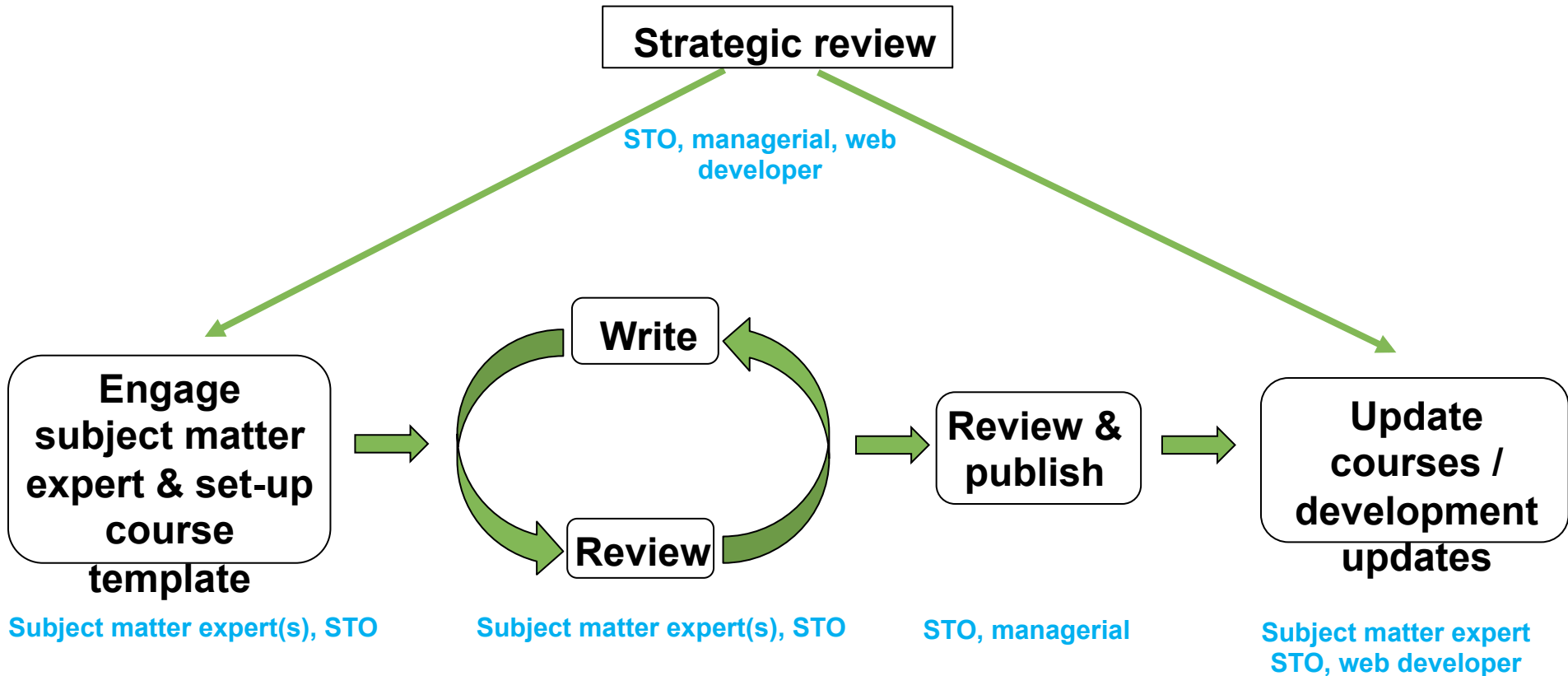


Choose one:

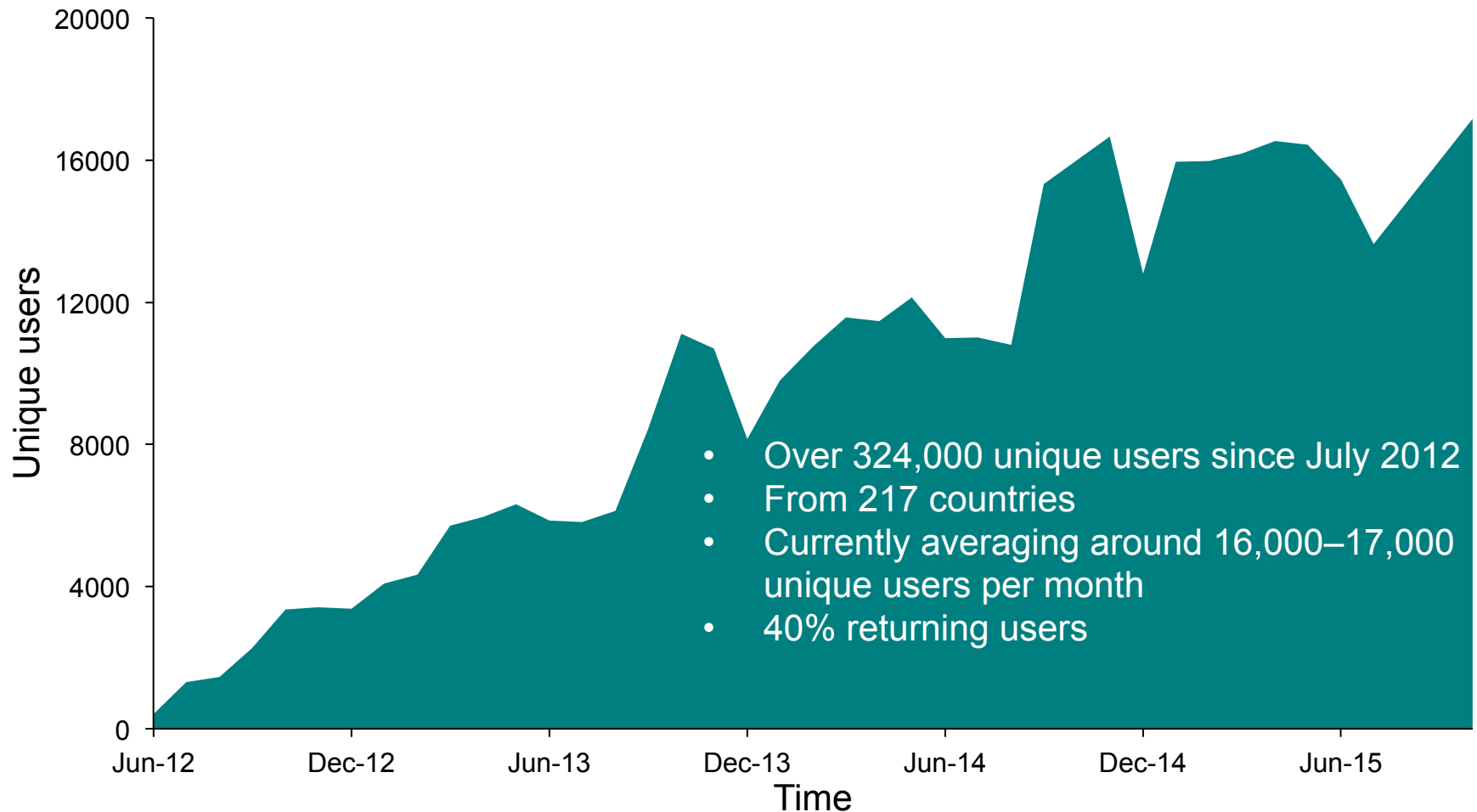
- ☒ Pink = root
Blue = internal nodes
Green = tips
- ☐ Pink = internal nodes
Blue = tips
Green = root
- ☐ Pink = tips
Blue = internal nodes
Green = root

Back NEXT

Developing the courses

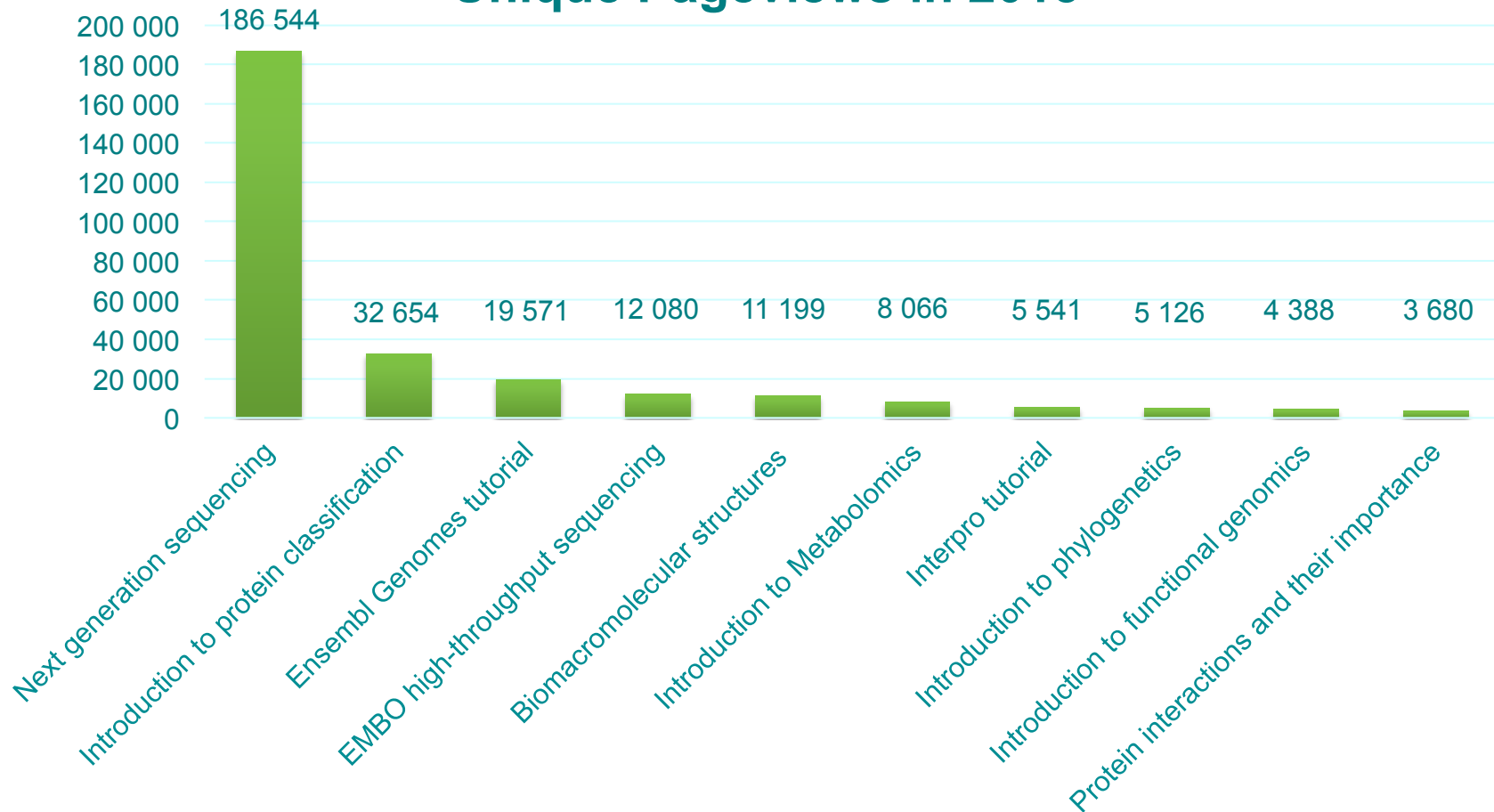


Analytics data



Most popular courses in 2015

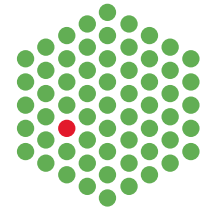
Unique Pageviews in 2015



Acknowledgements



EMBL



Innovative Medicines Initiative



wellcome**trust**