

Molecular Survey



Consent Form Information

- ☐ I agree to participate in this study
- ☐ I have had this study and consent form explained to me
- ☐ I understand that I can withdraw ay any time
- ☐ I understand that all information will remain anonymous
- ☐ I understand that my survey responses will not affect my grade in any course
- ☐ I will not consult other resources while completing this survey
- ☐ I will not use browser forward/back buttons as this may cause errors in response data

Email:

UtorID:

Password:

Submit

Molecular Survey



Age Group:

Gender:

Education Level:

Other Questions:

Check all that applies:

- ☐ Opio pores consununc in Ita
- ☐ Leribes! Icae audem fateris ulvirtea cote hicae con
- ☐ Huciaciostrus eorisquit inatis, nos, o ma
- ☐ Pecrit. Ebatrob usuludet ora restre puli ponsulla ande
- ☐ Elisquo viter pro et quem res nonihilica ad die prissendet viritracior in Ita
- ☐ At efaudetrum aut publi, non se rentermius rem vere ocridel
- ☐ Tum oc, silicup imilium num pritrordi ponone cultus, movirma ndionfectur que co

This part of the page will be the same as the TEXT BASED molecular survey

Submit

Molecular Survey



**Q. Olus, notiquit. Mertium ego nique
culum ina, nos erem tam?**

☐ True

☐ False

Submit

This section will be the same text
based science literacy questionnaire.

Molecular Survey



**Q. Olus, notiquit. Mertium ego nique
culum ina, nos erem tam?**

- ☐ Egertam forum hachum a
- ☐ Ci sa ex se potero cludam tum dem hortu
- ☐ Aperemus, cotemo hab

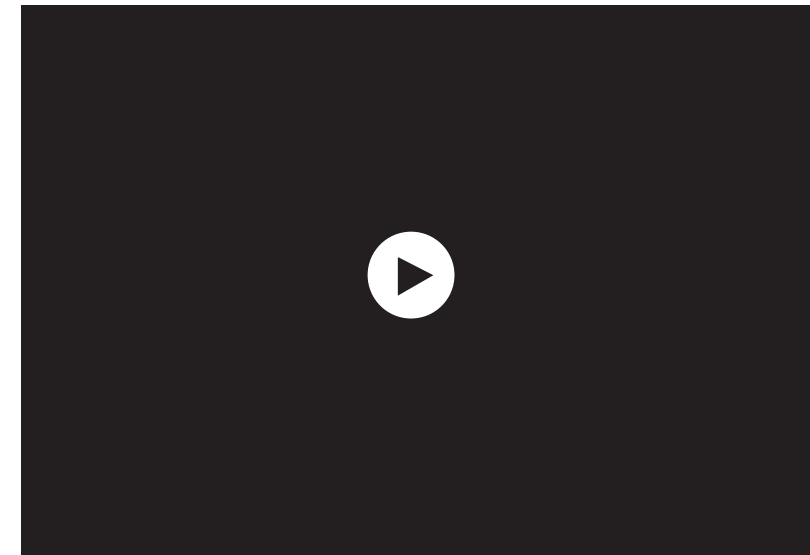
This section will
be the same text
based bioliteracy
questionnaire.

Submit

Molecular Survey



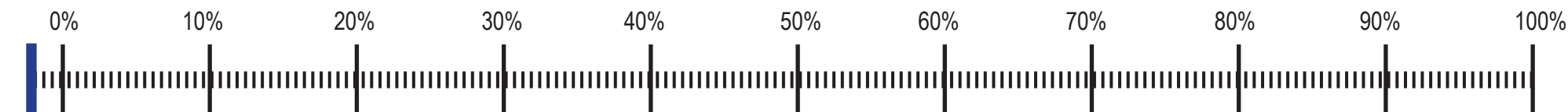
Q. An Extracellular molecule tries to move towards a complementary receptor.



☐ True

☐ False

Confidence Gauge



Submit

With each new question, a blank animation box will be shown until the student picks a choice. They must watch the animation at least once before moving on to the next question. The animation will be set such that it can be replayed OR looped after the initial viewing.

Ideally, the animation for all answer choices should be viewed before the student can submit their choice.

In this section, a confidence gauge will record how confident the student is with their answer choice. The initial bar will be hovering off the gauge, so that there is no bias when the student moves it reflect their own opinion.

If possible, I would like to also record number of clicks students place on their option prior to submission.

Molecular Survey



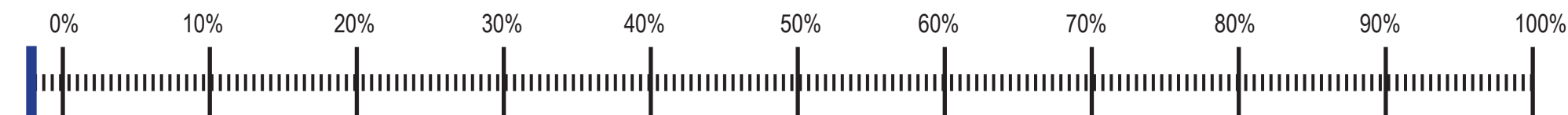
Q. An Extracellular molecule tries to move towards a complementary receptor.



☒ True

☐ False

Confidence Gauge



Submit

Molecular Survey



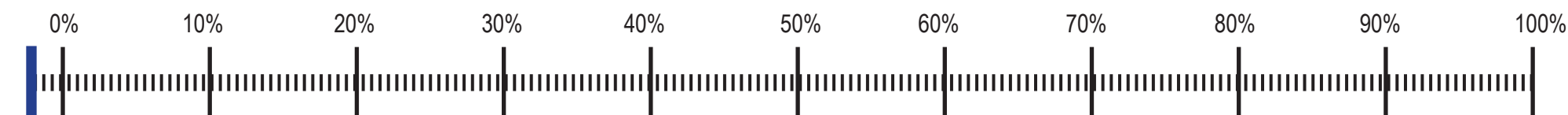
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☐ True

☒ False

Confidence Gauge

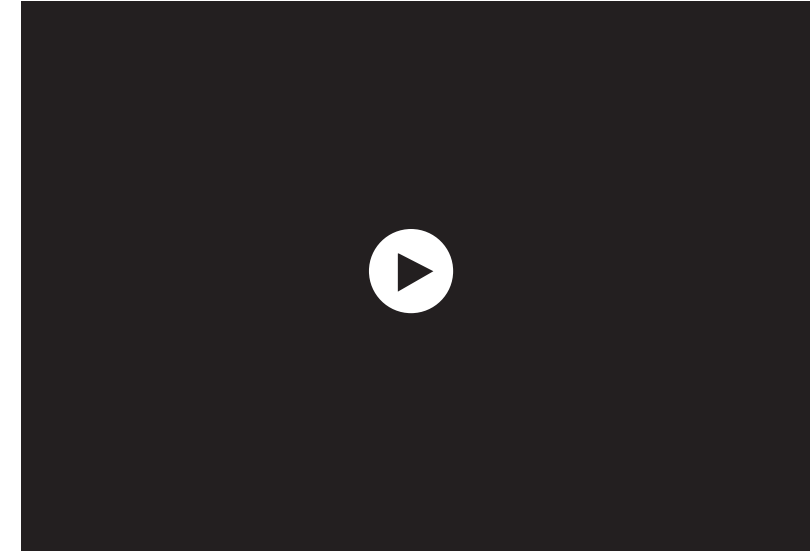


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Molecular Survey

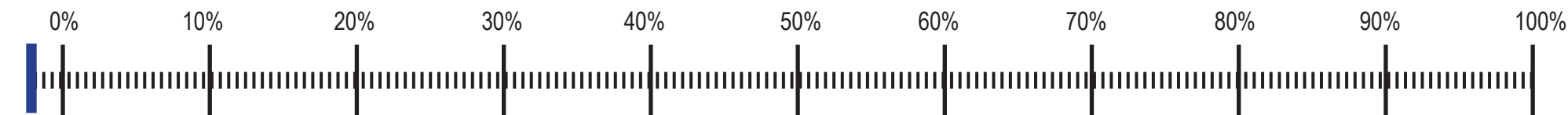


Q.Assuming there are several instances of the complementary receptor present, an extracellular molecule tries to move toward:



- ☐ One specific predetermined instance of the complementary receptor
- ☐ Any of the complementary receptor instances that are present
- ☐ Whichever instance of the complementary receptor is closest

Confidence Gauge

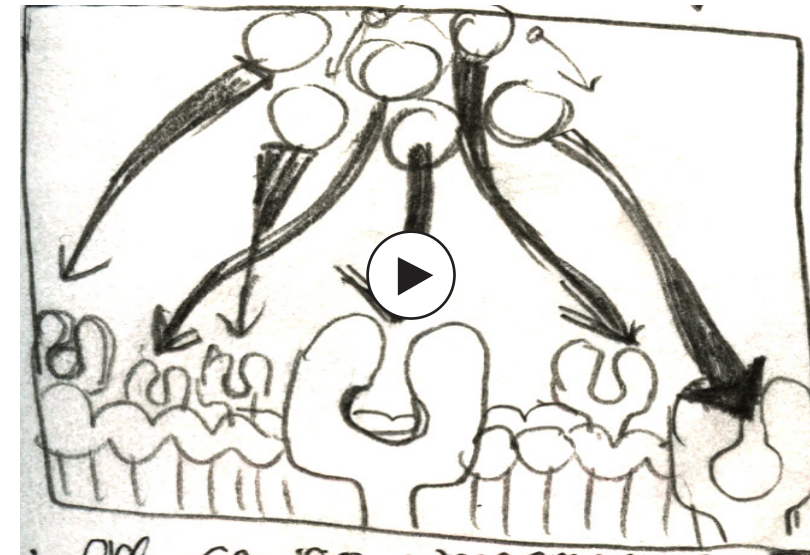


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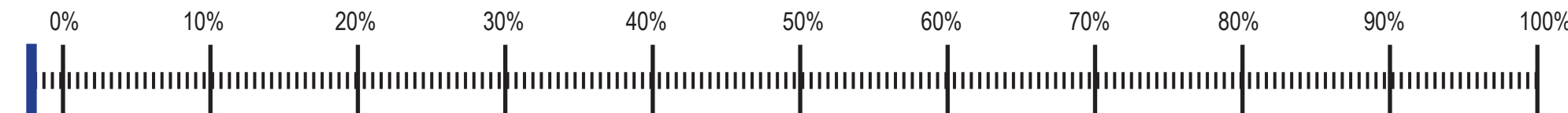


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- ☒ One specific predetermined instance of the complementary receptor
- ☐ Any of the complementary receptor instances that are present
- ☐ Whichever instance of the complementary receptor is closest

Confidence Gauge



Submit

Setup for animation: Complementary receptors will be scattered in all planes. Molecules will be released from one area closest to the front receptor.

Animation will show one molecule going to one receptor with no other encounters. Either a simplistic/stylized version of the molecule and receptor will be used, or a pair of molecule and receptor that look unquestionably complementary to each other.

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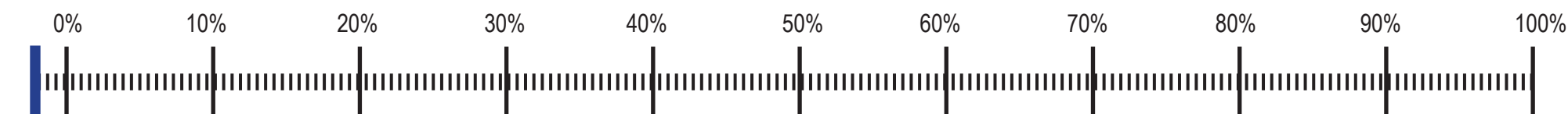


Q.Assuming there are several instances of the complementary receptor present, an extracellular molecule tries to move toward:



- ☐ One specific predetermined instance of the complementary receptor
- ☒ Any of the complementary receptor instances that are present
- ☐ Whichever instance of the complementary receptor is closest

Confidence Gauge



Submit

Animation will show one molecule going to receptors randomly, bouncing off several receptors before reaching to an empty one.

Molecular Survey



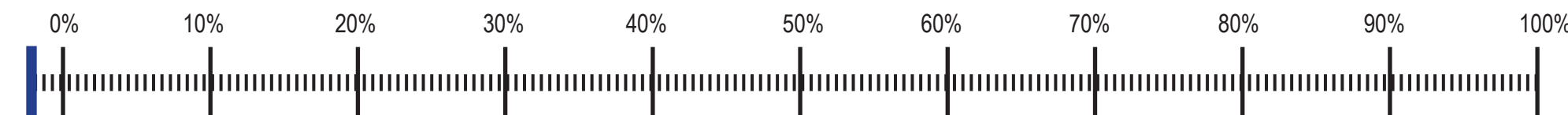
Q.Assuming there are several instances of the complementary receptor present, an extracellular molecule tries to move toward:



Animation will show all molecules going to the nearest receptor before scattering to the next closest receptor, and so forth.

- ☐ One specific predetermined instance of the complementary receptor
- ☐ Any of the complementary receptor instances that are present
- ☒ Whichever instance of the complementary receptor is closest

Confidence Gauge

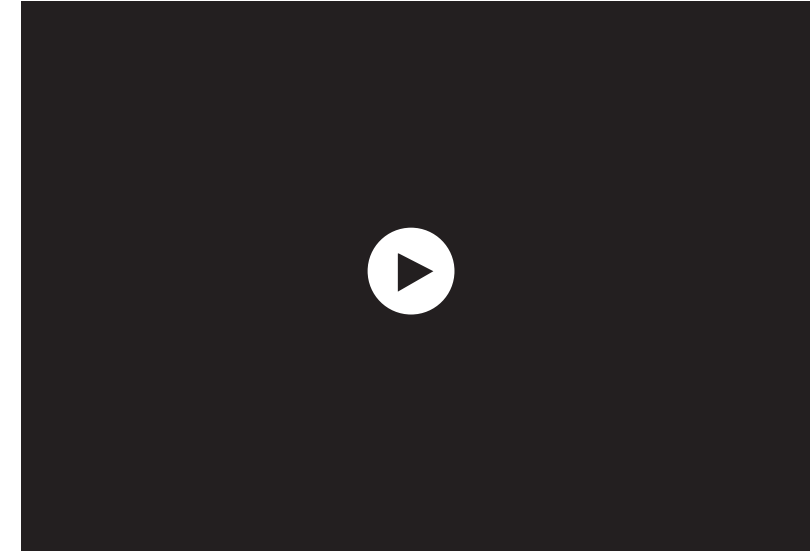


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Molecular Survey



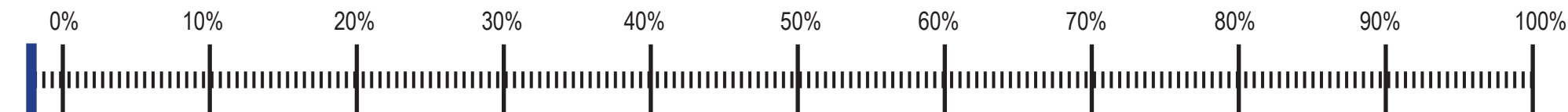
Q. An extracellular molecule knows the physical location of its receptor



☐ True

☐ False

Confidence Gauge



Submit

Molecular Survey



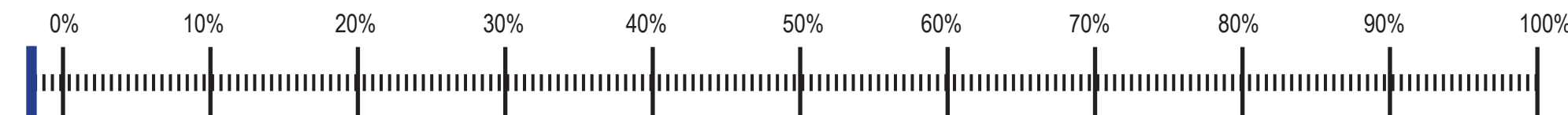
Q. An extracellular molecule knows the physical location of its receptor



☒ True

☐ False

Confidence Gauge



Submit

Molecule will be pulsing in response to complementary receptors before snapping to receptor.

Molecular Survey



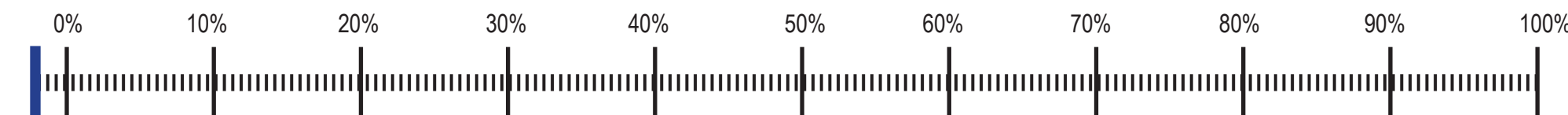
Q. An extracellular molecule knows the physical location of its receptor



☐ True

☒ False

Confidence Gauge



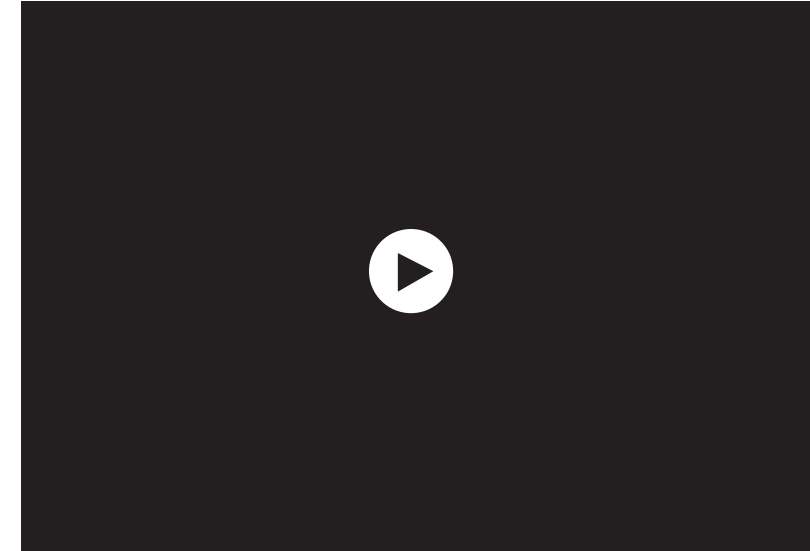
Submit

There will be no communications between molecule and receptor before binding.

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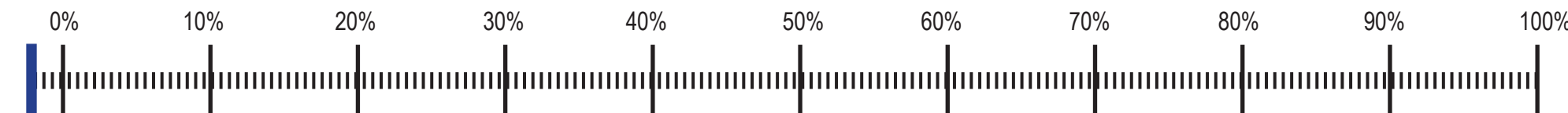


Q. How does an extracellular molecule know the location of its receptor?



- ☐ It can sense the receptor from a distance
- ☐ It has hard-wired knowledge
- ☐ It receives a message from else where
- ☐ It can sense the receptor when it is close to it

Confidence Gauge

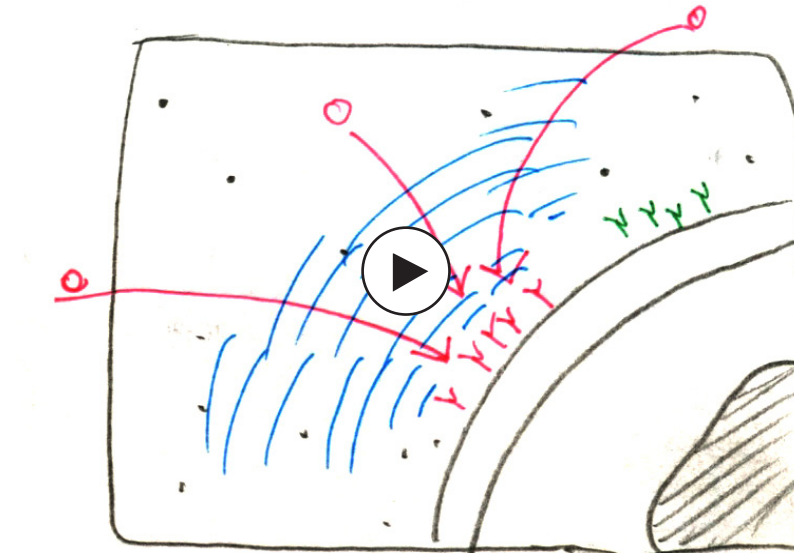


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Molecular Survey

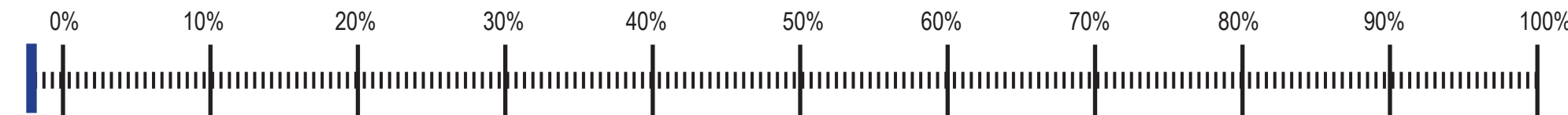


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- ☐ It can sense the receptor when it is close to it

Confidence Gauge



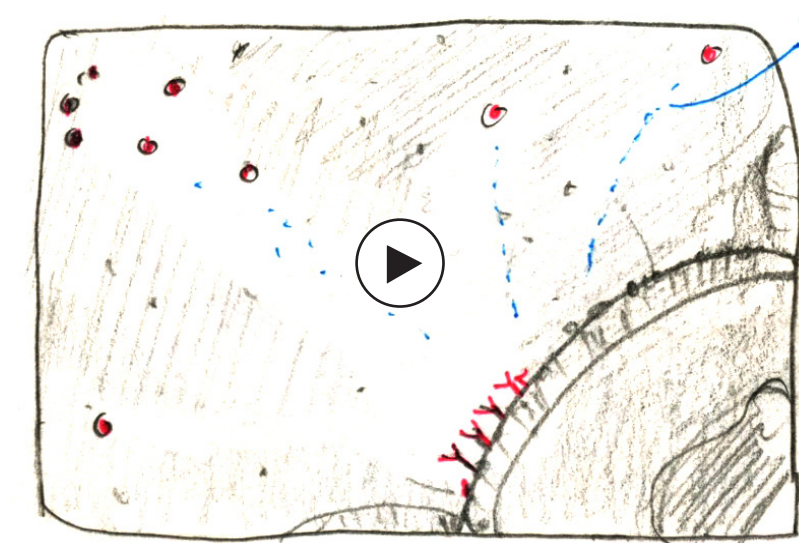
Submit

Receptors will be giving off some “radar” signals for the receptor to hone in on them. Sound effects will be used to enhanced the signaling idea.

Molecular Survey

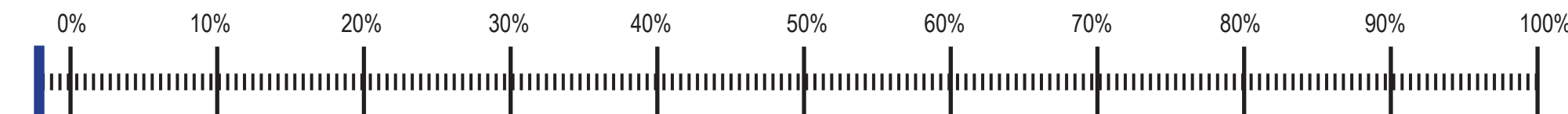


Q. How does an extracellular molecule know the location of its receptor?



- ☐ It can sense the receptor from a distance
- ☒ It has hard-wired knowledge
- ☐ It receives a message from else where
- ☐ It can sense the receptor when it is close to it

Confidence Gauge



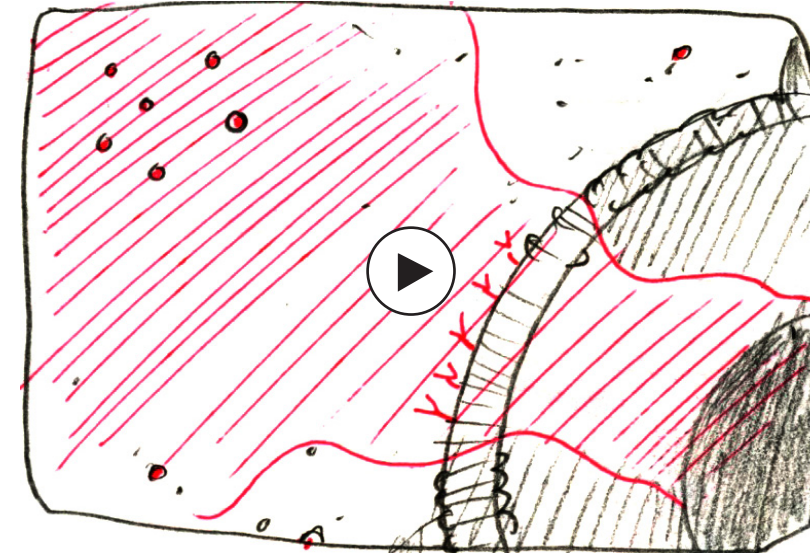
Submit

Receptor will have trail leading to the receptors from afar / off screen

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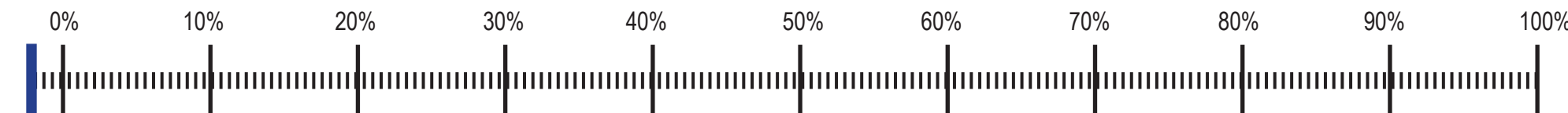


Q. How does an extracellular molecule know the location of its receptor?



- ☐ It can sense the receptor from a distance
- ☐ It has hard-wired knowledge
- ☒ It receives a message from else where
- ☐ It can sense the receptor when it is close to it

Confidence Gauge



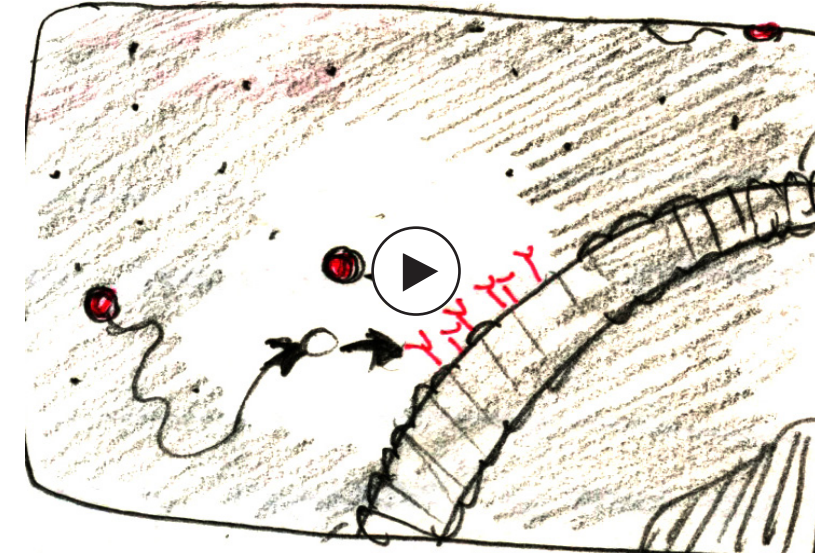
Submit

Something within the cell will be giving off some “radar” signals for the receptor to hone in on them. Sound effects will be used to enhanced the signaling idea.

Molecular Survey



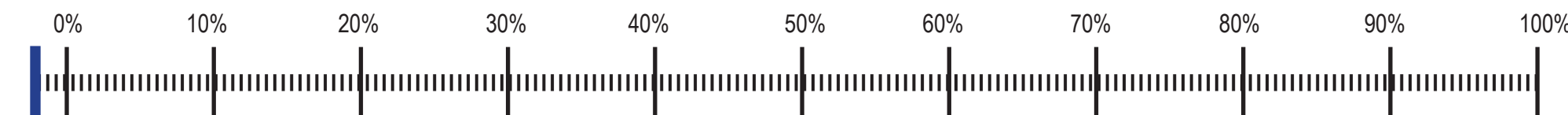
Q. How does an extracellular molecule know the location of its receptor?



Receptors will have a glow around them that only molecules within that glow will hone in and snap onto the receptors. Molecules will be moving in random motion outside of the bubble.

- ☐ It can sense the receptor from a distance
- ☐ It has hard-wired knowledge
- ☐ It receives a message from else where
- ☒ It can sense the receptor when it is close to it

Confidence Gauge

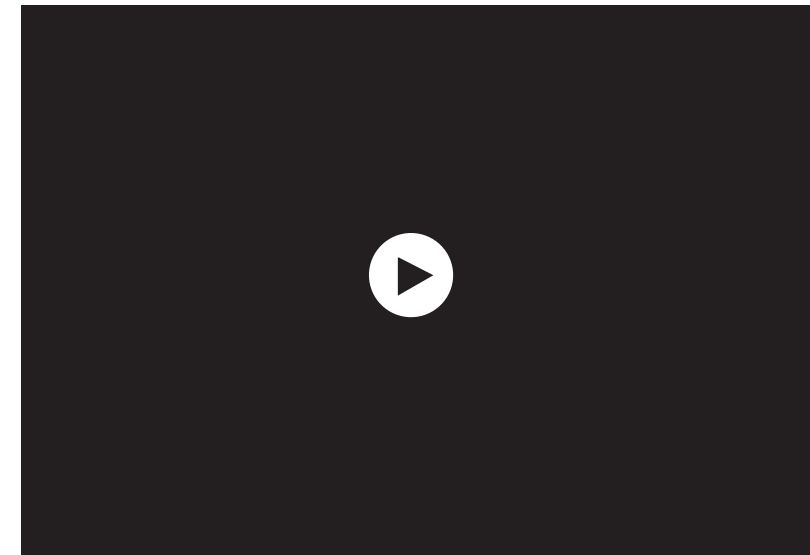


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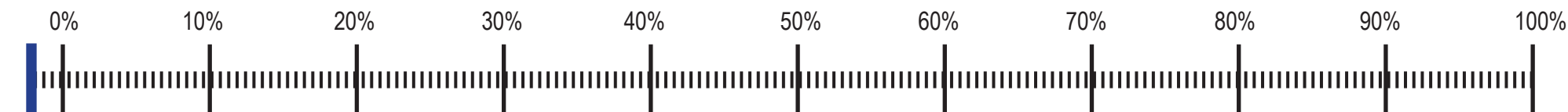


Q. What is the mechanism of an extracellular molecule's movement towards a receptor?



- ☐ The extracellular molecule propels itself
- ☐ The extracellular molecule is released from its source with the correct initial trajectory
- ☐ The extracellular mole uses other helper molecules to be carried closer to the receptor
- ☐ The extracellular molecule collides randomly with other molecules

Confidence Gauge

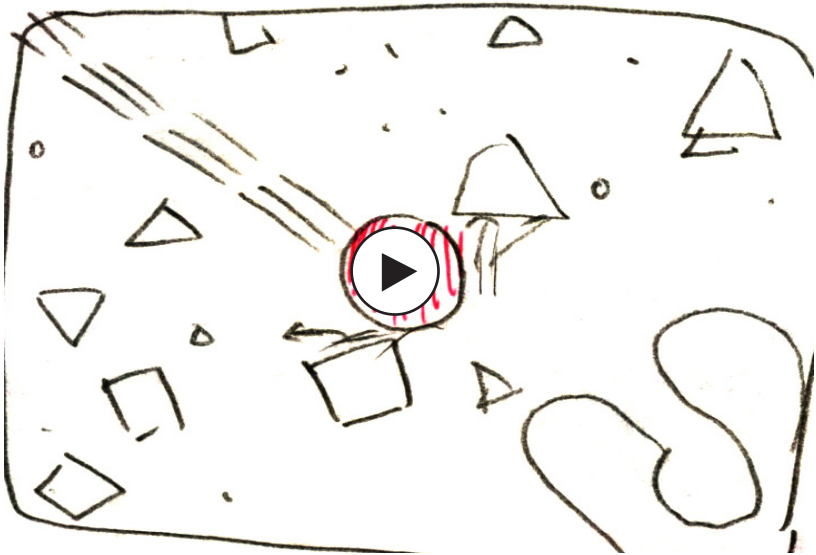


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Molecular Survey

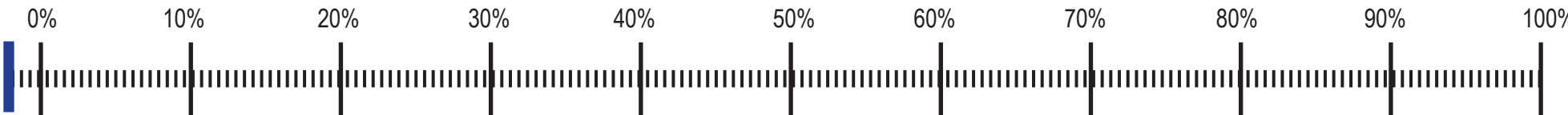


Q. What is the mechanism of an extracellular molecule’s movement towards a receptor?



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- ☐ The extracellular molecule is released from its source with the correct initial trajectory
- ☐ The extracellular mole uses other helper molecules to be carried closer to the receptor
- ☐ The extracellular molecule collides randomly with other molecules

Confidence Gauge



Submit

As the molecule moves towards the receptor, it will push aside other molecules as if it is being propelled towards the receptor. Molecule will be moving in a pulsing manner.

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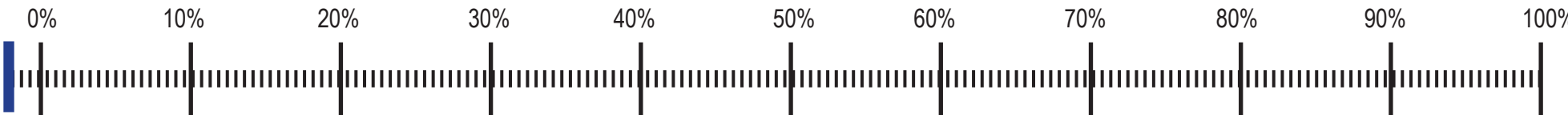
Q. What is the mechanism of an extracellular molecule’s movement towards a receptor?



Molecules will be released from a vesicle from an adjacent cell with a “pop” sound. They will be released towards their receptors, and travel towards them without distractions.

- ☐ The extracellular molecule propels itself
- ☒ The extracellular molecule is released from its source with the correct initial trajectory
- ☐ The extracellular mole uses other helper molecules to be carried closer to the receptor
- ☐ The extracellular molecule collides randomly with other molecules

Confidence Gauge

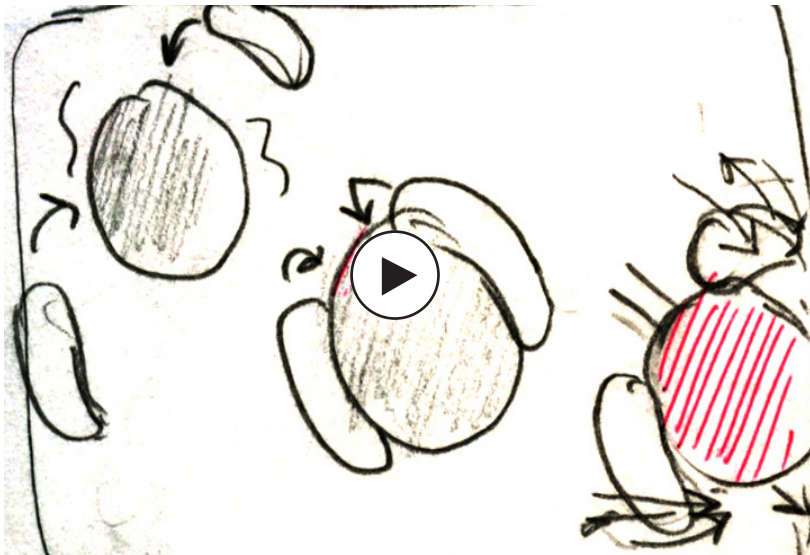


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Molecular Survey

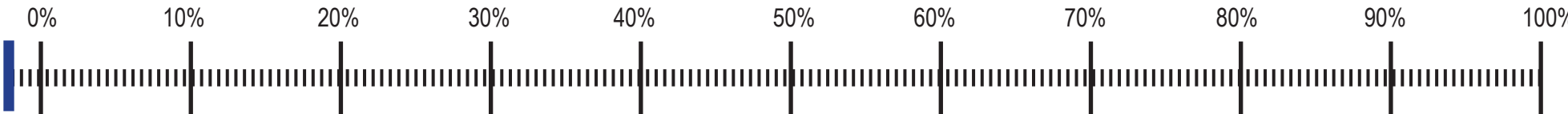


Q. What is the mechanism of an extracellular molecule’s movement towards a receptor?



- ☐ The extracellular molecule propels itself
- ☐ The extracellular molecule is released from its source with the correct initial trajectory
- ☒ The extracellular mole uses other helper molecules to be carried closer to the receptor
- ☐ The extracellular molecule collides randomly with other molecules

Confidence Gauge



Submit

Other small molecules will attach themselves to the complementary receptor molecule. Small molecules will act as the mechanism in propelling the molecule towards the receptor.

Molecular Survey

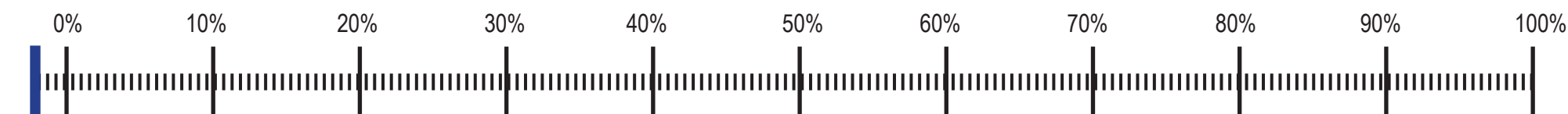


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- ☐ The extracellular molecule propels itself
- ☐ The extracellular molecule is released from its source with the correct initial trajectory
- ☐ The extracellular mole uses other helper molecules to be carried closer to the receptor
- ☒ The extracellular molecule collides randomly with other molecules

Confidence Gauge



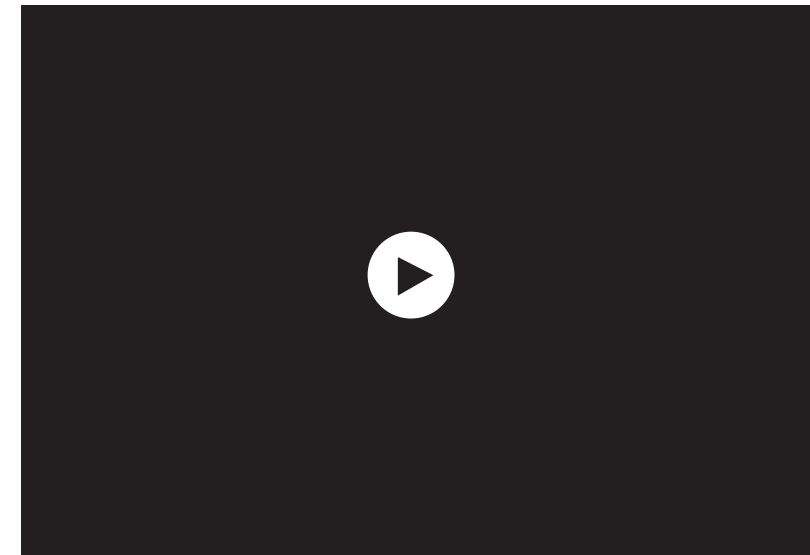
Submit

Molecule will move around its environment, encountering other molecules, bouncing off them until it hits its receptor

Molecular Survey



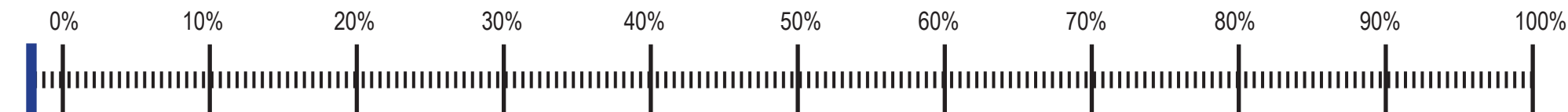
Q. An extracellular molecule can change direction on its own



☐ True

☐ False

Confidence Gauge

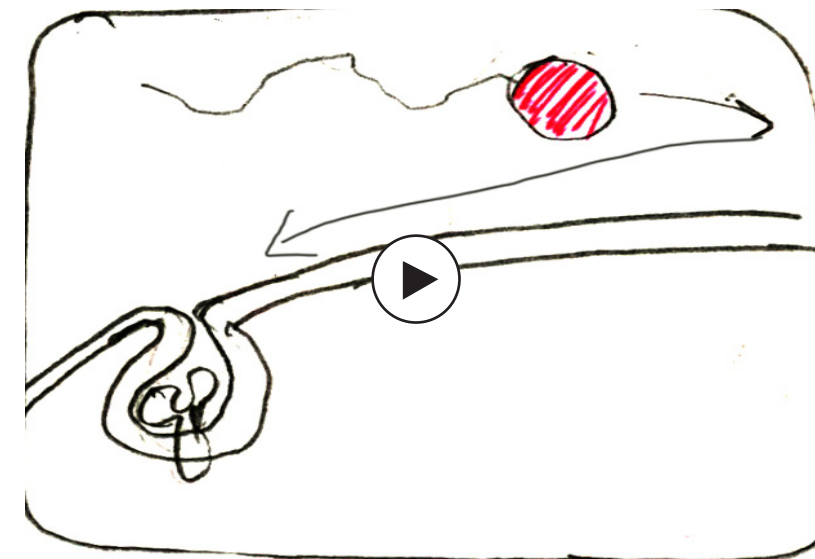


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Molecular Survey



Q. An extracellular molecule can change direction on its own

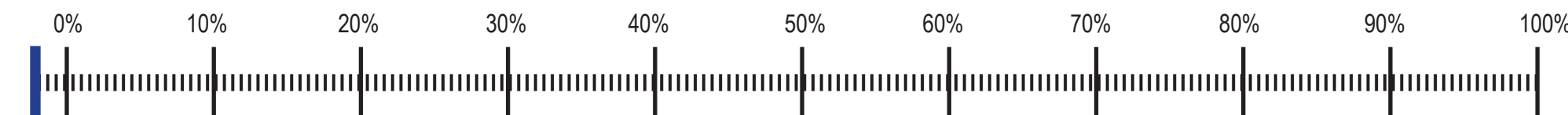


Receptors will be initially within the cell in a vesicle, until it merges to be on the surface. Molecule will move away from the receptor in a random motion until the receptor is exposed, and then it will hone in on the receptor.

☒ True

☐ False

Confidence Gauge

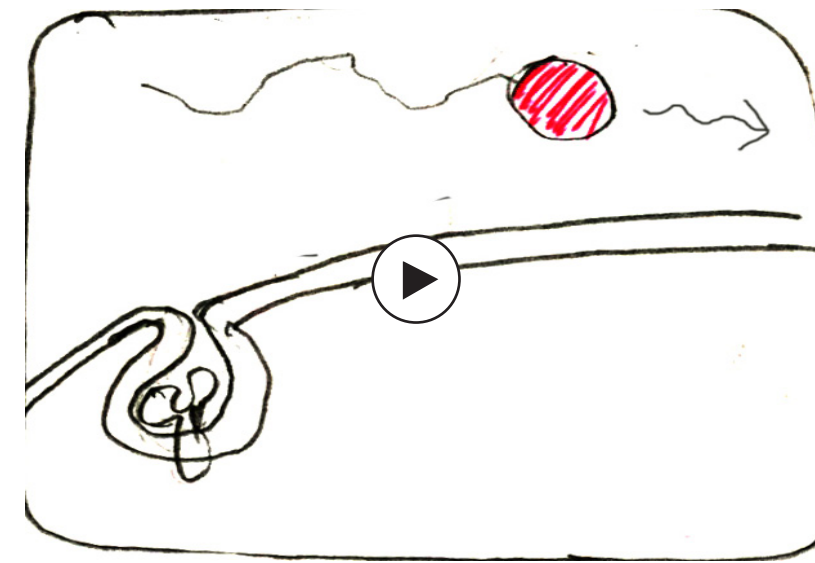


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Molecular Survey



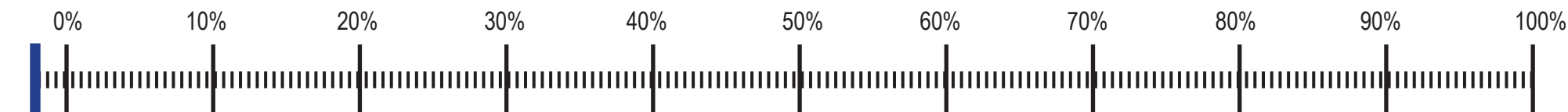
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Confidence Gauge



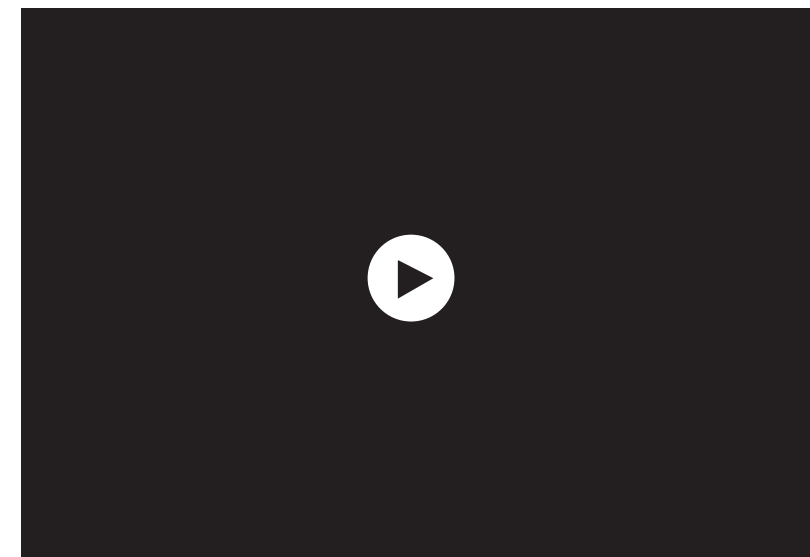
Submit

Receptors will be initially within the cell in a vesicle, until it merges to be on the surface. Molecule will move away from the receptor in a random motion and will continue to do so even as the receptor is exposed.

Molecular Survey

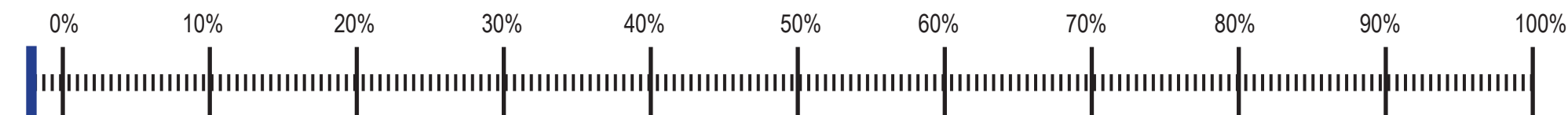


Q. What determines the chance of a binding event occurring between one of these molecules and a complementary receptor?



- ☐ If the cell depends upon the binding event, it will happen regardless of other factors
- ☐ Factors such as concentration and temperature determine the chance of binding

Confidence Gauge



Submit

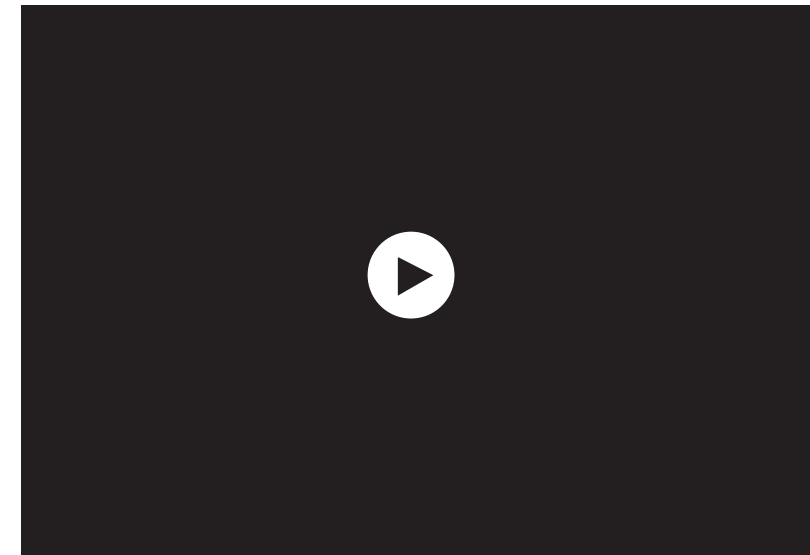
This question might need to be rephrased or reworded so that the animations created for its choices will be less vague. As of right now, it is difficult to create something to accurately represent either choices without introducing bias.

For this wireframe, click on Submit to get to the next question.

Molecular Survey



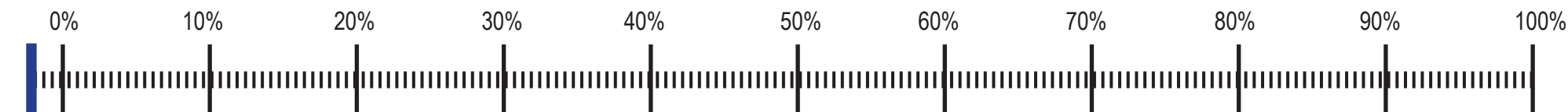
Q. A large molecule has a more direct path of motion, whereas a small molecule has a more random path



☐ True

☐ False

Confidence Gauge

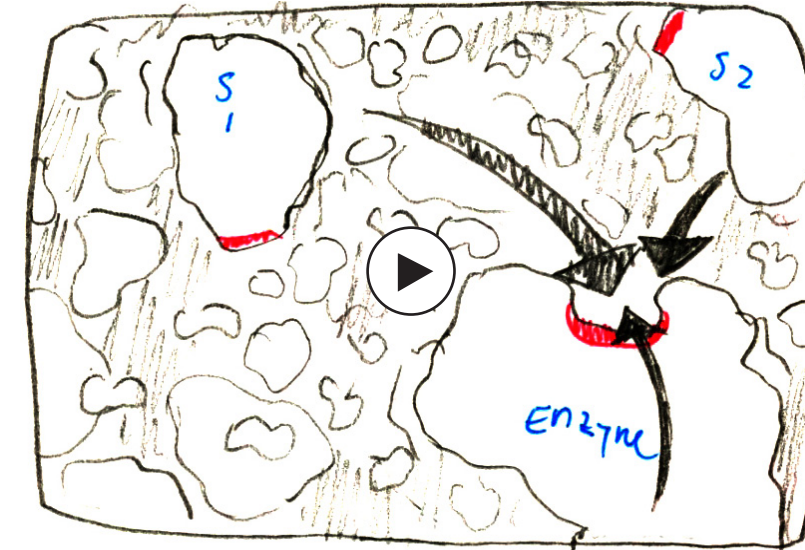


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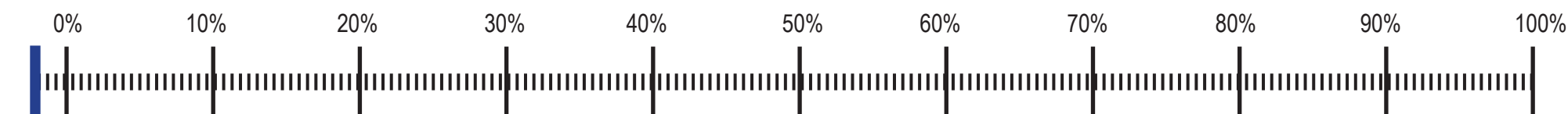
Q. A large molecule has a more direct path of motion, whereas a small molecule has a more random path



☒ True

☐ False

Confidence Gauge



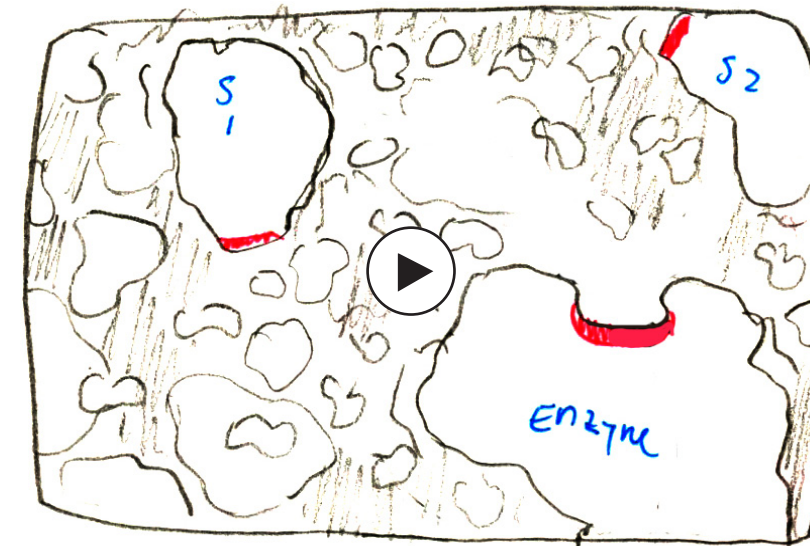
Submit

Macromolecules will move towards each other to create the complementary complexes. Small molecules in the environment move in a random motion.

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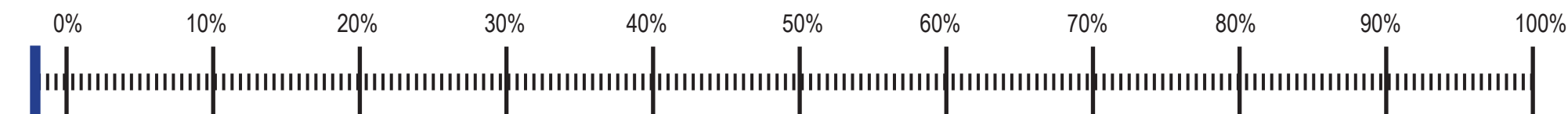
Q. A large molecule has a more direct path of motion, whereas a small molecule has a more random path



☐ True

☒ False

Confidence Gauge



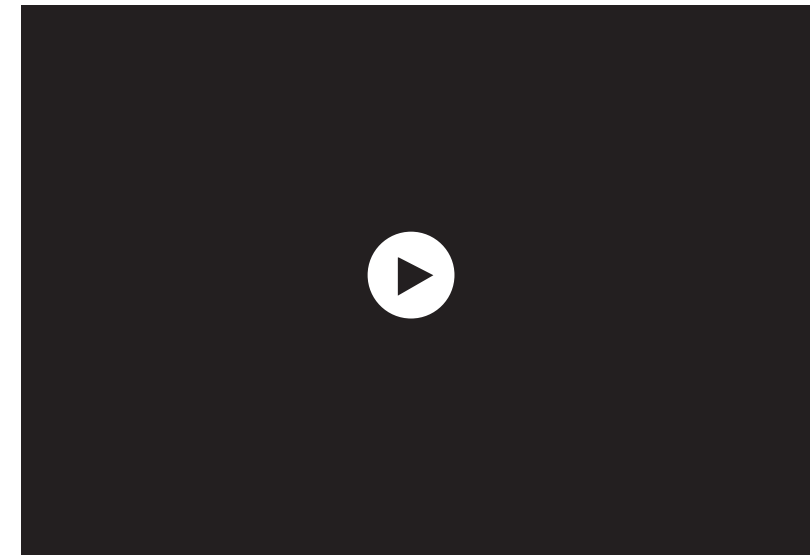
Submit

Both macromolecule and small molecules in the environment move in a random motion.

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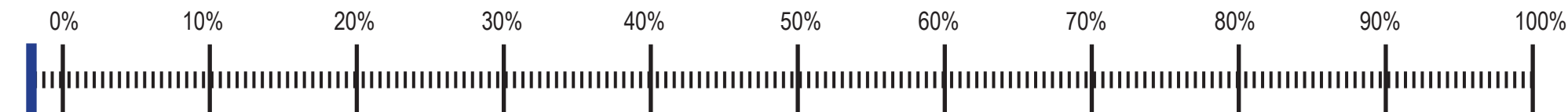
Q. A molecule's path of motion is more direct when it has been activated, whereas its path is more random when it is inactive



☐ True

☐ False

Confidence Gauge

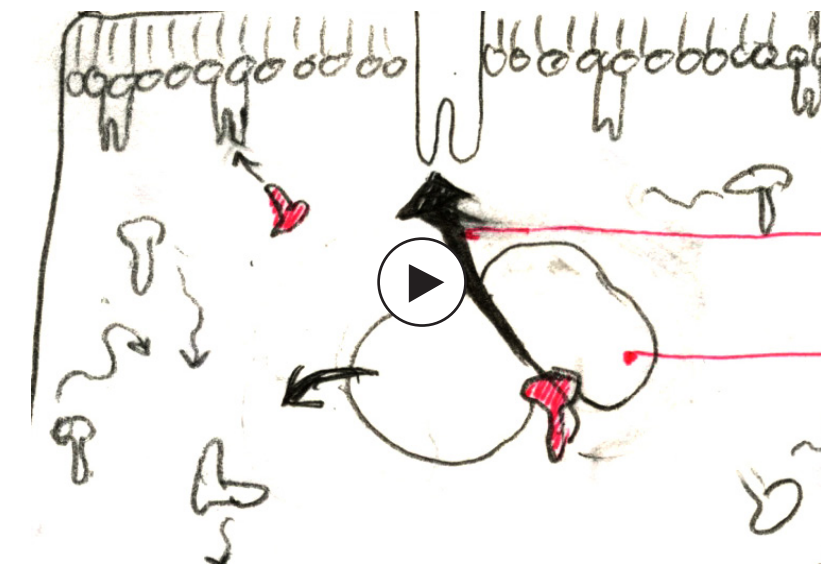


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Molecular Survey



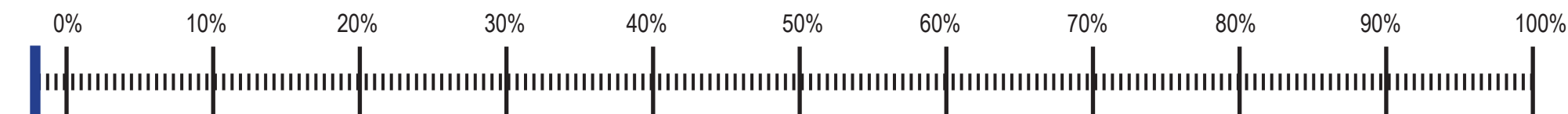
Q. A molecule's path of motion is more direct when it has been activated, whereas its path is more random when it is inactive



☒ True

☐ False

Confidence Gauge



Submit

These animations will reflect within the cell. Molecules will travel in a random motion until it is activated by an enzyme, and then it will hone in onto the receptor.

Molecular Survey



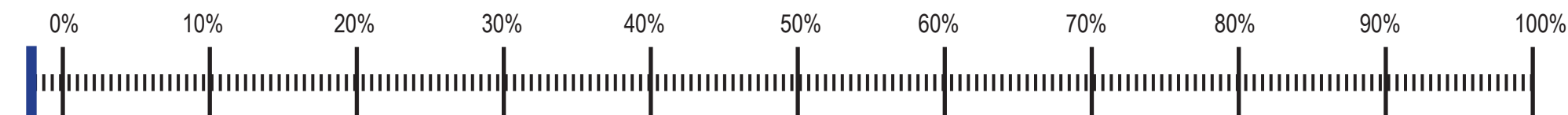
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☐ True

☒ False

Confidence Gauge



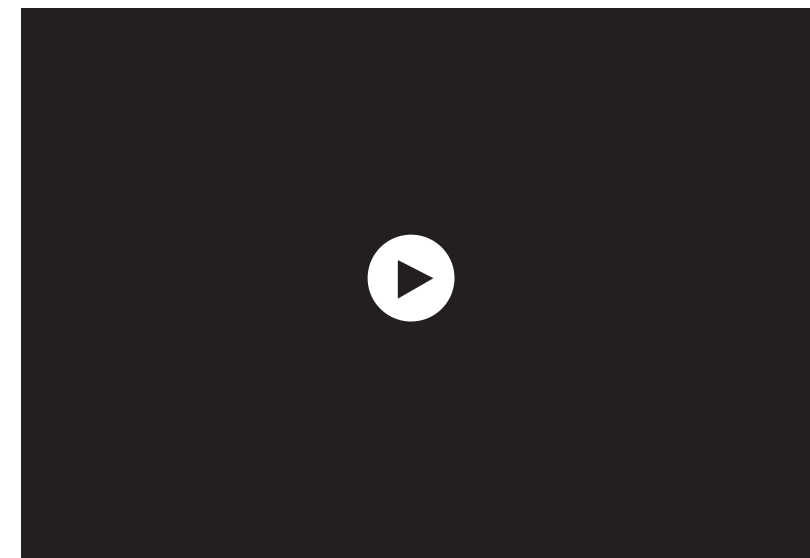
Submit

These animations will reflect within the cell. Molecules will travel in a random motion until it is activated by an enzyme, and then it will continue to move a random motion before it binds to the receptor

Molecular Survey



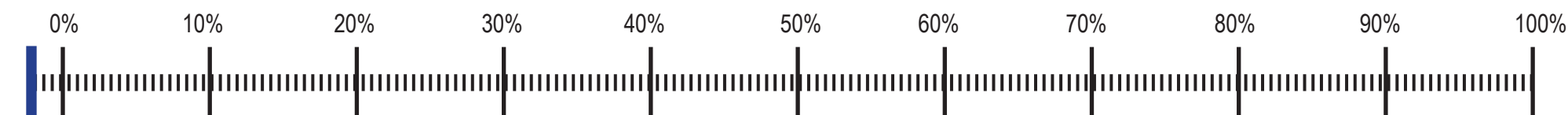
Q. Inside a cell, large molecules are densely crowded so much so that the average distance between two macromolecules is typically less than the width of a single macromolecule



☐ True

☐ False

Confidence Gauge

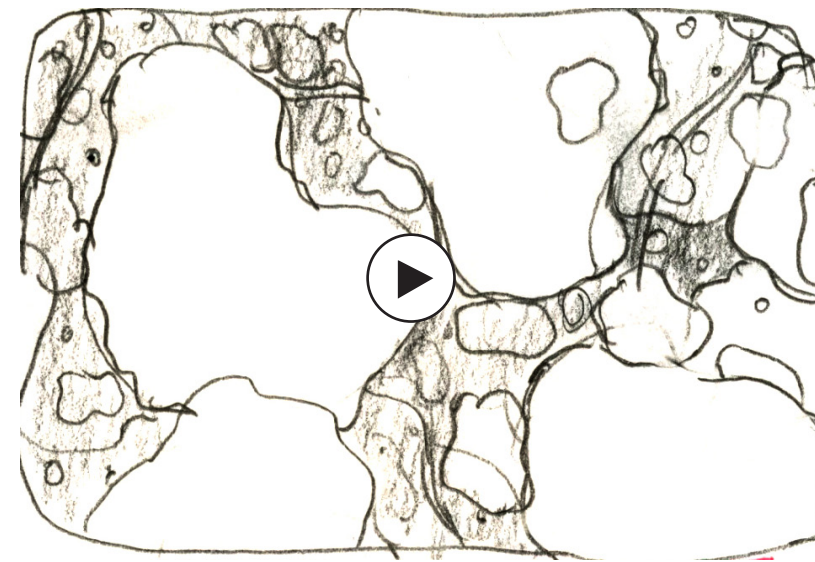


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Molecular Survey



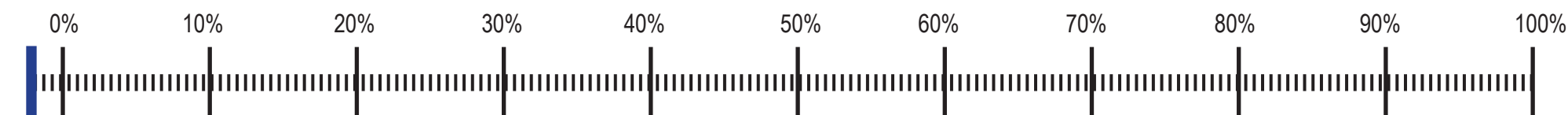
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☒ True

☐ False

Confidence Gauge



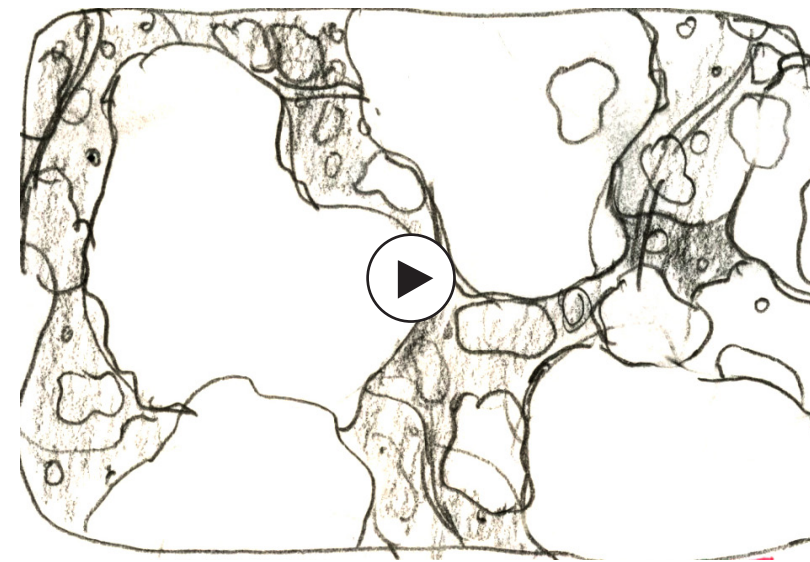
Submit

This question might conflict with question H, because in-cell molecular environment will be already depicted. We might need to either move the question elsewhere, or reword it.

Molecular Survey



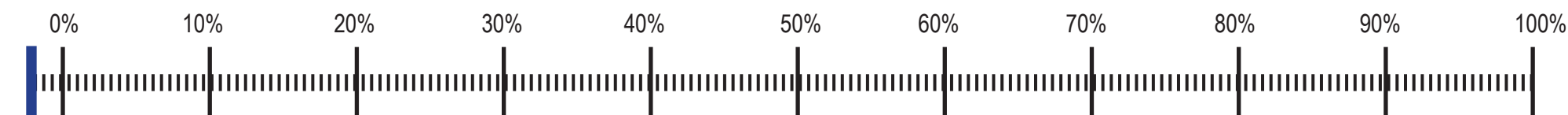
Q. Inside a cell, large molecules are densely crowded so much so that the average distance between two macromolecules is typically less than the width of a single macromolecule



☐ True

☒ False

Confidence Gauge



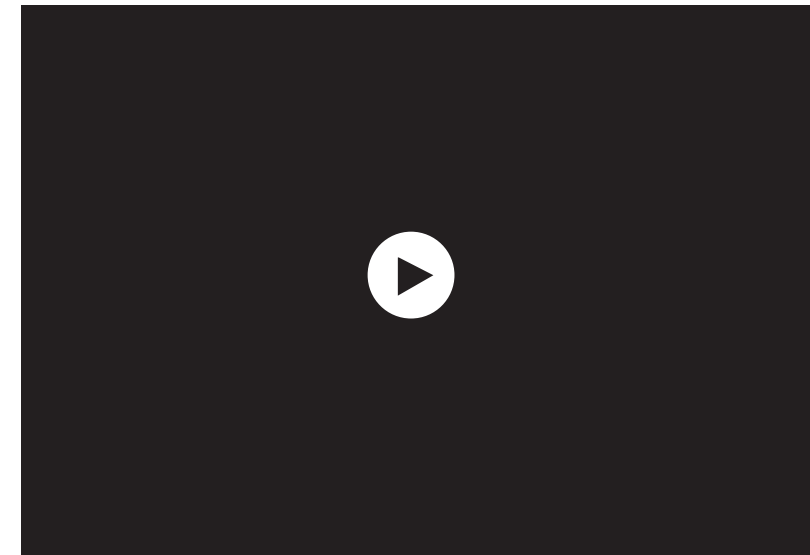
Submit

In this animation, the marcomolecules will be spaced out more.

Molecular Survey



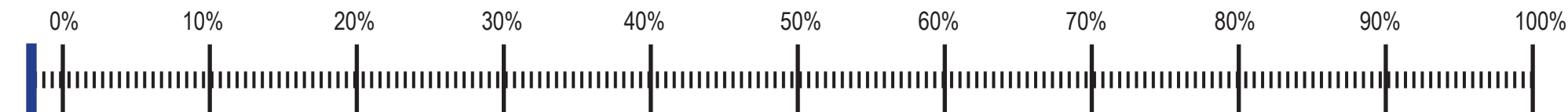
Q. Inside a cell, empty space is not a factor in the overall direction of diffusion of water and other molecules



☐ True

☐ False

Confidence Gauge

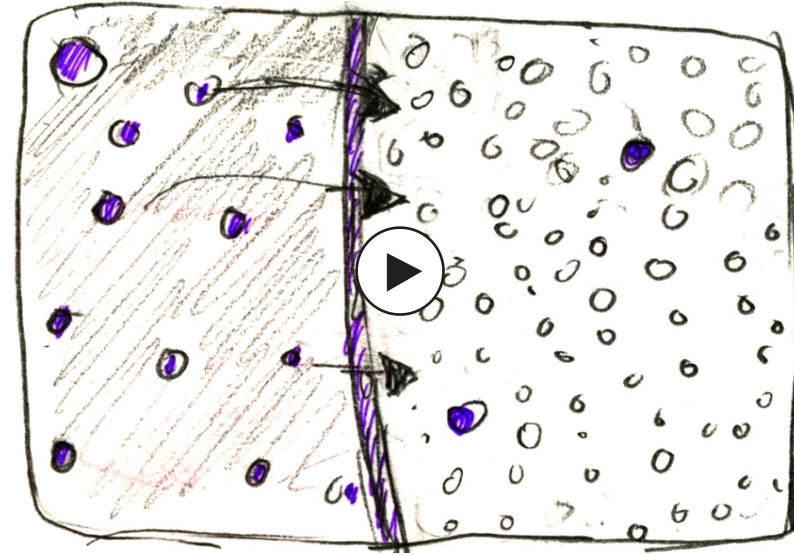


Submit

Molecular Survey



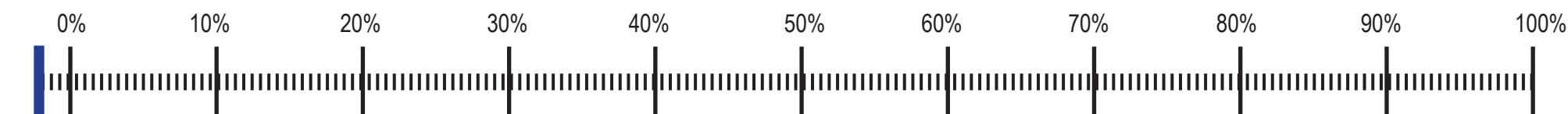
Q. Inside a cell, empty space is not a factor in the overall direction of diffusion of water and other molecules



☒ True

☐ False

Confidence Gauge



Submit

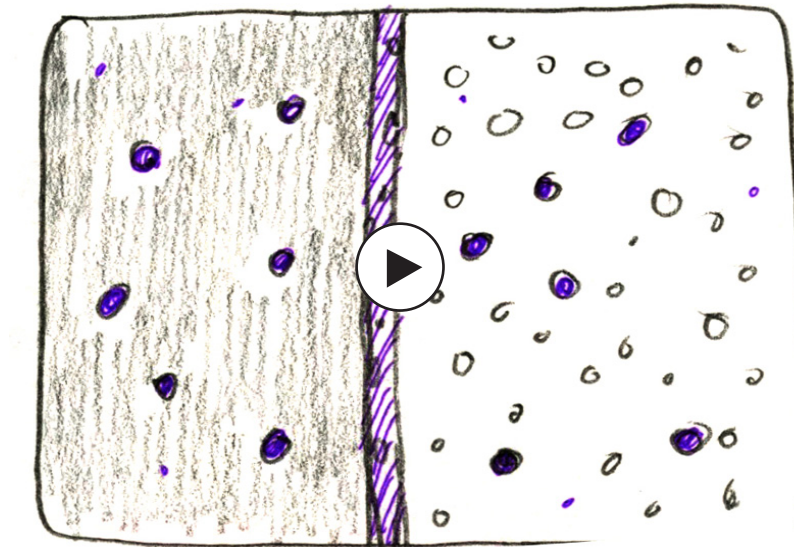
Molecules from “air” will move into the solution through a selective permeable membrane.

This question might seem really obvious with an animation to show what it would look like if it were to be true.

Molecular Survey



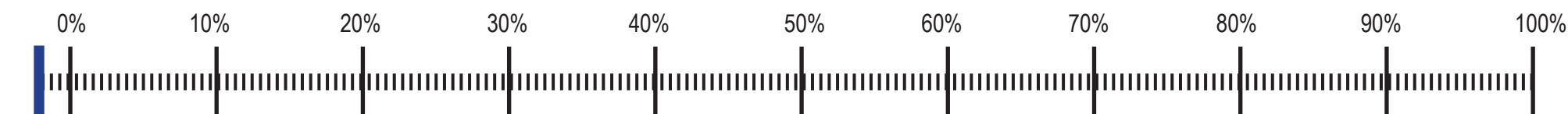
Q. Inside a cell, empty space is not a factor in the overall direction of diffusion of water and other molecules



☐ True

☒ False

Confidence Gauge

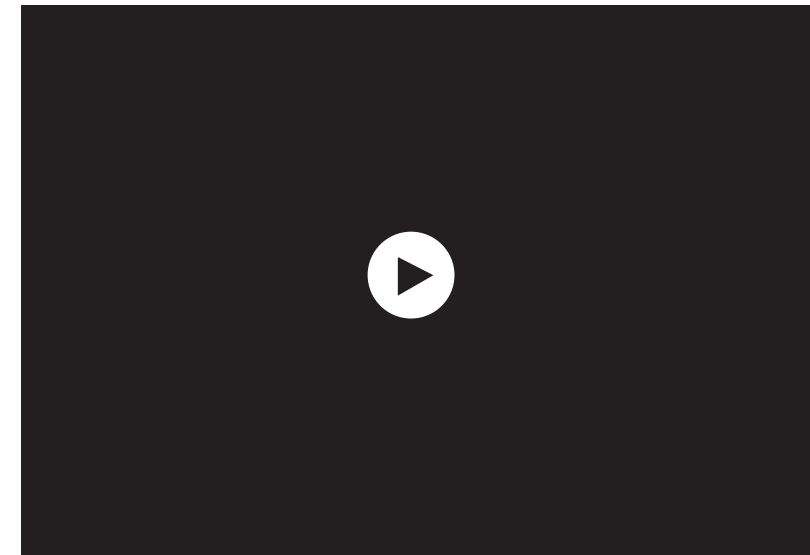


Submit

Molecular Survey



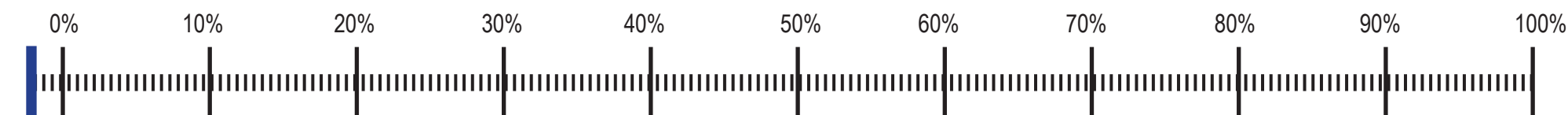
Q.In the case of simple diffusion across a permeable membrane, once solute molecules reach an equilibrium, they cease to cross the membrane



☐ True

☐ False

Confidence Gauge

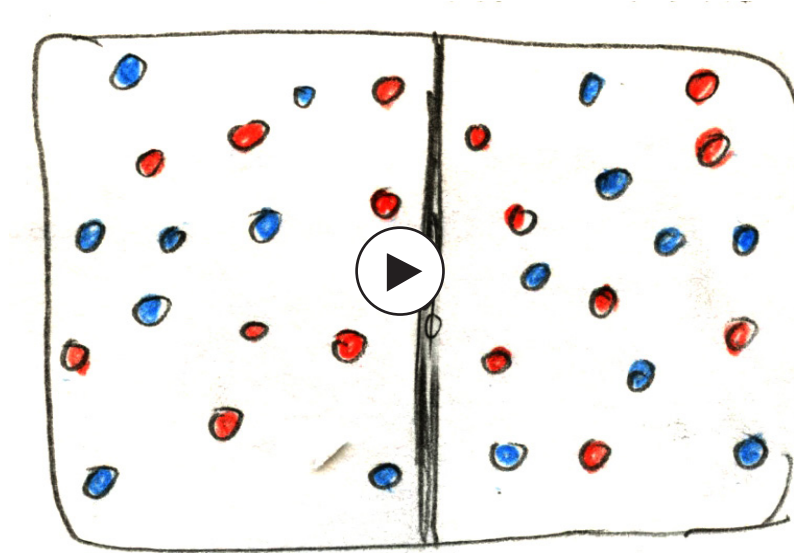


Submit

Molecular Survey



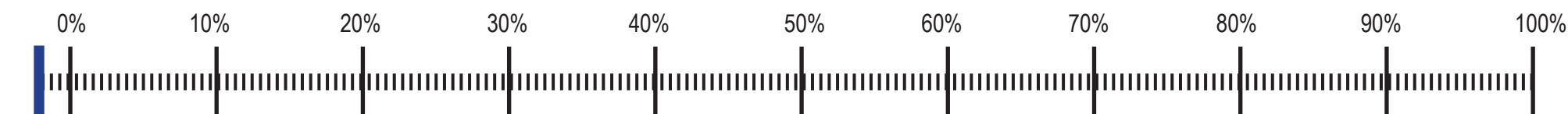
Q. In the case of simple diffusion across a permeable membrane, once solute molecules reach an equilibrium, they cease to cross the membrane



☒ True

☐ False

Confidence Gauge



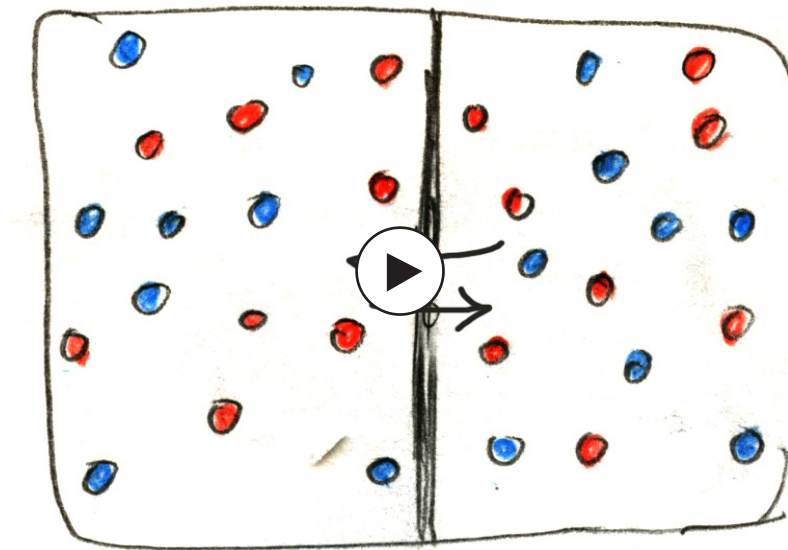
Submit

At equilibrium, the molecules do not move across the membrane

Molecular Survey



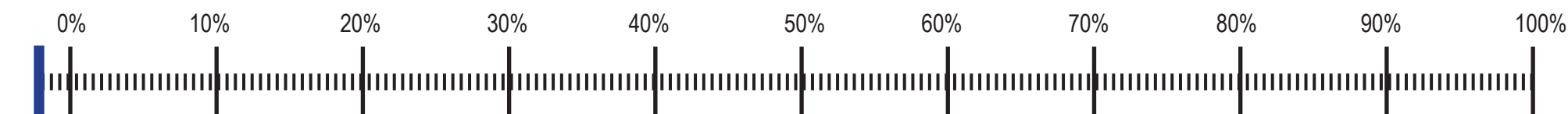
Q.In the case of simple diffusion across a permeable membrane, once solute molecules reach an equilibrium, they cease to cross the membrane



☐ True

☒ False

Confidence Gauge



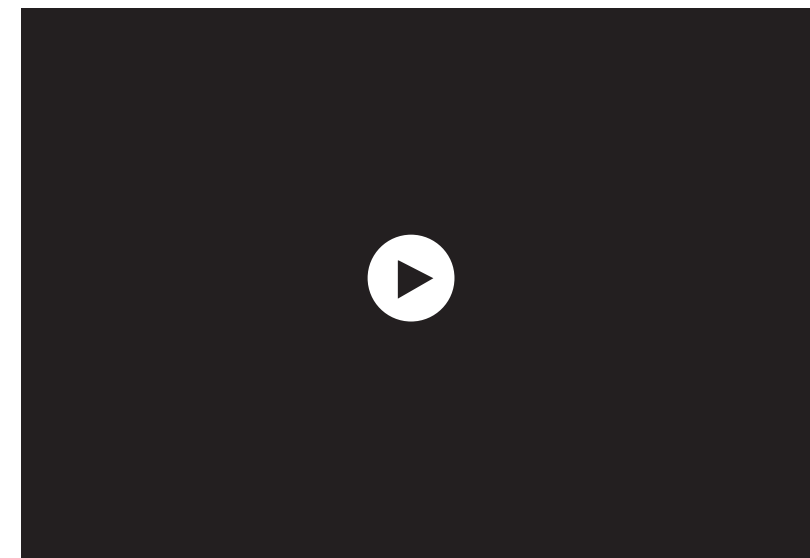
Submit

At equilibrium, the molecules continues to move across the membrane

Molecular Survey



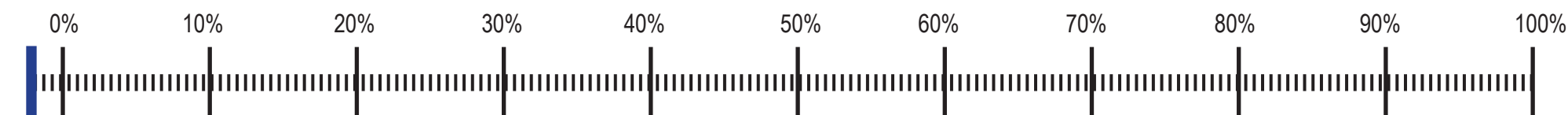
Q. A drop of dye is placed in some water The water, acting as a solvent, diffuses into the dye in the same way as the dye, acting as a solute, diffuses into the water



☐ True

☐ False

Confidence Gauge



Submit

Molecular Survey



Q. A drop of dye is placed in some water The water, acting as a solvent, diffuses into the dye in the same way as the dye, acting as a solute, diffuses into the water

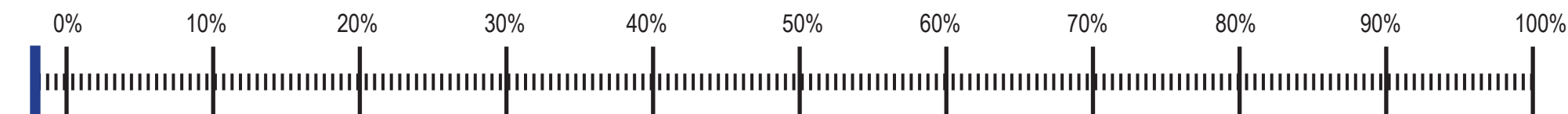


As the green dye is dropped into the solution, both the water molecules and green molecules move.

☒ True

☐ False

Confidence Gauge

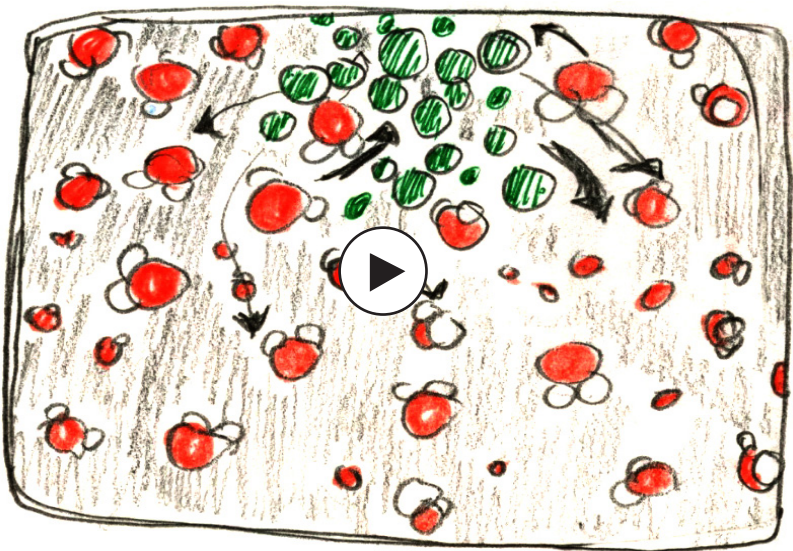


Submit

Molecular Survey



Q. A drop of dye is placed in some water The water, acting as a solvent, diffuses into the dye in the same wat as the dye, acting as a solute, diffuses into the water

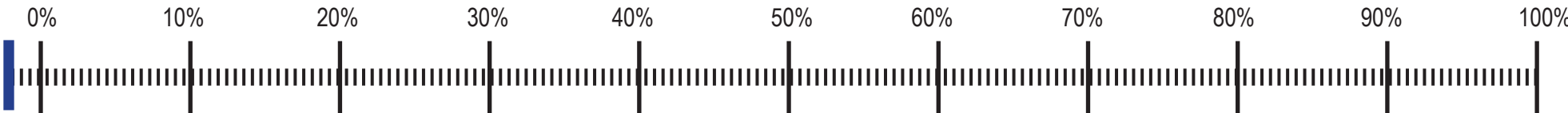


As the green dye is dropped into the solution, the green molecules move through the water molecules to fill the gaps.

☐ True

☒ False

Confidence Gauge



Submit

Molecular Survey



Thank you!

This is the end of the survey. You may close this browser if you wish to do so; however, you are highly encouraged to review through your answers.

Exit

Review

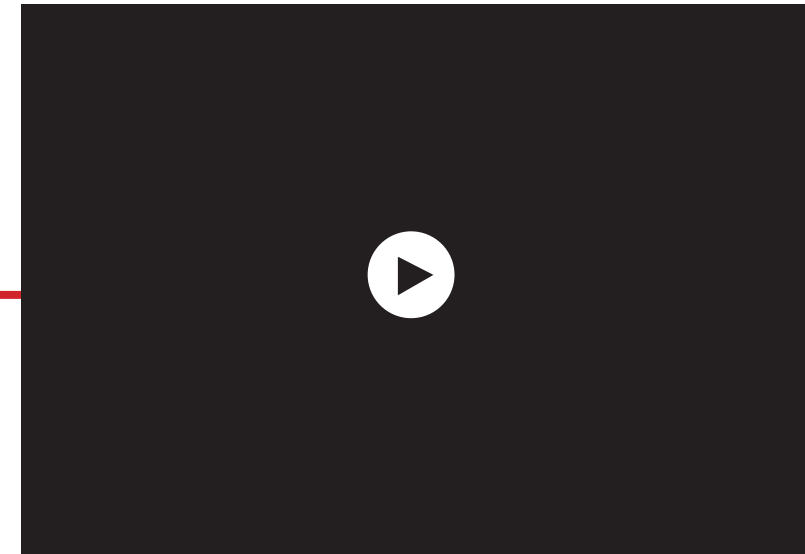
At this page, the student can hit “exit” to close the browser or “review” to see what questions they got wrong.

DO NOT USE THE BACK BUTTON

Molecular Survey

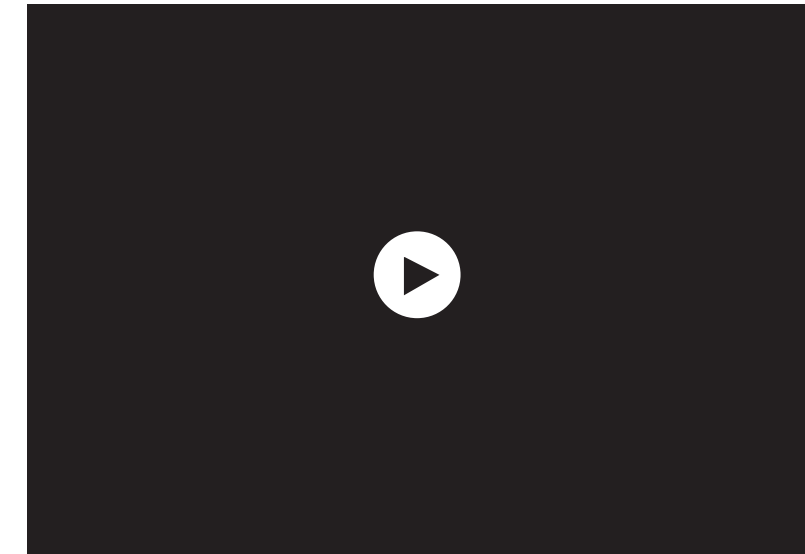


Q. A drop of dye is placed in some water. The water, acting as a solvent, diffuses into the dye in the same way as the dye, acting as a solute, diffuses into the water.



Correct Answer

Reasoning to correct answer



Your answer

DO NOT USE THE BACK BUTTON

This portion of the assessment will be optional. Incorrect answers will be noted with a red dot. The student may review though all his or her answers, but only the ones with a red dot will have a contrasting animation.

This portion might be a tricky because depending on which route the student is on, some of the questions will have no correct answer. For those questions, a text-only explanation might be used instead.