

# Membrane Channels

**Spoken Tutorial Project**

<http://spoken-tutorial.org>

**National Mission on Education through ICT**

<http://sakshat.ac.in>

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# Learning Objectives



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- ▶ **Demonstrate Membrane Channels, PhET Simulation**



# System Requirement



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- ▶ **Ubuntu Linux OS v 14.04**



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- ▶ **Java v 1.7.0**



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- ▶ **Ubuntu Linux OS v 14.04**
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- ▶ **Firefox Web Browser v 53.02.2**



# Pre-requisites



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- ▶ **Learner should be familiar with topics in high school biology**



# Learning Goals



# Learning Goals

- ▶ To predict movement of particles through the membrane



# Learning Goals

- ▶ To predict movement of particles through the membrane
- ▶ Types of channels present on the membrane



# Learning Goals

- ▶ To predict movement of particles through the membrane
- ▶ Types of channels present on the membrane
- ▶ To predict the rate of diffusion based on the number and type of channels present



# About Membrane Channels



# About Membrane Channels

- ▶ **Membrane channels are proteins**



# About Membrane Channels

- ▶ **Membrane channels are proteins**
- ▶ **They allow passive transport of solute across a membrane**



# About Membrane Channels

- ▶ Membrane channels are proteins
- ▶ They allow passive transport of solute across a membrane
- ▶ The solute moves by simple diffusion through the membrane



# About Membrane Channels



# About Membrane Channels

- ▶ **Solute moves from the region of higher concentration to the region of lower concentration**



# About Membrane Channels

- ▶ Solute moves from the region of higher concentration to the region of lower concentration
- ▶ The diffusion continues until the two compartments have equal concentrations



# Types of Membrane Channels



# Types of Membrane Channels

- ▶ **Leakage channels:** always open
- ▶ **Gated channels:** open in response to some stimulus



# PhET Simulation-Link



# PhET Simulation-Link

<https://phet.colorado.edu>



# Summary



# Summary

- ▶ How to use Membrane Channels, PhET simulation



# Summary



# Summary

- ▶ **Predict movement of particles through the membrane**
- ▶ **Types of channels present on the membrane**
- ▶ **Predict the rate of diffusion based on the number and type of channels present**



# Assignment



# Assignment

- ▶ **Fill the upper and lower compartments with equal number of blue and green particles**



# Assignment

- ▶ Fill the upper and lower compartments with equal number of blue and green particles
- ▶ Add gated channels of both colors on the membrane



# Assignment



# Assignment

- ▶ **Note if the diffusion rate increases with increase in number of channels**



# Assignment

- ▶ **Note if the diffusion rate increases with increase in number of channels**
- ▶ **Give explanation**



# 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)



# Forum for specific questions

- ▶ Do you have questions in **THIS Spoken Tutorial?**
- ▶ Please visit  
<http://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ Someone from our team will answer them



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# Acknowledgements

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- ▶ 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>

