

Membrane Channels

Spoken Tutorial Project

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

Snehalatha Kaliappan

Meenal Ghoderao

IIT Bombay

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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**
- ▶ **Java v 1.7.0**
- ▶ **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
- ▶ It summarises the Spoken Tutorial project



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- ▶ 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



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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- ▶ More information on this Mission is available at

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

