



# *Student Guide*

Concluding module

A large photograph of a white test tube rack filled with numerous test tubes. Each test tube contains a different colored liquid, including shades of orange, blue, red, green, yellow, and pink. The rack is set against a light background.

*Protein Next Top Model*



Developed by the Netherlands Bioinformatics Centre and the Netherlands Proteomics Centre

**Text**

Martje Ebberink and Hienke Sminia

**Illustrations**

.....

The Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported license applies to all Supplied material (<http://creativecommons.org/licenses/by-nc-sa/3.0/>).

**CC BY-NC-SA 2009 – Netherlands Proteomics Centre**

If you have questions or remarks, feel free to contact us.  
Netherlands Bioinformatics Centre ([nijmegen@dnalabs.nl](mailto:nijmegen@dnalabs.nl))  
Netherlands Proteomics Centre ([ebberink@npc.genomics.nl](mailto:ebberink@npc.genomics.nl))

## Assignment

Proteins are huge molecules. They are made up of amino acids. These are linked in chains of all kinds of lengths. After synthesizing, proteins fold in highly complex three-dimensional structures. The order of the amino acids is determined by the composition of base pairs of the genes in the DNA. This gene code is translated into RNA and this is used by cell components called ribosomes to synthesize a protein. Proteins play a major role in virtually all cellular processes. They are involved in all kinds of reactions and they can have structural functions.

Depending on their function they have all kinds of sizes and structures. Functions vary from transporting molecules, working as a hormone or receptor to eliminating germs.

At present, over 100.000 different proteins are known. All proteins of a single cell or organism together are called a proteome. In a proteome, many proteins are so-called 'housekeeper genes' that maintain the functioning of the cell. Some proteins however have remarkable characteristics. Which of these proteins has the most striking feature or the most important function? In other words, which protein is Protein Next Top Model?

This is how it works:

1. Form a group with four or five other students.
2. Choose one protein from the list below. Consult other groups since proteins can be chosen by only one group.
  - Insulin
  - Prion (Creutzfeld-Jacob)
  - Erythropoietin (EPO)
  - Collagen
  - Botulinem toxin (Botox)
  - Alcohol dehydrogenase (ADH)
  - Immunoglobulin
  - Myoglobin
  - Hemoglobin
3. Read the file that elaborates on your protein. Use the internet to obtain additional information. You can find some links in the protein file.
4. Prepare a short presentation with the group. Your goal is to convince your classmates that your protein is the best one and therefore deserves the title 'Protein Next Top Model'. The following should be included in the presentation:
  - The name of the protein
  - The structure of the protein (in 3D!)
  - The main function of the protein
  - Arguments that support your claim that this protein is the 'Protein Next Top Model'
5. All your findings will be presented in the next lesson. Determine who will be the speaker. Be creative, but make sure the presentation does not exceed the amount of two minutes.
6. As a group, use your ballot to assess the other presentations. Thus you will obtain an overview of all proteins and determine which protein will gain the title. Your teacher will count all points afterwards.
7. The winning protein is discussed in class.

**Ballot**

Name: \_\_\_\_\_

**Ballot Protein Next Top Model**

Group	Protein name	Main function	Grade	Argumentation
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Which protein you think should be 'Protein Next Top Model'?

.....