

# 3D-Models of Enzymes

**Talk to a Teacher**

<http://spoken-tutorial.org>

**National Mission on Education through ICT**

<http://sakshat.ac.in>

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# Learning Objectives



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- ▶ **Load structure of *Human Pancreatic Hexokinase* on Jmol panel**



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- ▶ **Modify the display of *secondary structure***



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- ▶ **Highlight amino acid residues at the active site**



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- ▶ **Highlight substrate and cofactors of the enzyme**



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- ▶ **View *Ramachandran* plot for protein**



# Pre-requisites



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- ▶ **Familiar with basic operations from Jmol Application window**



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- ▶ Knowledge of basic Biochemistry
- ▶ Familiar with basic operations from Jmol Application window
- ▶ **'Proteins and Macromolecules' in Jmol Application series**  
<http://spoken-tutorial.org>



# System Requirements

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Talk to a Teacher

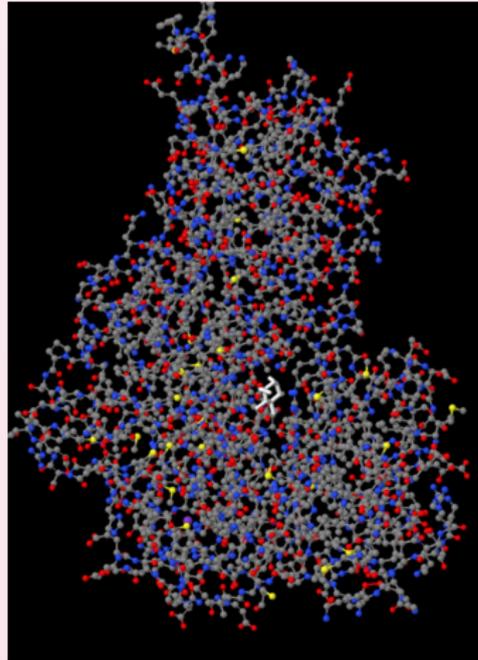
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- ▶ **Java(JRE) version 7**
- ▶ **Mozilla Firefox Browser 22.0**



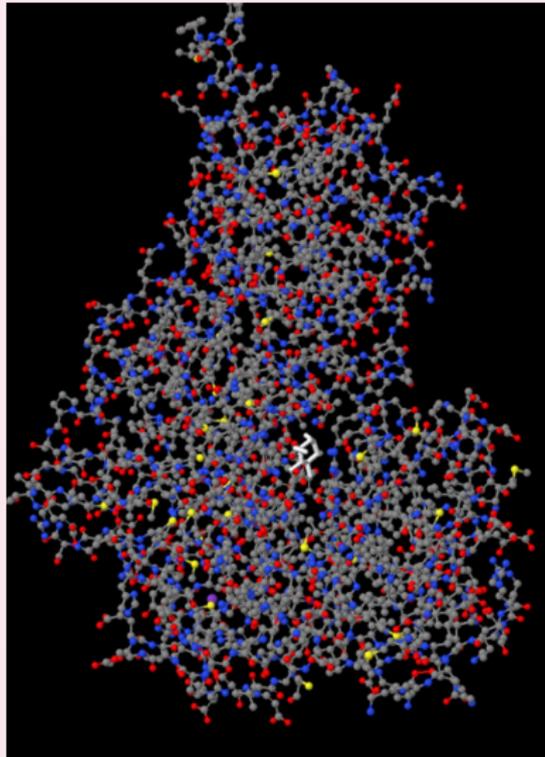
# Human Pancreatic Hexokinase

- \* Monomeric protein of 465 amino acids
- \* 2 Domains: Large domain and small domain.
- \* Active-site is located in the cleft between two domains.



# Human Pancreatic Hexokinase

- \* **Active-site has 3 amino acid residues, *Asparagine 204, Asparagine 231, Glutamic acid 256.***
- \* *Alpha-D-Glucose as substrate.*



# Summary

- ▶ **Load structure of Human Pancreatic Hexokinase using *PDB* code (*3IDH*)**
- ▶ **Modify the display of secondary structure**
- ▶ **Highlight amino acid residues at the active site**



# Summary

- ▶ **Highlight substrate and cofactors of the enzyme**
- ▶ **View Ramachandran plot for proteins**



# Assignment

- ▶ Load the .pdb file of enzyme Lysozyme on Jmol panel
- ▶ Highlight the substrate bound to the enzyme
- ▶ Highlight the amino acids at the active-site



# About the Spoken Tutorial Project

- ▶ Watch the video available at [http://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](http://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- ▶ It summarises the Spoken Tutorial project



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- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



# Spoken Tutorial Workshops

## The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)



# Acknowledgements

- ▶ Spoken Tutorial Project is a part of the Talk to a Teacher project
- ▶ It is supported by the National Mission on Education through ICT, MHRD, Government of India
- ▶ More information on this Mission is available at

<http://spoken-tutorial.org/NMEICT-Intro>

